GREEN CLIMATE FUND | Independent Evaluation Unit

IEU BRIEF
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COASTAL AND TERRESTRIAL WATER SECTOR INTERVENTIONS IN DEVELOPING COUNTRIES: A SYSTEMATIC REVIEW

Key findings:

Based on a rigorous protocol and companion evidence gap map, our systematic review assesses the impact of built infrastructure, nature-based options, institutional interventions, and financial/market mechanisms.

Water-efficient irrigation systems and **ecosystem-based management interventions** stand out as particularly valuable tools for enhancing adaptive capacity, warranting specific attention.

Water-efficient irrigation systems increase intermediate outcomes (yields, income) and there is evidence this translates into final outcomes (reduced poverty, better dietary diversity, food security).

Ecosystem-based watershed management enhances intermediate outcomes (yields, income).

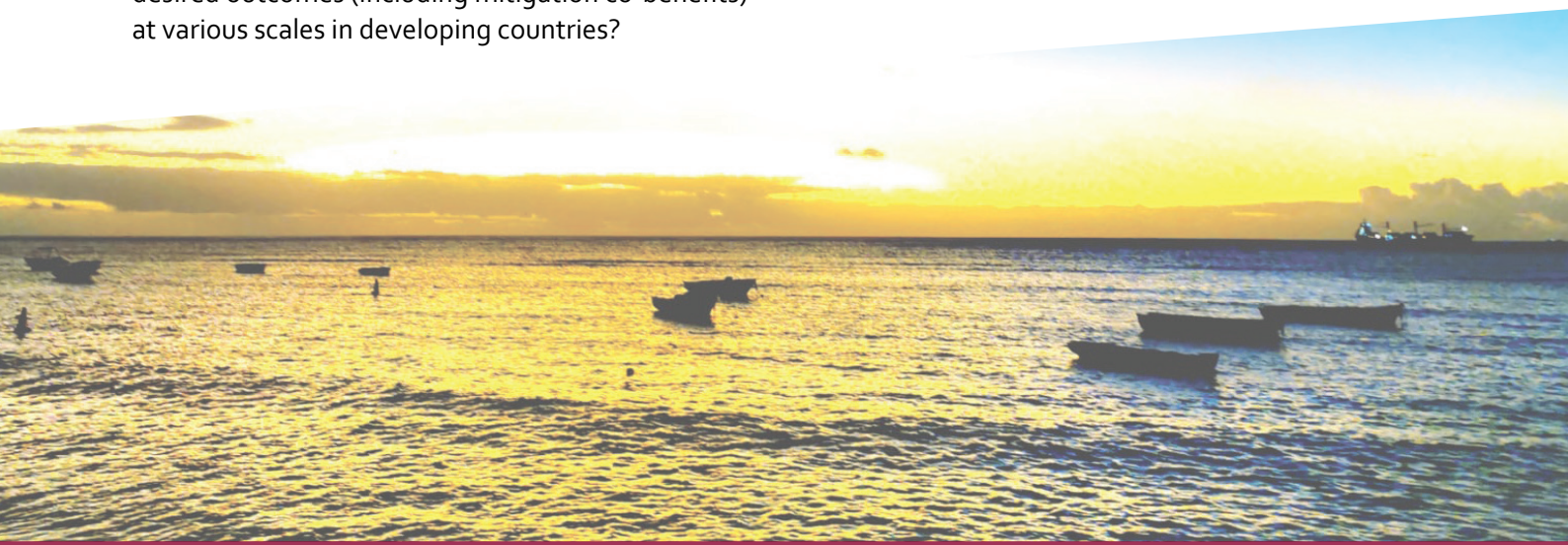
1. Objectives

Global water resources are severely impacted by climate change, which threatens water security goals and targets. This brief provides a summary of the key findings from the GCF-IEU's evidence review of specific water sector interventions in achieving desired outcomes at various scales in developing countries. Based on a rigorous protocol and companion evidence gap map, our systematic review assesses the impact of four interventions: built infrastructure, nature-based options, institutional interventions, and financial/market mechanisms. The evidence review is guided by two key evaluation questions:

- What is the effectiveness of selected coastal and terrestrial water sector interventions in achieving desired outcomes (including mitigation co-benefits) at various scales in developing countries?
- What factors influence the effectiveness of coastal and terrestrial water sector interventions in developing countries?

2. What are evidence reviews? Why are they useful?

An evidence review is a comprehensive collation, analysis, and presentation of evidence.This review identifies a gap in the analysis of coastal and terrestrial water sector interventions in developing countries, as no systematic review had assessed their effectiveness on adaptive capacity. Current reviews focus on terrestrial interventions in infrastructure, agriculture, but but do not focus explicitly on adaptative capacity and mitigation co-benefits.



3. The rationale for this review

This review examines the effectiveness of interventions in promoting desired outcomes in hydrological systems. It emphasizes that water is a complex sector with inherent linkages between freshwater resources and impacts on other sectors and ecosystems. Adaptive interventions in the water sector can have both co-benefits and negative trade-offs. Responding to climate change presents considerable challenges for water managers, users, and policymakers.

4. Methods

The evidence review screened 19,435 papers from 56 academic and grey literature sources. It selected 172 causal evaluations of interventions across eight board categories. The selected 172 impact evaluations underwent a detailed data extraction process and an evidence mapping tool was used to visualize the evidence base. The overall effects of six specific intervention types were established using statistical meta-analysis. A narrative synthesis was completed where the identified evidence base did not allow statistical pooling of studies' impacts.

5. Results

The study conducted 17 meta-analyses to examine the overall effects of the following interventions on indicators for adaptive capacity:

- Ecosystem-based watershed management
- Water-efficient irrigation systems
- Development of formal regulatory frameworks
- Insurance for losses due to flood and drought
- Establishment of user-based organizations
- Payments for ecosystem services

The largest meta-analyses focused on the effects of **water-efficient irrigation systems** on income (12 studies) and yield (9 studies). The results showed increased intermediate outcomes (yields, income), and there is evidence this translates into final outcomes (reduced poverty, better dietary diversity, food security). Income effects are largest in Latin America and the Caribbean and for programmes implemented by international aid agencies or firms. Yield effects are largest in Sub-Saharan Africa.

Ecosystem-based watershed management enhanced intermediate outcomes in terms of yields (8 studies) and income (7 studies). However, this did not translate into final outcomes (dietary diversity). Effects were greatest when a government agency implemented programmes alongside an international financial institution.

The four further interventions also showed positive significant effects on income or expenditure albeit across a limited number of studies.

6. Contribution

Our meta-analysis suggests that water-efficient irrigation systems and ecosystem-based management stand out as valuable tools for enhancing income and crop yield, warranting specific attention. The complexity and diversity of water resources necessitate a nuanced analysis of specific concerns, considering economic, social, and environmental challenges. Practitioners must identify appropriate interventions and outcome categories to understand the evidence base and effectively address their specific objectives.

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