Evaluation of the Environmental Orientation of the Environmental Quality Incentives Program (EQIP) in Puerto Rico (2014–2024)

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Abstract

The Environmental Quality Incentives Program (EQIP) is the main agricultural conservation program of the USDA–NRCS, yet its role in tropical insular systems remains understudied. This study evaluates the environmental orientation of EQIP in Puerto Rico from 2014 to 2024 using a longitudinal database of funded practices, resource-based classification, spatial analysis, and qualitative validation. Results indicate a consistent concentration of practices and funding in soil and water management, with limited emphasis on biodiversity, vegetation, and energy. Investment is spatially concentrated in areas with greater institutional access to NRCS offices. A notable increase in funding followed Hurricane María (2017), reflecting a response focused on agricultural recovery and vulnerability reduction. Overall, EQIP in Puerto Rico functions primarily as a mechanism for stabilizing productive agroecosystems rather than restoring natural ecosystems, highlighting its role as a hybrid agricultural–environmental policy in socioecological resilience.

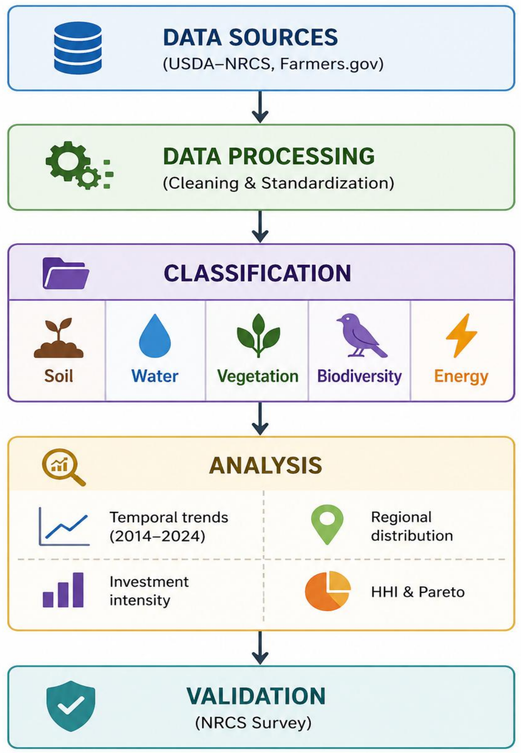
Introduction

The Environmental Quality Incentives Program (EQIP), administered by the USDA–NRCS, is the primary federal program supporting conservation practices in agricultural systems across the United States and its territories. Despite representing a major public investment in agricultural conservation, EQIP in Puerto Rico lacks systematic evaluation, raising questions about whether its resources are effectively aligned with the island's most critical environmental challenges. In Puerto Rico, EQIP plays a key role in promoting soil conservation, water management, and sustainable agricultural practices under complex environmental conditions. Agricultural systems on the island face significant challenges, including soil erosion, limited arable land, resource degradation, and increasing vulnerability to extreme climatic events such as hurricanes. Despite the importance of EQIP, there has been limited evaluation of how its environmental priorities are implemented, particularly in terms of resource allocation and spatial distribution. This study addresses this gap by analyzing the environmental orientation of EQIP in Puerto Rico from 2014 to 2024, providing insights to support more effective, equitable, and evidence-based conservation policy and management.

Objectives

This study aims to analyze the environmental orientation of the Environmental Quality Incentives Program (EQIP) in Puerto Rico during the 2014–2024 period by examining the types of conservation practices funded, their regional distribution, and temporal trends. Specifically, the study quantifies environmental investment allocated to sustainability practices across agricultural regions, evaluates changes in investment patterns over time to identify shifts in conservation priorities, and validates quantitative findings through interviews with NRCS personnel involved in EQIP implementation, thereby integrating institutional perspectives to support the interpretation of results.

Methodology



Results & Discussion

Environmental investment under EQIP in Puerto Rico from 2014 to 2024 was consistently concentrated in soil and water conservation, which together accounted for the majority of practices and funding across all years, often exceeding 65% of total implementation. In contrast, biodiversity, vegetation, and energy practices remained comparatively limited, indicating a narrower environmental focus. Spatial analysis revealed strong territorial concentration of investment (HHI = 2,530.35), with higher participation in the North, West, and Central regions, while the East and many municipalities showed limited or no engagement. At the municipal level, a small number of locations concentrated a large share of contracts and funding. Temporal patterns showed relatively stable investment until 2017, followed by a marked increase after Hurricane María, reflecting a reactive role in post disturbance recovery rather than a structural shift in program priorities. Despite increased funding, the number of practices and contracts did not grow proportionally, indicating a shift toward fewer but more resource intensive interventions over time. Qualitative responses from NRCS personnel supported these findings, identifying soil and water as the primary program priorities and highlighting the role of institutional access in shaping participation. Together, these results indicate that EQIP functions primarily as a mechanism for stabilizing agroecosystems through soil and water management, while its voluntary and institutionally driven structure limits its capacity to target areas of greatest environmental need.

Key Figures

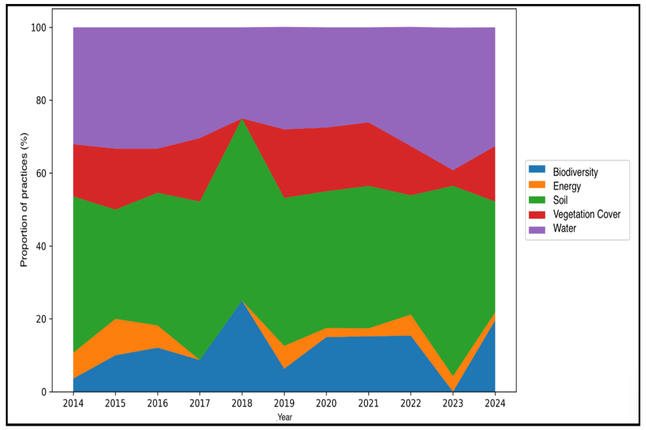


Figure 1. Annual percentage composition of EQIP-funded practices in Puerto Rico, classified by the primary environmental resource protected or improved during the 2014–2024 period.
Note. Adapted from Financial Assistance Practices Data by the United States Department of Agriculture (n.d.).

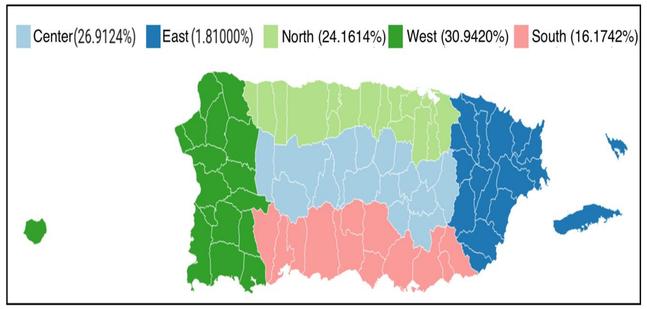


Figure 2. Percentage share of regions in EQIP program funds in Puerto Rico, 2014–2024.

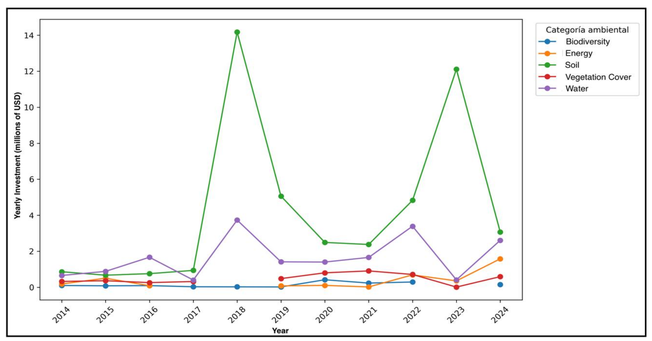


Figure 3. Temporal evolution of EQIP environmental investment by resource category in Puerto Rico, 2014–2024.

Note. Adapted from Financial Assistance Practices Data by the United States Department of Agriculture (n.d.).

Conclusion

EQIP in Puerto Rico functions primarily as a conservation instrument within productive agroecosystems, with a strong emphasis on soil and water management. This concentration of practices and funding indicates that the program's main environmental role is the stabilization of soils and regulation of hydrological processes rather than broad ecosystem restoration or direct biodiversity conservation. Investment patterns, including the increase following Hurricane María, highlight its role in post disturbance recovery and its contribution to socioecological resilience under climatic stress. At the same time, spatial concentration of funding, driven by institutional access and voluntary participation, limits its ability to target areas of greatest environmental need at the landscape scale.

Future Work

Future research should evaluate the environmental effectiveness of EQIP practices using biophysical indicators and farm-level analyses. It should also examine socioeconomic factors influencing participation. Comparative studies between Puerto Rico and other tropical insular jurisdictions (e.g., Hawaii and the U.S. Virgin Islands) would help contextualize program performance and guide improvements.

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