Utilization of electronic data collection approach in managing scaling-up of agroforestry options in smallholder farms

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Background

Data collection is indispensable in the Trees for Food Security II project where research is evidence-based and dependent on information collected from farmers. The project is implemented by ICRAF in Ethiopia, Uganda and Rwanda, in collaboration with respective development partners in the countries. Open Data Kit (ODK), a suite of methods that allow for data collection using digital mobile devices, transmission and aggregation of data to an online server, was adopted to improve data quality and provide timely, credible and useful results. Now in the second year of project implementation, we analyse the challenges and opportunities associated with utilization of the electronic data collection approach.

Objectives

To document challenges, opportunities and lessons learnt under the Trees for Food Security II project, while utilizing ODK as a data collection tool

Research approaches and methods

1. Generation of online questionnaires

Number	Name	Purpose/objective
1	Farmer profiling/registration	To profile all farmers hosting participatory trials. This will allow the project to obtain contextual variables among the farmers. https://ona.io/treeforfoodsecurity2017/40287
2	Participatory_trial_Rwanda	To record and monitor all participatory trials in Rwanda. These trials include; Tree biomass incorporation, Stakes for climbing beans, Soil conservation and erosion control. https://ona.io/treeforfoodsecurity2017/40738
3	Participatory_trial_Ethiopia	To record and monitor fruits for nutrition and income participatory trial. https://ona.io/treeforfoodsecurity2017/40738
4	Participatory_trial_Uganda	To record and monitor trials in Uganda. These include: River bank stabilization, Fodder bank trial, Fruit orchards, Soil conservation and Boundary marking. https://ona.io/treeforfoodsecurity2017/40738
5	RRC_Nursery_Tree_Distribution	To record tree distribution in RRCs, numbers and recipients' information. https://ona.io/treeforfoodsecurity2017/37526
6	RRC_Performance_Checklist	To record performance of RRCs in terms of visitors, ownership, trainings, available resources, satellite nurseries, challenges, opportunities and threats. https://ona.io/treeforfoodsecurity2017/41048
7	Seedling_Survival_and_Performance	To monitor survival and performance of tree seedlings supplied by the project in the farms. https://ona.io/treeforfoodsecurity2017/41590
8	Long-term trial_Uganda	To monitor and assess performance of tree species and incorporated crops at a long-term trial in Mbale https://ona.io/treeforfoodsecurity2017/37500
9	Long-term_trial Ethiopia	To monitor and assess performance of tree species and incorporated crops at long-term trials in Melkassa and Bako https://ona.io/treeforfoodsecurity2017/37500

2. Current status on data colection

Activity	Rwanda	Uganda	Ethiopia
Participatory trial	278	139	36
RRC performance checklist	04	02	02
RRC nursery tree distribution	389	1029	86
Farmer profiling/registration	162	626	98
Seedling survival and performance	126	553	01

Conclusion

Use of electronic data collection methods offers promising results for managing projects involving multiple organizations through centralization of the science in a timely and cost-effective way. The study therefore offers great insights into how data collection and monitoring of inter-country projects could be effectively managed.

3. Generation of online questionnaires

- Analyses per country showed that Rwanda has the highest proportion of female-headed households participating in hosting trials at 42% followed by Uganda and Ethiopia at 36% and 20%, respectively (Fig. 1).
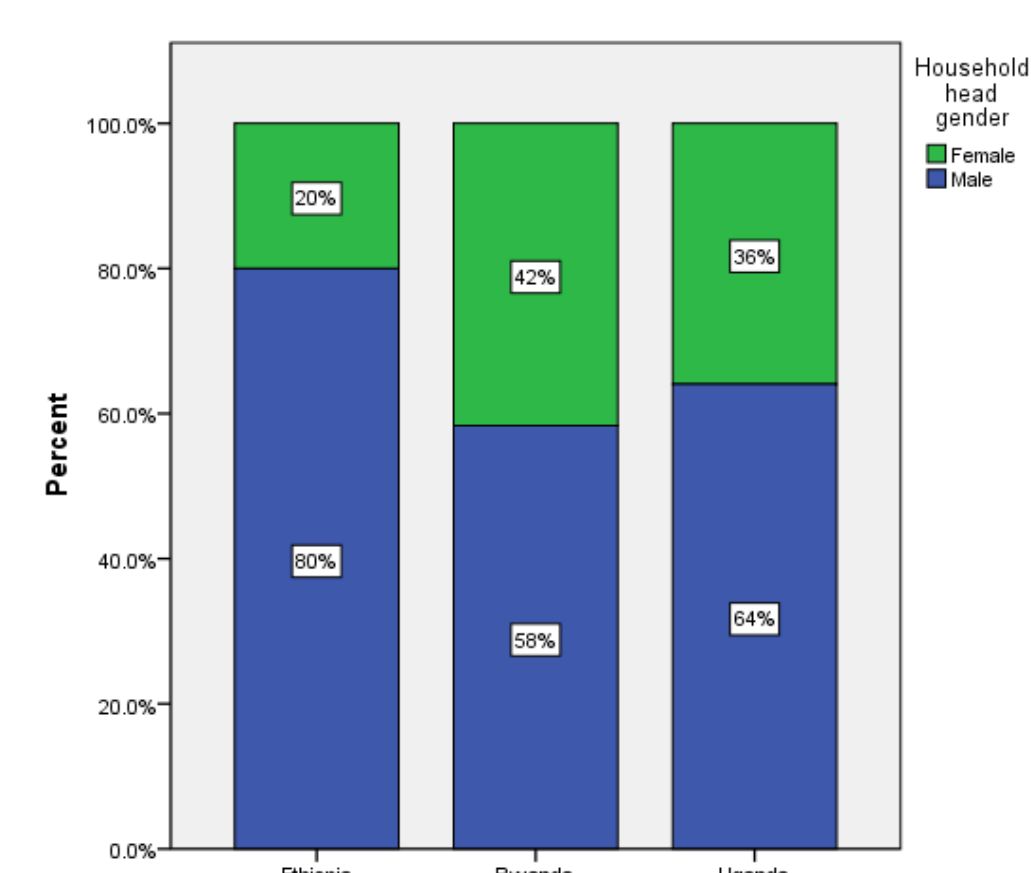

Figure 1: Percentage of household heads by gender under Tree for Food Security II Project for Ethiopia, Rwanda and Uganda

Watering of seedlings was a common practice among farmers in Rwanda with 47% of farmers reporting it (Fig. 3)
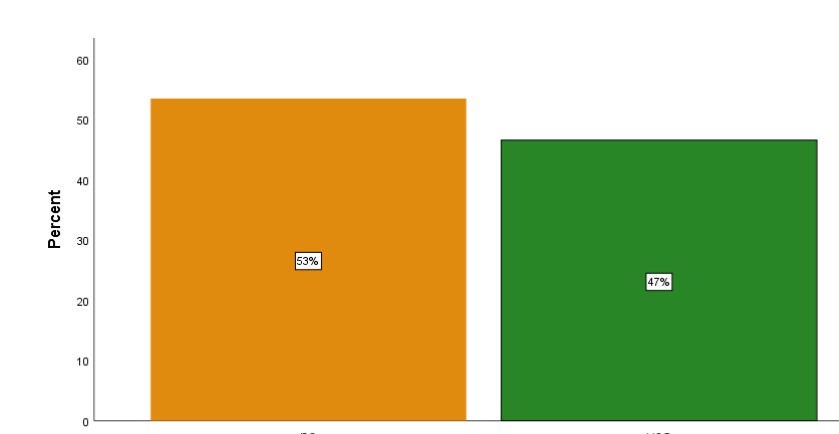

Figure 3: Percentage of reported cases of seedlings watered among tree species provided under Tree for Food Security II project in Rwanda during the 2017 and 2018 period
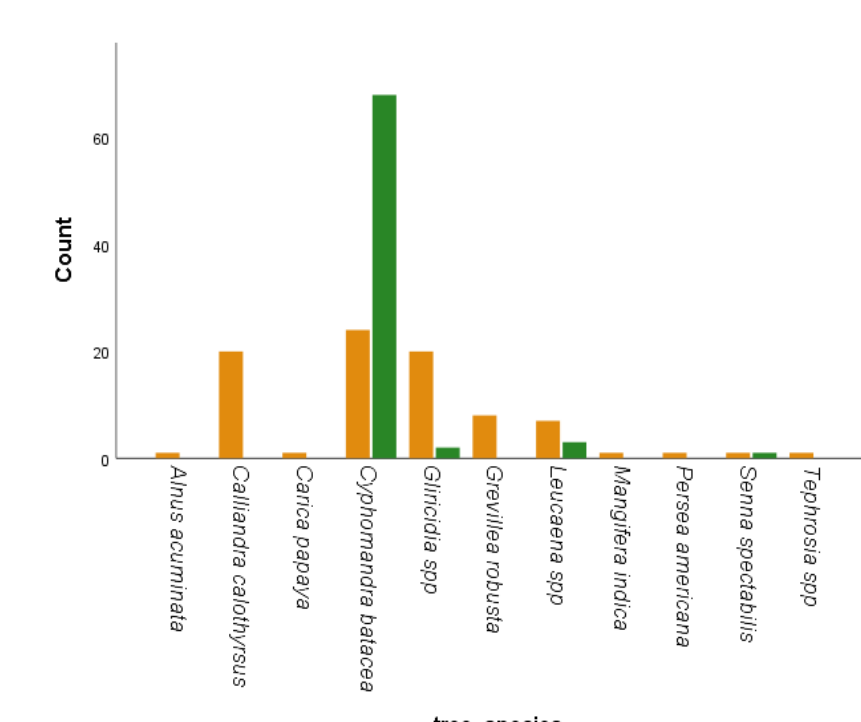

Figure 4: Number of reported cases of seedlings watered among different tree species provided under Tree for Food Security II project in Rwanda during the 2017 and 2018 period.

Analysis of data collected from March to June 2018 of 126 farms/tree planting trials in Rwanda revealed that:

- 100% survival for *Alnus acuminata*, *Carica papaya*, *Mangifera indica* and *Persea americana* seedlings (Fig. 2).
- Survival of *Cyphomandra batacea* (tree tomatoes/Tamarillo) stood at 85% (Fig. 2).
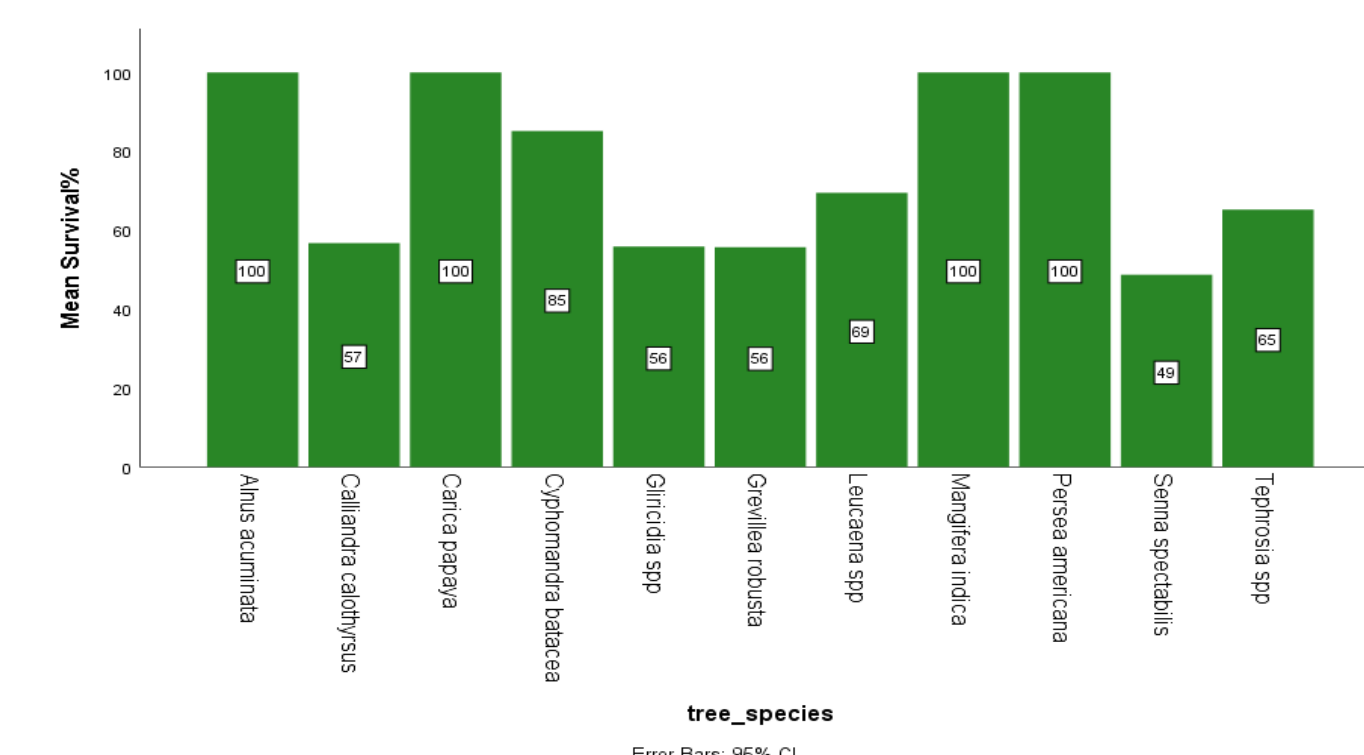- *Senna spectabilis* recorded the lowest survival rate at 49% (Fig. 2)

Figure 2: Percentage tree seedlings survival provided under Tree for Food Security II Project in Rwanda in year 2017 and 2018

Seedling watering was common and only reported at Bugesera by 54% of the farmers (Fig. 5).
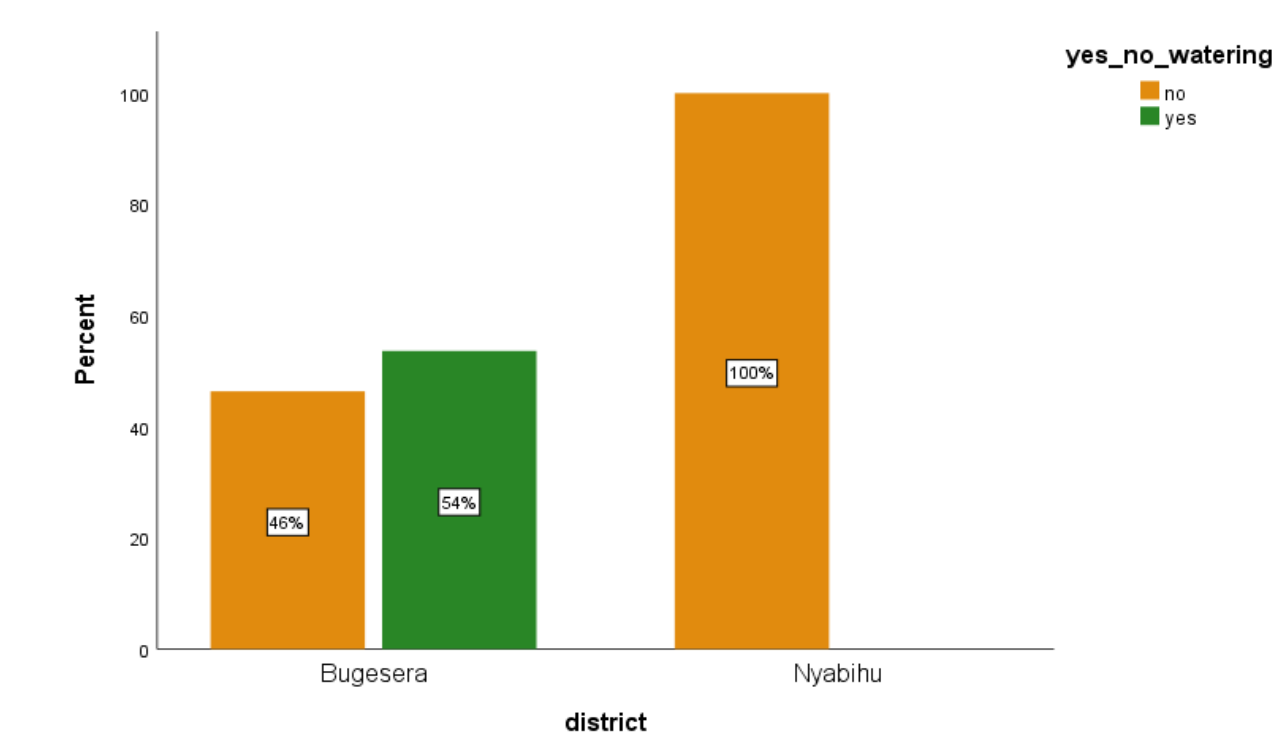

Figure 5: Percentage of reported cases of seedlings watering among tree species provided under Tree for Food Security II project in Rwanda by the district during the 2017 and 2018 period.

Tamarillo, *Leucaena spp*, *Gliricidia spp*, and *S. spectabilis* seedlings were watered (Fig. 4).

Challenges

1. The process of developing questionnaires was time consuming at the initial stages
2. Non-availability and lack of project awareness among enumerators from partner organizations
3. Lack of technological awareness on how to fill questionnaires and submit data
4. Data sharing concerns in terms of ownership and quality checks
5. Time lapse between implementation and monitoring of project activities
6. Poor network connectivity of mobile devices resulting in recording of inaccurate GPS coordinates
7. Need to create new files for evaluation and participatory trial activities revised

Opportunities

1. Collecting research data in the geographically dispersed environment requires minimal coordination to ensure completeness, accuracy and timely transmission of the data
2. Electronic systems enhance transparent decision-making and improved data entry and data integrity
3. Can be integrated with webform option which could allow desktop data entry for data collected using paper format where field online data collection is impossible
4. Timely data analysis is possible. This can inform the project early enough on key indicators for improving the process, revising project objectives or adding new ones from observations
5. Data archiving is improved and data losses minimized

Acknowledgments