

From Colchis to the Amazon: A Synthesis of Kolkhian and Amazonian Eco-Engineering for National Parks in Western Georgia

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Abstract This work provides a comparative analysis of the architecture of the traditional "Oda" housing in the wetlands of Western Georgia with modern eco-tourist infrastructure in the Amazon basin. The study examines Colchian forests and swamps, which are UNESCO World Heritage sites and face the challenge of balancing conservation with tourist development. The aim of the study is to determine the possibility of integrating local vernacular architectural principles into modern eco-tourist planning. Special attention is paid to the constructive and climatic adaptation of the Kolkhian "Oda": passive ventilation, stilt foundations, and the use of local materials, and its parallels with Amazonian eco-lodge practices. Comparative analysis reveals that despite geographic and cultural differences, both regions have developed similar architectural responses to extreme humidity and hydrological challenges. The study concludes that the architectural logic of the Kolkhian "Oda" can be used as a basis for sustainable and ecologically compatible infrastructure in the protected areas of Western Georgia.

Key words: Colchic Rainforests, Amazonia, Vernacular Architecture, Oda House, Sustainable Tourism, Vernacular architecture; Ecotourism; Sustainable design; Passive ventilation.

Introduction

Despite the fact that the tropical ecosystems of the Amazon basin and the eastern coast of the Black Sea — the Colchis lowland — are separated by thousands of kilometers and radically different cultural contexts, they share an identical ecological challenge: a close, often aggressive symbiosis between the hydrosphere

and the biosphere. Conditions of excess rainfall, extreme humidity, and swampy soil have produced surprisingly similar, independent architectural responses on two different continents: Amazonian dwellings and the Kolkhian Oda.

Since the Colchian forests and wetlands received UNESCO World Heritage status in 2021, there has been an urgent need to form an infrastructural model that does not disturb the integrity of this fragile landscape. This paper aims to provide a comparative analysis of the engineering logic of these two vernacular systems and justify why the 'Oda' type construction represents the most sustainable and efficient architectural solution for the management of 2026 eco-tourist protected areas.

Methodology: The research methodology is based on photo-visual and comparative analysis, which examines aspects of construction, material, spatial organization, and climatic adaptation.

Main Part

Projects implemented in the Amazon in recent years precisely address the challenges we have in the Colchis lowland. In the Amazon, as in Colchis, the main challenges are extreme humidity, floods, and the preservation of biodiversity. The eco-lodges there are no longer just "huts"; they are examples of high-tech, sustainable architecture that aim for minimal damage to the ecosystem and the integration of the user into the natural environment.

Let us consider a few of them:

- **Mashpi Lodge (Ecuador)** – (Fig. 1; Fig. 2) "Invisible" architecture; this is an excellent example of eco-tourism. The building is so integrated into the tropical forest that it was not necessary to cut down any trees. The "Mashpi Lodge" was built using the latest sustainable construction techniques to avoid damaging the surrounding forest. A large part of the structure is pre-fabricated in Quito and designed according to the topography of the area to reduce the load on the local environment. Panoramic glass facades create a visual connection with the environment and ensure the optimization of natural lighting and ventilation. The design and style of the



Fig. 1



Fig. 2

building ensure full coverage through floor-to-ceiling panoramic glass windows. It is decorated with a stunningly modern design and decor, which combines warm earth tones, steel, stone, and glass. "Mashpi Lodge" offers high comfort for nature in the middle of the forest.

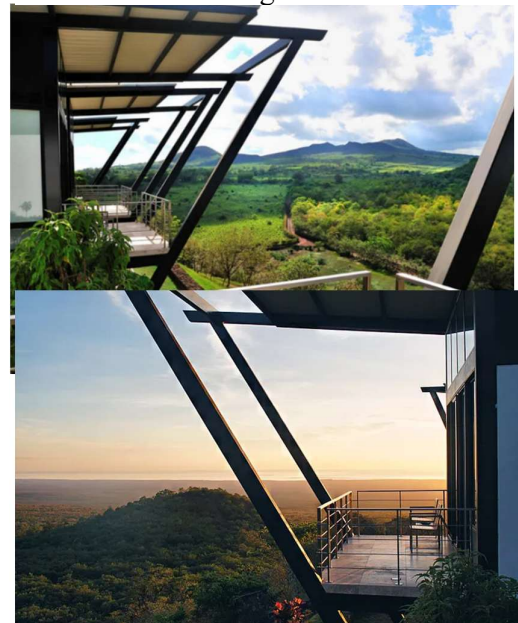
It is interesting that modern projects in the Amazon region increasingly resemble principles that were introduced in the traditional architecture of Western Georgia centuries ago.

- **Pikaia Lodge (Galapagos / Amazon)** – (Fig. 3; Fig. 4) Regenerative design focused on the reuse of materials and energy efficiency. The building was designed by Ecuadorian

Fig. 4

architect Humberto Coral Plaza. It is located on the Galapagos Islands, and its creation involved the participation of the Galapagos National Park Service and Ecuadorian environmental authorities. It represents a land-based tourism model focused on preserving the natural environment and creating new jobs for the residents of Santa Cruz Island. Pikaia Lodge blends harmoniously into the landscape, does not

Fig. 3



dominate it, and is unique in its architecture. The structure is focused on the secondary use of building materials and energy efficiency. It is built from hand-worked lava stone, sustainable teak wood sourced from the mainland, and bamboo. The building's frame is formed by prefabricated steel columns and girders. The synthesis of natural stone and wood creates a so-called "breathable" shell. (Or the building is constructed from a

combination of lava stone, wood, and bamboo, while the structural system is based on a steel frame. This combination of materials creates a so-called "breathable" shell, which helps with humidity regulation and the stabilization of the internal microclimate.)

Before modern eco-lodges offered the synthesis of glass and metal like Mashpi, the indigenous population of the Amazon responded to tropical challenges through 'Maloca' and 'Palafitos'. Amazonian Palafitos and the Kolkhian Oda are evolutionary parallels: both systems refuse to "subjugate" the land and choose to exist above it, on columns, which remains the most effective engineering logic in the context of 2026 sustainable development.



Fig.5



Fig.6

Regarding the territories of Colchis and its climatic specifics: The ecosystem of the Kolkheti National Park is characterized by an

extreme hydro-thermal regime, where the amount of precipitation during the year often exceeds 2000 mm, and the relative humidity of the air constantly fluctuates within 80-90%. In such conditions, 'solid' materials characteristic of industrial construction, namely concrete and steel, enter into a fundamental conflict with the environment. The high thermal inertia of concrete causes constant condensation on the inner surfaces of the building, which creates a "greenhouse effect" and promotes biological degradation — the rapid spread of mold and fungal cultures. It is this material and structural mismatch that creates the need to revise modern construction practice and reintegrate the principles of vernacular, 'airy' architecture.



Fig. 7



Fig.8



Fig.9

Analysis

It is noteworthy that modern projects in the Amazon region increasingly resemble the principles that were introduced in the traditional architecture of Western Georgia centuries ago.

Visual and comparative analysis:

1. **Visual feature:** Light metal frame and huge glass stained-glass windows.
2. **Parallel with Colchis:** Although Mashpi Lodge is not a classic "Palafito" (a house on stilts), it is more of a complex structure of metal and glass that is hung on a steep slope. Its comparison with the Kolkhian Oda happens not at the level of geometric shapes, but at the level of architectural philosophy and the principle of relationship with the ecosystem.
3. Although Mashpi Lodge is massive, it rests on metal columns that occupy minimal area on the soil. What do they have in common with the Oda? Both buildings avoid maximum utilization of the land. In the case of Mashpi, this is necessary to protect the jungle system; in the case of the Oda, it is to preserve the hydrological cycle of the soil. Both architectures exist "above the ground" and not "in the ground".
4. **"Breathable" shell:** The main feature of Mashpi Lodge is the huge glass walls, which often open and make the building a part of the environment. The Oda's gallery (balcony) and Mashpi's glass facade perform the same function — through-air circulation. In both cases, the architecture rejects "hermeticity" (which is a problem with concrete buildings) and uses natural breeze to overcome humidity.
5. **Differentiation of materials ("Bone and Skin"):** In Mashpi, a metal skeleton (Bone) and light glass/wood shell (Skin) are used. The construction of the Oda is built with the same logic — a solid oak/chestnut skeleton and plank walls that are not load-bearing, and their replacement/renewal is easy. This is modular thinking, which is the main basis of 2026 sustainable architecture.
6. **Visual feature:** Pikaia Lodge — synthesis of local lava stone and wood. It has so-called "breathable" walls. The combination of stone and wood in Western Georgia (especially in Adjarian architecture) serves an analogous function — stone protects from moisture, while wood ensures warmth and ventilation.
7. **Emphasis:** Use of local materials, which withstand centuries without chemical treatment.

Comparative analysis clearly shows that Colchis is the "Amazon" of Europe. If architecture in the Amazon is a means of survival, in Colchis it is historical memory (Oda), which must now functionally return to its roots. Because Colchis is a UNESCO site, we must mention recent conventions and new guidelines that require "material authenticity," meaning that every subsequent building in protected areas should structurally comprehend and continue the tradition of the place using innovative technologies. Accordingly, it would organically fit into the existing landscape. In the case of Kolkheti National Park, the principles of the vernacular 'Oda' offer a more stable and culturally authentic model.

The architectural development of Western Georgia's national parks should not mean copying tradition, but its 'evolution'. The structural logic of the Kolkhian Oda, in synthesis with the principles of sustainable architecture, just as in the Amazonian case, will create a new global standard of sustainability in the management of wetland areas.

In response to these climatic conditions, the Kolkhian Oda has formed a self-regulating architectural system based on three main engineering principles:

- ✓ Vertical isolation

- ✓ Through-ventilation
- ✓ Durability of local materials

Raising the building on stone or wooden columns not only protects the construction from moisture but also creates an under-floor ventilated space that constantly dries the soil surface and prevents the accumulation of moisture. The planning structure of the Oda — wide open galleries (balconies) and opposing openings — ensures passive thermoregulation, which maintains an optimal microclimate even without mechanical cooling. The use of chestnut and oak timber, with its natural pores and antiseptic properties, allows the building to "breathe," which radically distinguishes it from the hermetic shell of concrete. These characteristics make the Oda typology not only a historical relic but also a ready-made prototype of regenerative design for modern protected areas.

Conclusion

Thus, the study showed that the structural logic of the Kolkhian Oda finds surprising parallels in the vernacular and modern eco-architecture of the Amazon basin. Modern Amazonian projects, such as Ecuador's 'Mashpi Lodge' or Pikaia Lodge in the Amazon, are establishing principles of 'amphibious' and 'modular' construction in 2026 architectural practice, which directly resonates with the structural potential of the Oda. In both regions, architecture is considered not as a static barrier, but as a connecting line between humans and the wild.

Amazonian experience offers high-tech solutions — for example, light screw steel foundations and biomimetic roofs, whose integration into the 'Neo-Kolkhian' Oda will allow us to create zero-impact infrastructure in the national parks of Western Georgia, compliant with UNESCO standards. The recommendations resulting from the study are not limited only to the landscape of the Colchis lowland. The engineering principles of the Oda-type architecture — passive ventilation, stilt foundation, and climatic buffer zones — represent a kind of universal "design-code" for all protected areas of Western Georgia. For example, in the Mtirala, Kintrishi, and Machakhela national parks, where the amount of precipitation and the complexity of the relief are critical, reinterpreting vernacular architecture is the only way to create sustainable tourist infrastructure.

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