www.kerpic.org/2026-kibris
Kerpic'26 – Earth – Based Architecture
15th International Conference
N.Cyprus, 22-24 May / 2026

ANALYSIS OF CLIMATE-RESPONSIVE AND SUSTAINABLE ARCHITECTURAL DESIGN STRATEGIES IN CYPRUS

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ABSTRACT

Cyprus, located within the Mediterranean climate zone, constitutes a significant research context for the implementation of climate-responsive and sustainable architectural design strategies due to its high levels of solar radiation, elevated temperatures during extended summer periods, limited freshwater resources, and increasing energy consumption. Reducing the environmental impact of the building sector and improving energy efficiency have become critical priorities, making sustainability-oriented approaches essential in architectural design processes within the Cypriot context. The aim of this study is to conduct a comprehensive analysis of climate-responsive and sustainable architectural design strategies in Cyprus based on climatic, spatial, and technological parameters.

This study adopts qualitative research methods. In the first stage, an extensive review of national and international literature on sustainable architecture, climate-responsive design, and Mediterranean architecture was conducted. In the second stage, climatic data specific to Cyprus such as temperature, solar radiation duration, humidity levels, and prevailing wind directions were analyzed to evaluate their influence on building design. In the third stage, selected traditional and contemporary building examples in Cyprus were comparatively examined based on criteria including building orientation, spatial organization, natural ventilation, shading systems, building envelope performance, material selection, renewable energy integration, and water efficiency strategies.

The findings indicate that traditional Cypriot architectural elements such as thick masonry walls, courtyard-based spatial configurations, narrow openings, and shading devices provide high performance in terms of passive climate control. These features significantly contribute to reducing cooling loads and enhancing indoor thermal comfort. Furthermore, the study reveals that the integration of solar energy systems, rainwater harvesting techniques, and the use of local materials with low embodied energy in contemporary architectural practices substantially reduce environmental impacts.

In conclusion, the development of climate-responsive and sustainable architectural design strategies in Cyprus requires an integrated approach that combines traditional passive design principles with contemporary active systems. Such an approach is expected to reduce energy consumption, improve occupant comfort, and contribute to long-term environmental and economic sustainability within the built environment.

KEY WORDS:
Sustainable architecture; Mediterranean climate; Cyprus; passive design strategies; energy-efficient buildings; local architecture