



HAL
open science

A global experimental dataset of intercropping and agroforestry studies in horticulture

Raphaël Paut, Léa Garreau, Rodolphe Sabatier, Marc Tchamitchian

► To cite this version:

Raphaël Paut, Léa Garreau, Rodolphe Sabatier, Marc Tchamitchian. A global experimental dataset of intercropping and agroforestry studies in horticulture. 6th European Agroforestry Conference. Agroforestry for the Green Deal transition, May 2022, Nuoro, Italy. hal-04331615

HAL Id: hal-04331615

<https://hal.inrae.fr/hal-04331615>

Submitted on 8 Dec 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

A global experimental dataset of intercropping and agroforestry studies in horticulture

EURAF 2022
 Agroforestry for the Green Deal transition.
 Research and innovation towards the sustainable development of agriculture and forestry

Corresponding Author:
raphael.paut@inrae.fr

Raphaël Paut¹, Léa Garreau², Rodolphe Sabatier², Marc Tchamitchian²

¹ INRAE, UMR Agronomie, AgroParisTech, Université Paris-Saclay, 78850 Thiverval-Grignon, France

² ECODEVELOPPEMENT, INRAE, 84000, Avignon, France

Theme: Crop and grassland productions

Keywords: agroforestry; intercropping; horticulture; data paper

Abstract

Intercropping fruit trees and vegetable crops in mixed systems is attracting more and more farmers in Europe (Léger et al. 2018; Lauri et al. 2019). There is also an increasing amount of research being conducted to understand the functioning of these complex systems (Do et al. 2020; Paut et al. 2021). Yet, so far, no dataset has been provided for a systematic synthesis of existing data on intercropping and agroforestry experiments in the specific field of horticulture. Therefore, the aim of the present work is to present a global experimental dataset of intercropping and agroforestry studies in the specific field of horticulture (fruit trees and vegetable crops).

The dataset includes, to date, results of field experiments published in 92 articles published between 1980 and 2017 covering 695 experiments worldwide (crop*field site* treatment combinations). The selected experiments were carried out over five continents on 11 trees and 67 vegetable crop species (Figure 1). We plan to complete the dataset with articles published after 2017. The dataset contains measurements of variables that are considered relevant for the analysis of agroforestry and intercropping experiments:

- i. Basic publication information: Title, Authors, year, Country, Site (latitude, longitude).
- ii. Crops and trees information: Species, Botanical family, Functional group (legume/non-legume), Plant functional type (C3/C4).
- iii. Parameters of the experiment: Soil texture and pH, crop management (greenhouse/field conditions), type of fertilisation (organic/inorganic), Use of pesticides, intercropping pattern (strip, row, mixed), Intercropping design (replacement, additive), Density of each species, Sowing and harvesting dates, N fertilisation, Yields of pure and mixed stands, Standard deviation of yields, Land Equivalent Ratio (LER).

Data was extracted from tables, figures and text. Digitising the data from published scatter plots in the literature was performed with the WebPlotDigitizer tool (<https://automeris.io/WebPlotDigitizer/>). These data were assembled and harmonised according to the International System of Units. The dataset is

reusable and was designed to be updated. We also aim to establish a set of recommendations to design experiments on intercropping. We believe this will provide valuable data for more comprehensive analyses of intercropping and agroforestry systems in horticulture worldwide.

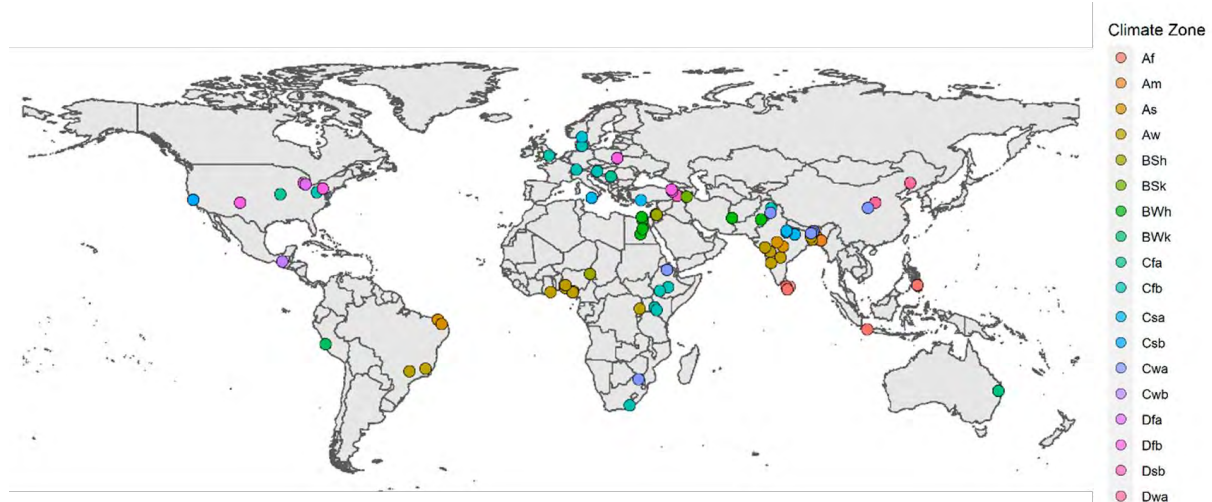


Figure 1. Latitude and longitude coordinates of the field sites included in the database. The Köppen-Geiger climatic classification was used to link each field site to a grid size with a resolution of 0.50 degrees of latitude by 0.50 degrees of longitude. Each Köppen-Geiger climatic subzone is indicated by a colour gradient

References

- Do H, Luedeling E, Whitney C (2020) Decision analysis of agroforestry options reveals adoption risks for resource-poor farmers. *Agron Sustain Dev* 40:20. <https://doi.org/10.1007/s13593-020-00624-5>
- Lauri P-É, Barkaoui K, Ater M, Rosati A (2019) Agroforestry for fruit trees in Europe and Mediterranean North Africa. In: *Agroforestry for sustainable agriculture*. Burleigh Dodds Science Publishing, pp 385–418
- Léger F, Morel K, Bellec-Gauche A, Warlop F (2018) Agroforestry market gardening: a strategic choice to improve sustainability in agroecological transition? *Int J Agric Ext* 43–52
- Paut R, Sabatier R, Dufils A, Tchamitchian M (2021) How to reconcile short-term and long-term objectives in mixed farms? A dynamic model application to mixed fruit tree - vegetable systems. *Agric Syst* 187:103011. <https://doi.org/10.1016/j.agsy.2020.103011>