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Data Article

Data on how tree planting and management practices influence tree seedling survival in Kenya and Ethiopia

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ABSTRACT

Understanding which trees farmers prefer, what determines their survival and enhancing farmer knowledge of tree management is key to increasing tree cover in agricultural landscapes. This article presents data on tree seedling survival under different tree planting and management practices in Kenya and Ethiopia. Data were collected from 1600 households across three Counties in Kenya and 173 households across four Woredas in Ethiopia, using a structured questionnaire which was administered through the Open Data Kit. Data on seedling survival were collected at least six months after tree seedlings were planted. To understand how planting and management practices influence tree planting across the different socioeconomic and biophysical contexts, both

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household level and individual tree level data were collected. Household level data included socio-economic and biophysical characteristics of the households while tree specific data included when the tree seedling was planted, where it was planted, the management practices employed and whether surviving. The datasets described in this article help understand which options confer the best chance survival for the planted seedlings and in which socio-economic and biophysical contexts they are most successful.

Specifications Table

Subject	Environmental Science (General)
Specific subject area	Land restoration interventions in agricultural landscapes
Type of data	Table and figures
How data were acquired	Data were acquired through a structured survey questionnaire administered using electronic data entry specifically the Open Data Kit (ODK)
Data format	Raw data available in CSV files
Parameters for data collection	Data was collected from households that had received tree seedlings and planted through the project. Only tree seedlings planted as part of the on-farm planned comparisons were assessed.
Description of data collection	A structured survey questionnaire administered through the Open Data Kit (ODK) was used to collect data on tree seedling survival under different planting and management practices. Data were collected approximately six months after the tree seedlings were planted. Specifically, data were collected in September 2017 in Ethiopia and July 2018 in Kenya. Data on survival and management practices employed for each tree seedling was collected. The height and root collar diameter of individual tree seedlings was also collected. Furthermore, data on the role and responsibilities of men and women in decision making within tree planting initiatives was collected from the sites in Kenya.
Data source location	Tsaeda Emba, Samre, Gursum, and Boset districts in Ethiopia and Kitui, Machakos and Makueni Counties in Kenya.
Data accessibility	The datasets and the corresponding survey questionnaires are available as open access files on MEL dataverse at: https://hdl.handle.net/20.500.11766.1/FK2/BLHHPR https://hdl.handle.net/20.500.11766.1/FK2/O9LOGI
Related research article	Magaju, C.; Ann Winowiecki, L.; Crossland, M.; Frija, A.; Ouerghemmi, H.; Hagazi, N.; Sola, P.; Ochenje, I.; Kiura, E.; Kuria, A.; Muriuki, J.; Carsan, S.; Hadgu, K.; Bonaiuti, E.; Sinclair, F. Assessing Context-Specific Factors to Increase Tree Survival for Scaling Ecosystem Restoration Efforts in East Africa. *Land* 2020, *9*, 494.

Value of the Data

- The datasets described in this article will be useful in informing on socio-economic and biophysical factors, and tree management practices to consider for successful tree planting efforts especially in East Africa.
- The datasets promote better understanding of the tree planting options that can lead to high survival rates of trees in given contexts. Analysis of the data showed that some tree species performed better under specific locations and management options.
- The datasets show the value of monitoring the survival of tree seedlings beyond the tree planting activities and will be useful for other researchers, NGOs and development agencies working on reforestation as well as government agencies and farmers groups/associations.

- Further analysis of these datasets can help build more experiments about the most successful tree species in given locations and then focus on experimenting additional simplified management options that can lead to even higher survival rates of reforestation operations.

1. Data Description

This article describes two datasets on tree planting interventions implemented as on-farm planned comparisons which were collected within the project on 'Restoring degraded lands for food security and poverty reduction in East Africa and the Sahel: taking successes to scale.[1] The first dataset [1] contains data collected from four Woredas (districts) in the Tigray and Oromia regions of Ethiopia in September 2017 while the second dataset [2] contains data collected from six sub counties in Kitui, Machakos and Makueni Counties in Kenya in July 2018.

The two datasets share the same general structure. Each dataset includes four CSV files:

- DataDictionary_Introduction: the file provides background explanatory information about the dataset.
- DataDictionary_ElementDescription: the file provides explanation for each variable/column and any code used inside the dataset. In general, the datasets share the same variable categories (see table xx), although the actual number of variables can vary, depending on the answer received and the availability of information.
- DataDictionary_UniqueIdentifier: the file provides reference links to an online resource for elements, terms, and concepts used inside the dataset.
- Tree_Planting_Data_Year: the file contains the raw data collected through the survey. The complete file name is "Tree_Planting_Data" followed by the year of data collection (Tree_Planting_Data2018 for Kenya, Tree_Planting_Data2017 for Ethiopia). Each row corresponds to a specific tree and its agricultural management, the same household is associated to several rows.

The category of variables, the number and examples of each category contained in the two dataset is summarized in Table 1 below.

2. Experimental Design, Materials and Methods

A structured survey questionnaire administered through ODK was used to collect data on tree survival under different planting and management practices at least six months after the seedlings were planted. Data were collected from six sub counties across Kitui, Machakos and Makueni Counties in Kenya, and in Boset, Gursum, Samre, and Tsaeda Emba Woredas (districts) in Oromia and Tigray regions in Ethiopia (Fig 1).

Data were collected from all households that had been registered and profiled with the project to provide diverse social, economic and biophysical contexts within which to compare the performance of the options [3,4]. These households had also received tree seedlings through the project. Only tree seedlings planted as part of the on-farm planned comparisons were assessed [5].

To assess the performance of the tree planting options under different agroecological conditions and farmer circumstance, data were collected at both household and individual tree level. Household level data included socio-economic characteristics of the households while tree specific data included species planted, when planted, where planted, the management practices employed and if the tree was surviving the height and diameter. Data were collected from 1600 households and 17,520 individual trees across the sites in Kenya, and 173 households and 4224 trees across the sites in households in Ethiopia.

[1] http://www.worldagroforestry.org/project/restoration-degraded-land-food-security-and-poverty-reduction-east-africa-and-sahel-taking.

Table 1
Descriptive summary of variables in each dataset.

Variable category	Number of variables in the first dataset [1]	Number of variables in the second dataset [2]	Examples	Remarks
Survey and household identification	4	4	Household ID, Data Collector, Date.	These variables distinguish every household from another by a numeric ID, and other identifiers.
Location	15	10	Country, District, County/woreda/Village, GPS coordinates, etc.	These variables zoom from the country which is the biggest geographic location to the specific point (GPS).
Household demographics	0	7	Age, Gender, sources of income, etc.	List of demographic characteristics of farmers and their respective households
Trees description	6	6	Tree Species, Niche, Planting reason, etc	These variables describe the origin of the trees and the reason of plantation
Inputs and farming activities	51	272	Manure, Mulch, watering frequency, Planting hole, Production type, etc.	These variables describe everything in relation with trees and farmer from plantation to production.
Success indicators	4	12	Survival, Diameter, Height,	These variables describe the situation of trees in the time of the survey.
Total	80	311		

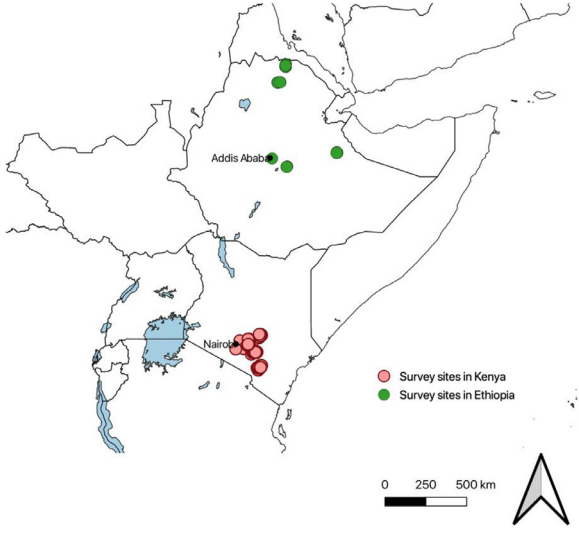

Fig. 1. Survey sites in Ethiopia and Kenya.

CRediT Author Statement

Christine Magaju: Methodology, Conceptualization, Data curtion, Writing – original draft, Data curtion, Formal analysis, Visualization; **Leigh Ann Winowiecki:** Methodology, Conceptualization, Data curtion, Writing – original draft, Data curtion, Formal analysis, Visualization; **Pietro Bartolini:** Data curtion, Writing – original draft; **Asma Jeitani:** Data curtion, Writing – original draft; **Ibrahim Ochenje:** Methodology, Conceptualization, Writing – original draft, Data curtion, Formal analysis, Visualization; **Aymen Frija:** Data curtion, Formal analysis, Visualization; **Hassen Ouerghemmi:** Data curtion, Formal analysis, Visualization; **Tor-Gunnar Vågen** Data curtion, Writing – original draft, Formal analysis, Visualization; **Parmutia Makui** Data curtion, Writing – original draft, Formal analysis, Visualization; **Enrico Bonaiuti:** Data curtion, Formal analysis, Visualization; **Niguse Hagazi:** Methodology, Conceptualization, Writing – original draft; **Asefa Tofu:** Methodology, Conceptualization, Writing – original draft; **Alemayehu Sitotaw:** Methodology, Conceptualization, Writing – original draft; **Mary Crossland:** Methodology, Conceptualization, Writing – original draft; **Esther Kiura:** Methodology, Conceptualization, Writing – original draft; **Kiros Hadgu:** Methodology, Conceptualization, Writing – original draft; **:** Methodology, Conceptualization, Writing – original draft; **Sammy Carsan:** Methodology, Conceptualization, Writing – original draft; **Phosisio Sola:**Methodology, Conceptualization, Writing – original draft; **Fergus Sinclair:** Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

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Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.dib.2021.107073.

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