

**Title:** Dataset associated with "Land use conversion to agriculture impacts biodiversity, erosion control and key soil properties in an Andean watershed"

**Abstract:** The conversion of natural vegetation to agricultural land uses in mountainous Andean landscapes threatens an array of key ecological processes and ecosystem services. In protected areas and buffer regions that provide water to cities, it is critical to understand how interactions between plants and soil communities sustain a range of ecosystem functions, associated with nutrient recycling, soil structure, and erosion control. We sought to understand how land use conversion within a mountainous tropical forest landscape influences the diversity of vegetation and soil macrofauna communities, soil physico-chemical properties, and hydrological regulation services. Biodiversity and a suite of key soil-based ecosystem services were compared in five major land uses of the Cali River watershed: 1) annual cropping systems, 2) coffee plantations, 3) pastures, 4) abandoned shrubland, and 5) secondary forests. The diversity of woody and herbaceous vegetation, as well as soil macrofauna was assessed in each land use. Soil chemical fertility and aggregate morphology were assessed via laboratory analyses and visual separation of soil aggregates based on their origin. Infiltration, runoff, and sediment production were measured using a portable rainfall simulator. We found a decrease in the diversity of woody vegetation across land-uses to be associated with lower diversity of soil macrofauna. At the same time, agricultural management, annual crops in particular, supports the largest earthworm populations, likely due to increased organic inputs and low impact tillage, which appears not to diminish soil fertility and water infiltration. In contrast, the low soil fertility in pastures was associated with the lowest values of soil C, poor aggregation, and high bulk density, and likely reflects overgrazing, with negative implications for water infiltration and erosion. Associations between the different sets of variables, evaluated with a co-inertia analysis, highlights the hierarchical relevance of plant cover and woody diversity on ecosystem services. The biological complexity associated with intact forest cover appears to generate "bundles" of co-occurring ecosystem services, with this land use demonstrating the highest infiltration, and low runoff and sediment losses. Our findings demonstrate that forests and tree-based agricultural systems may better contribute to the provision of multiple ecosystem services, including biodiversity conservation and hydrologic regulation.

**Contact:** Steven Fonte, [steven.fonte@colostate.edu](mailto:steven.fonte@colostate.edu)

**Data license** – CC-BY (<https://creativecommons.org/licenses/by/4.0/>)

**Recommended data citation** – Galindo, V., C. Giraldo, P. Lavelle, I. Armbrrecht, and S.J. Fonte. (2021). Dataset associated with "Land use conversion to agriculture impacts biodiversity, erosion control and key soil properties in an Andean watershed." Colorado State University. Libraries. <http://dx.doi.org/10.25675/10217/234038>

**Associated article citation** – Galindo, V., C. Giraldo, P. Lavelle, I. Armbrrecht, and S.J. Fonte. (2022). Land use conversion to agriculture impacts biodiversity, erosion control and key soil properties in an Andean watershed. *Ecosphere* 13(3): e3979. <https://doi.org/10.1002/ecs2.3979>

**Format of data files** – .csv

**Location where data were collected** – Valle del Cauca Department, Colombia

**File Information** –

Galindo.Land use conversion impacts on Ecosystem Services in Colombia.csv:  
This data set involves soil and plant variables collected from 50 farm and forest plots in a mountainous region of the Valle del Cauca Department of Colombia. Sampling was conducted in 2016 to evaluate soil biodiversity and ecosystem services provided across five dominant land uses in the region.

Galindo et al (2022) Codebook.csv:

The codebook contains information about variables in the data set, including possible values and units of measurement.

**Variable information** – All soil and plant variables represent average values from multiple sub-samples (minimum 3 samples) collected within 20 x 30 m plots. The number of sub-samples and exact configuration of sampling transects varies depending on the variable in question. See Galindo et al (2022) Codebook.csv for variable descriptions and units of measurement. See methods section of Galindo et al. (2022) for details.

**Date dataset was last modified**

- Are there multiple versions of the dataset? yes/no
  - If yes, list versions:
    - Name of file that was updated:
      - i. Why was the file updated?
      - ii. When was the file updated?
    - Name of file that was updated:
      - i. Why was the file updated?
      - ii. When was the file updated?

**Related materials** - Relationships with any ancillary datasets outside of this dataset, if applicable

**Data source** - Resources, such as books, articles, serials, and/or data files, if any, that served as source of this data collection

**Related Files** - Files names of other documentation that are being submitted along with the data and that would be helpful to a secondary data user, such as pertinent field notes or other companion files, publications, etc.

**Any other important information about your data**