

Abstract


Keywords

1. Introduction

2. Method


3. Results and discussion

3.1. Selected studies

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3.2. Natural forests

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3.3. Planted forests

3.4. Usefulness of the meta-analyses

3.5. Limitations

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Acknowledgements

References

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## Managing watershed services of tropical forests and plantations: Can meta-analyses help?

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### Abstract

The watershed services provided by tropical natural and planted forests are critical to human well-being. An increasing number of valuation studies and experiences with payment for ecosystem services have dealt with the role of ecosystems in regulating the flow of water. However, several studies and experiences have been based on misconceptions about the role of forests and plantations in the hydrological cycle, despite the publication of many reviews by hydrologists. The objective of this paper is to evaluate whether meta-analyses applied to studies comparing water flows in tropical watersheds under natural or planted forests and non-forest lands can provide useful results for valuing watershed ecosystem services and making decisions. The meta-analyses show significantly lower total flows or base flows under planted forests than non-forest land uses. Meta-analyses conducted with subsamples of the data also show lower total flow and higher base flow under natural forests than non-forest land uses. However, the available studies were restricted to humid climates and particular forest types (Pinus and Eucalyptus planted forests and lowland natural forests). The small number of available studies with sufficient original data is a major constraint in the application of meta-analyses. This represents a major technical challenge for valuation studies or payment for ecosystem services, especially in countries where financial resources for implementing field research are scarce.

### Keywords

Ecosystem services; Tropics; Natural forest; Planted forests; Hydrology; Policy; Meta-analysis