



Restoration of Degraded Land for Food Security and Poverty Reduction in East Africa and the Sahel: Taking Successes in Land Restoration to Scale

Country Report on farmers profiles.
Mali – Data of 2018

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Foreword

This report summarizes main findings from data analysis about land restoration using tree plantations in Mali. Results we present in this report are related to farmers profiles, including socio-demographic characteristics in addition to farm structures and other related variables. Data on tree's survival in Mali was not made available at the time of this analysis and will be analyzed at a later stage.

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Introduction

This report is elaborated in the framework of the “Restoration of degraded land for food security and poverty reduction in East Africa and the Sahel: taking successes in land restoration to scale” Project. It aims at analyzing 2018 data of the mentioned project, in relation to farmers and farms profiles. This report builds on the collected data to provide a more comprehensive overview of the contextual situation of farmers and farms. The current report presents a statistical analysis of the relevant data/variables collected during 2018 in Mali. The project also collected relevant data survival rates of tree’s conducted under different management and other agroecological contextual factors. However, this later data is not yet cleaned and curated, and will thus be analyzed and presented in an additional report.

Statistical analysis of farmers and farms profiles in Mali

Overall Geographical distribution of the sample

Most of the farmers considered in the data set are located in Segou county (which represents 37.3% of the total sample). Farmers of Sikasso represents 32.2% of the total sample while farmers located in Mopti constitute 30.5% of the total sample (Figure 1).

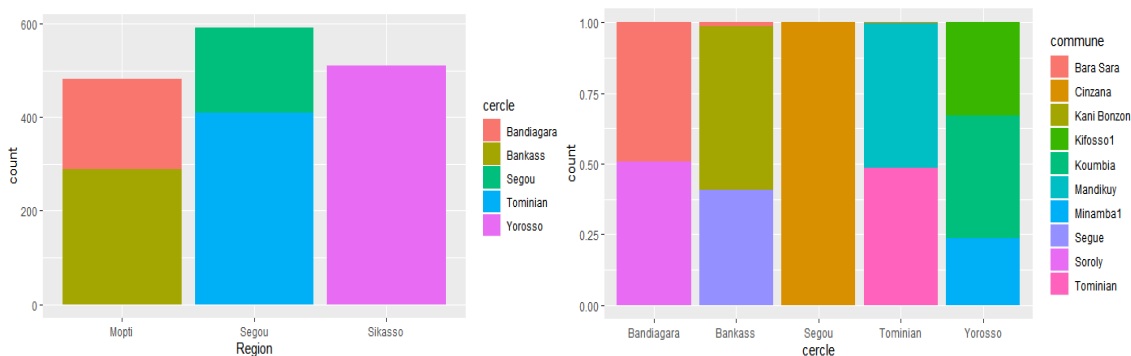


Figure 1. Location of farms in counties and sub-counties (cercles and communes).

Figure 1 also shows the distribution of farmers by “commune” and “circle”, which are the smallest territorial administrative division in the Malian system of local governments (counts in the commune/cercle figure is expressed in percentages).

Farmers profiles

Most of farmers involved in the project in Mali are male (about 89.45 %), with the highest rate of male participation in Sikasso county with 93.3% (Figure 2). Figure 2 also provides a gender distribution of the participant farmers to the project in the different “communes”.



Figure 2. Gender of participating farmers to the tree plantation experiments.

The age of the participants in the different “cercles” is represented by a box plot (Figure 3). The average age of farmers was respectively 45 years, 46 years, 47 years, and 42 years in Bandiagara, Bankass, Yorosso, Segou, and Tominian. The largest (variability) range of age is the the one recorded in Tominian, with 78 years of difference between a maximum age of 95 years and a minimum age 17 years.

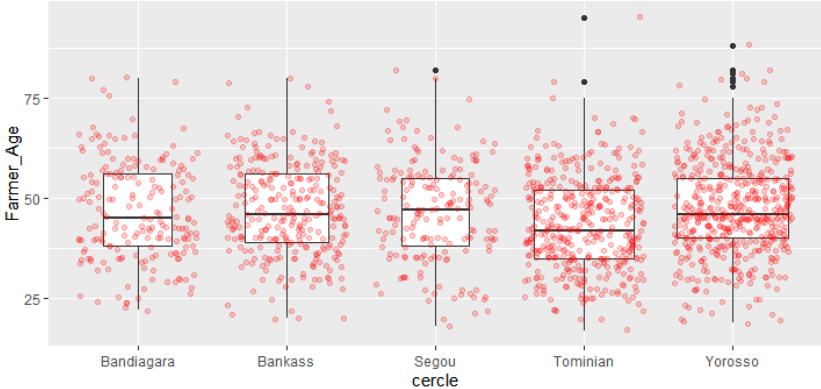


Figure 3. Distribution of farmer age by project site in (cercle)

Female famers are younger than male farmers in all considered “communes” (Figure 4). The least median value of female farmers age was calculated in Minamba, with a value of 20 years old. The highest median value of female farmers age was recorded for Tominian. The highest median aage value (50 years) for male farmers was registered in Kani Bonzon.

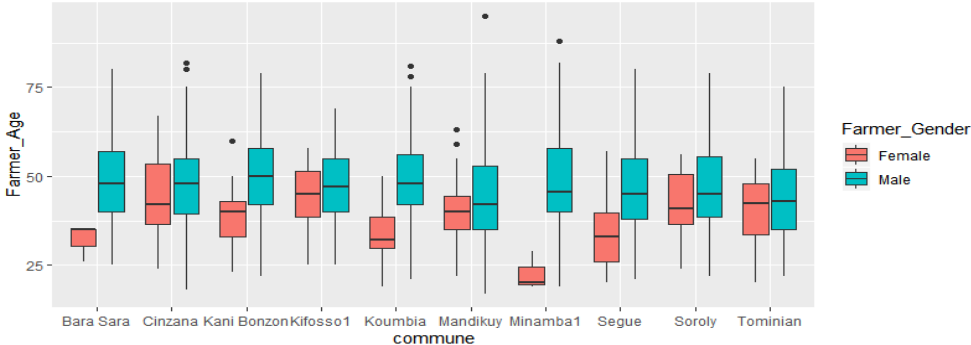


Figure 4. Distribution of the age of participant farmers by commune and gender

About 98.8 % of the household heads in the project areas are male and only 1.2 % are female. These proportions are differently distributed in the project sites (Figure 5). In Kani Bonzon, Minamba and Segue all the household heads are male. In Mandikuy, the proportion of female head of households is the highest with a value of 2.6 %.

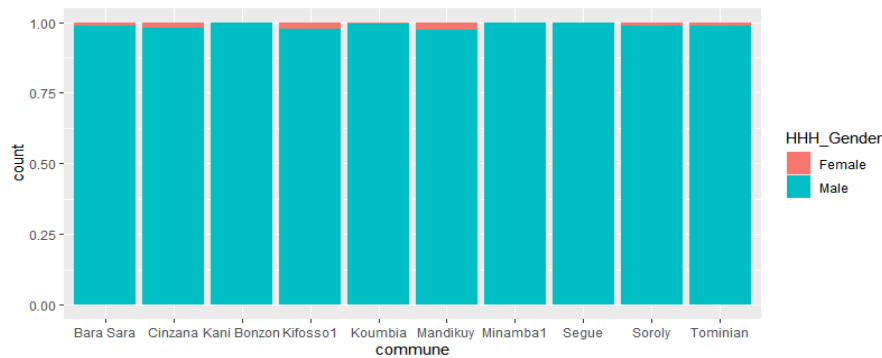


Figure 5. Gender of the head of households per commune

About 45.6 % of the household heads participating to the project have an education level below primary school, while 15.3% of them attended primary school and the rest the rest with other types of education such as koranic schools and basic literacy teaching. Only 2.8% of the total sample of farmers attended higher education. In Segou 3.9 % of the participants attend a higher education level. This was the highest rate recorded for this type of education across all communes (Figure 6).

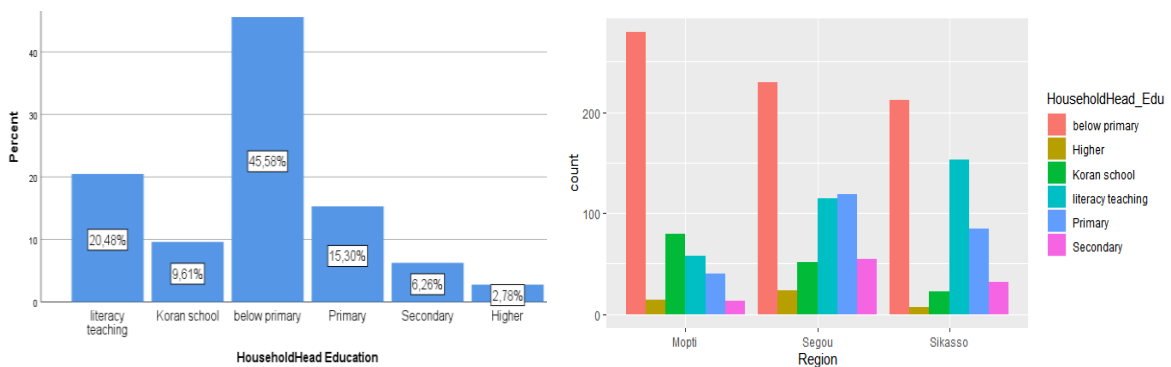


Figure 6 Education level of household heads in the different project areas.

Household population is the population enumerated in private households during a census. Through our survey the median values of household population in the considered sample were about 8 in Mopti and 9 in Segou. In Sikasso, the median value of household population was about 10 persons. The highest recorded value was 103 persons and it was recorded in Mopti, while the minimum value was 1 person also recorded in this same county (Figure 7).

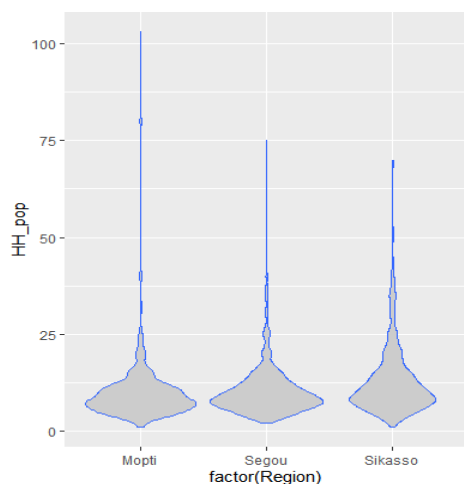


Figure 7. Household population violin plot in the different project areas.

Farm descriptions

Most of the farms (97.6%) are managed and exploited under private land tenure systems. In Segou, all existing farm land was either communal or private. This same region is characterized by the highest share of communal lands in comparison to other regions of the project.

Table 1. Land ownership by commune

Region	Communal	Private	Rented
Mopti	0.8%	98.8%	0.4%
Segou	3.4%	96.6%	
Sikasso	2.0%	97.6%	0.4%
Total	2.1%	97.6%	0.3%

The average farm size in Mopti region is equal to 8.1 ha. In Segou and Sikasso the average size was a higher with values of 8.53 ha and 17.6 ha, respectively recorded in both regions. The largest farm in the project was located Sikasso with a total land size of 100 ha. In terms of distribution, farm sizes in Sikasso are concentrated around a median value of 15 ha. This value is higher than the medians calculated for Segou (7 ha) and Mopti (6 ha) (Figure 8).

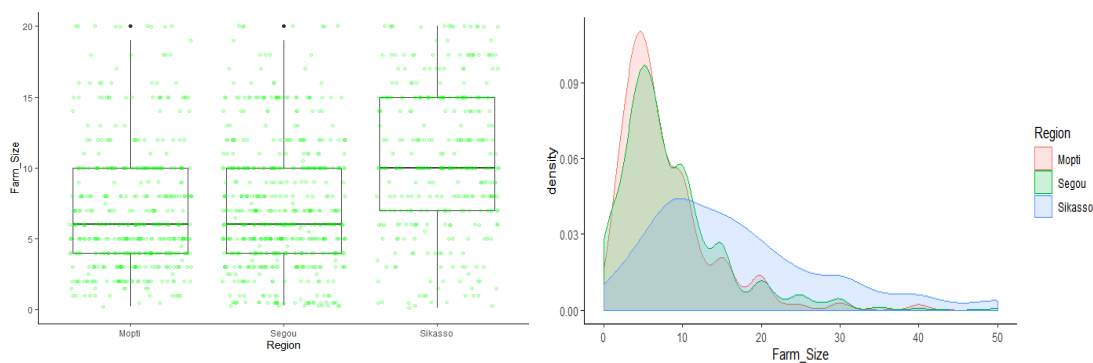


Figure 8. Distribution of farm sizes in the different study regions of the project

The share of Cultivated land is a ratio (percentage) of cultivated area to total land size of a given farm. The average share of cultivated land in the projection regions were equal to 88.8 % in Mopti, 84.1 % in Segou, and 83.8 % in Sikasso. This variable was distributed around a median value of 100 % in Mopti and Segou, and a value of 90.4% in Sikasso (Figure 9).

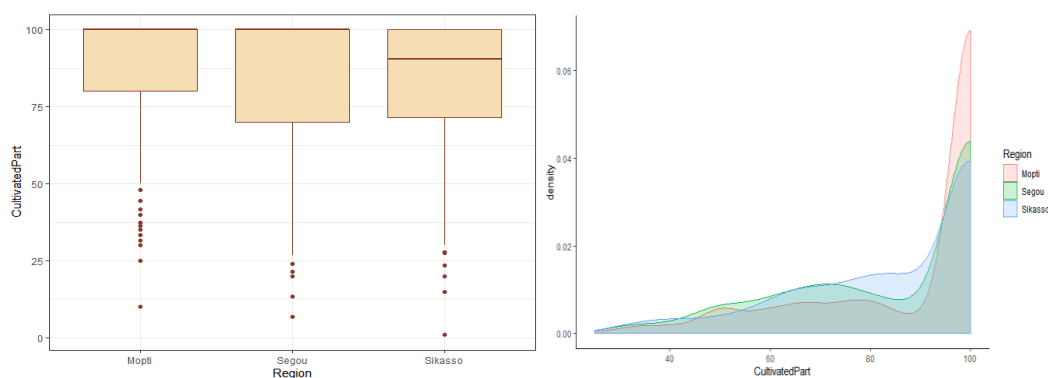


Figure 9. Share of cultivated land (percentage) density for the different project regions.

In Yorosso the older the head of household is the higher (larger) land he owns. This same relation is also observed for Tominian. Furthermore, we also remark that the share of cultivated land decreases

in larger farmers with older head of households. In Bandiagara, Bankass and Segou the share of cultivated land is lower for both old and young farmers. for these areas, the share of cultivated land will be high for medium-age farmers compared to the older and younger farmers (Figure 10).

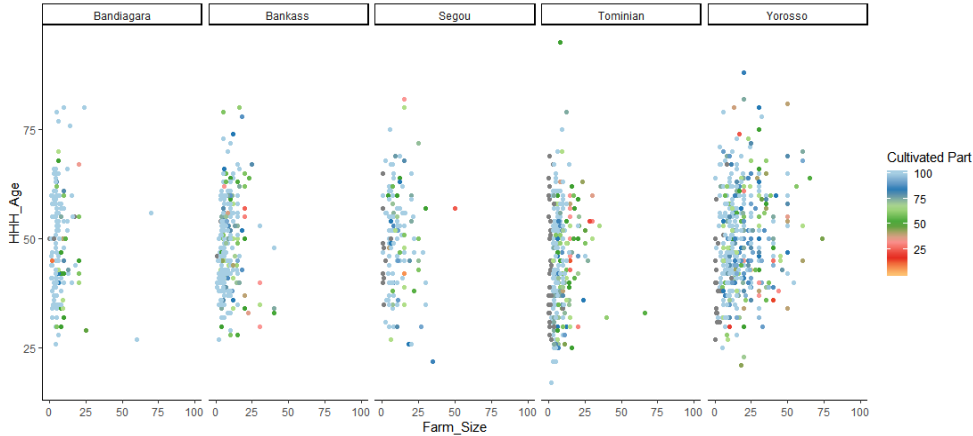


Figure 10. share of cultivated land (Cultivated part) in relation to farm size and age of household head.

Another relevant relation that can be read from Figure 12 is related to the fact that the share of cultivated land in the sampled farms is usually higher for the highly populated households.

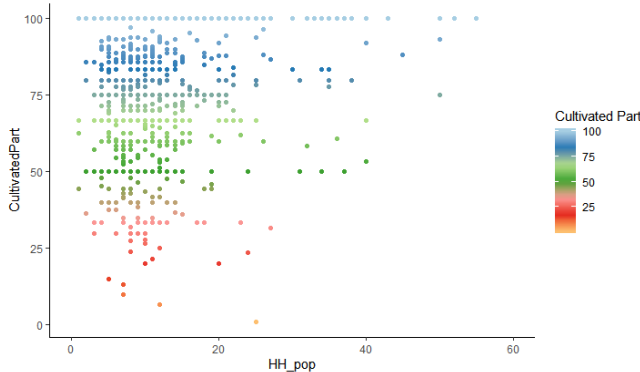


Figure 11. share of cultivated land for different household sizes

The statistical analysis also shows that 90.1 % of the land in the studied area was affected by soil erosion. The most affected region is Mopti where 93.4 % of the land was touched by erosion. This percentage is bit lower in Sikasso (91%) and Segou (86.6 %) (Figure 13).

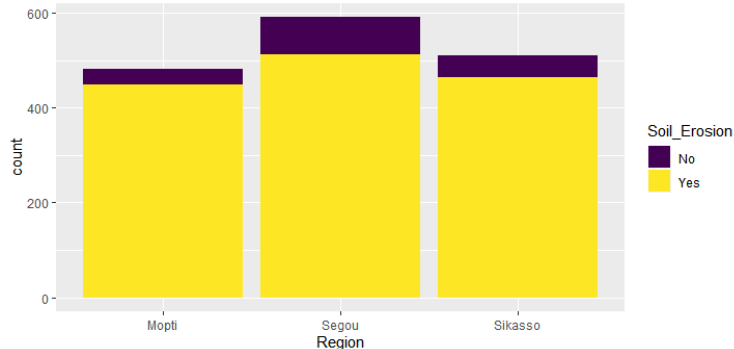


Figure 12. Soil erosion in the study areas/regions

Only 0.88 % of farmers have a positive perception of their soil quality as being of high-quality soils. Majority of farmers (72%) perceive their soils as being of medium quality while 27% of them perceive

their soils as being of low quality. It is also remarkable that farms with high soil quality are usually larger than farms with low and medium soil qualities (Table 2).

Table 2. Farmers’ perceptions of soil quality in different farm sizes.

Perceptions of Soil quality	Mean	Median	Minimum	Maximum
High	13.6	11	4	40
Low	8.6	7	0.24	70
Medium	12.3	9	0.10	100

The collected data also reflects about the distance of farms to the most strategic locations such as a nearest road, Market, or even a source of water that can be used for both irrigation and domestic use. These three distances have been collected through the survey data: distance to the nearest road, distance to market, and distance to the closest water source (Table 3). Table 3 present some summary statistics of these distances for the different farms of our sample.

Table 3. Mean distances of farmers to key facilities in the different considered counties

Region	Distance to main road (Km)	Distance to market (Km)	Distance to water sources (Km)
Mopti	3.08	6.69	1.4
Segou	2.95	7.8	0.5
Sikasso	2.66	6.63	0.97

Figure 13 shows a distribution of farms’ distance to road in the three studied regions. An ANOVA test of differences of mean distances between regions was not significant (at 5%), which means that all studied farms in Mali have equal distances to main roads.

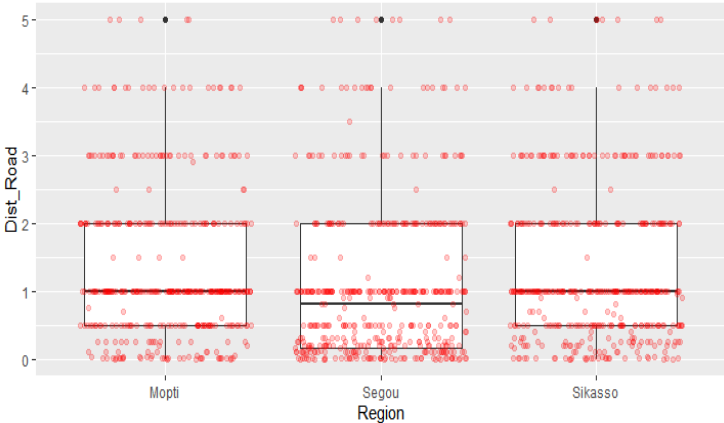


Figure 13. Distance (in km) between farm and the nearest road per region

The same type of analysis was conducted for the “farms distance to market”. Figure 15 shows the distribution of this variable across the three considered regions. We performed an ANOVA test to compare the existence of significant differences across regions in relation to this variable. The ANOVA was significant (at 5%), which means that there are differences across farms of different regions in terms of their distance to markets. We then proceeded with a Tukey test, for pair wise comparison of means across the three regions. Results (Table 4) shows the differences between each region and the others.

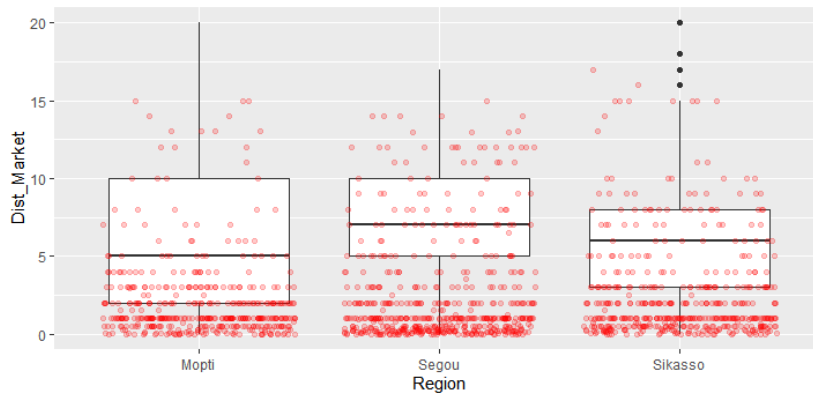


Figure 14. Distribution of distances between farms and the nearest market for the considered project regions

Table 4. Results of the Tukey test for pairwise comparison of average distances to markets

Region	Region	Diff	Sig.
Mopti	Sikasso	0.06	0.977
	Segou	-1.1*	0.001
Sikasso	Mopti	-0.06	0.977
	Segou	-1.1*	0.000
Segou	Mopti	-1.1*	0.001
	Sikasso	-1.1*	0.001

Segou is the farthest region to market compared to Mopti and Sikasso. In fact, we can't classify the counties from the farthest to the nearest because we can't compare Sikasso and Segou as it shows the table 5 of comparison.

Table 5. Multiple comparative table of distance to market across different counties

Test	Conclusion
Mopti Vs Segou	Segou > Mopti
Sikasso Vs Segou	Sikasso < Segou
Mopti Vs Sikasso	No sig.

Figure 16 shows the distribution of farmers' distance to water sources in three regions.

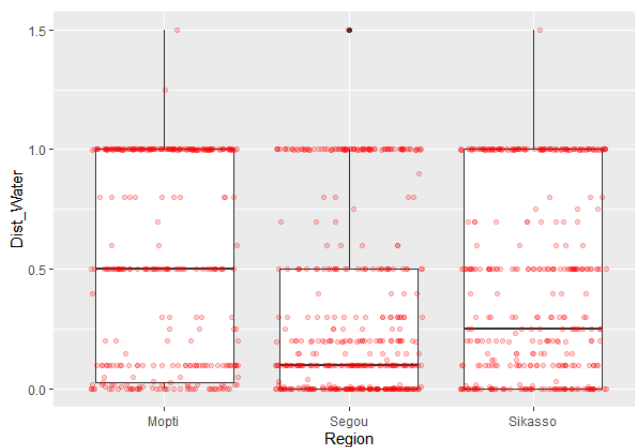


Figure 15. Distance (in km) between farm and the nearest water source per county

An ANOVA test demonstrated significant differences (at 5%) between farmers of the different regions in terms of their respective distances to water points. We then proceeded with a Tukey test for pair wise comparison of means across the farms of the three regions. Results show that all regions are significantly different from each other (see Table 6).

Table 6. Multiple comparative table of distance to water sources different counties

Region	Region	Diff	Sig.
Mopti	Sikasso	0.48*	0.04
	Segou	0.95*	0.000
Sikasso	Mopti	-0.48*	0.004
	Segou	0.47*	0.031
Segou	Mopti	0.95*	0.000
	Sikasso	0.47*	0.031

Kitui is the farthest region to water sources compared to Machakos and Makueni and we can classify the regions from the farthest to the nearest to water points as follow: Mopti, Sikasso, Segou (see table 7).

Table 7. Multiple compare tables

Test	Conclusion
Mopti Vs Segou	Segou < Mopti
Sikasso Vs Segou	Sikasso < Segou
Mopti Vs Sikasso	Sikasso < Mopti

Conclusions

This report analyzed socioeconomic data in Mali for the year 2018. It provides an overview of farmers sociodemographic characteristics and farm structures. The brief socioeconomic data shows that studied farms in Mali are of medium to high sizes and are characterized by low quality soils and low access to water resources. The report needs to be complemented with an analysis of tree's survival rates and their enabling factors. Tree's survival analysis in Kenya will provide interesting insights as the agroecological context in this country is less favorable, and special management options need to be undertaken for the success of land restoration through tree's plantations.