

Comparison between a statistical approach and paired catchment study in estimating water yield response to afforestation

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Abstract Afforestation has been encouraged worldwide for diverse benefits. However, the escalating debate about the water yield reduction after afforestation continues to influence forestry policy. The water yield impacts have traditionally been evaluated using paired catchment studies (PCS), but these are mainly designed for de/re-forestation impacts. Thus they do not necessarily guide forest-water policy for afforestation since they have different baseline hydrology. Furthermore, the few long-term afforestation PCS are limited to only selected countries. Thus, a simple method using the abundant data of non-PCS is needed, especially for regions without PCS. A statistical approach was developed and tested by fitting it with data from 44 catchments with forest and grassland cover cited from literature. It showed that the average reduction in annual runoff, estimated through the statistical approach, agrees well with the PCS approach. This indicates that if the data are sufficient, the statistical approach provides an alternative to PCS to predict afforestation impacts.

Key words afforestation; water yield impacts; paired catchment studies; statistical approach