



S.E.T.A. PROJECT: SAFEGUARDING THE ENVIRONMENT THROUGH AFFORESTATION IN WEST NILE SUB-REGION, UGANDA

EVALUATION REPORT 2019



PROJECT DONOR: Autonomous Province of Trento (P.A.T.)

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List of abbreviations

ACAV	Associazione Centro Aiuti Volontari
ARUDFA	Arua District Farmers Association
ICAM	Industria Cioccolato e Affini Morbegno
JAVIK	Jabara Agricultural and Vocational Institute Koboko
KODFA	Koboko District Farmers Association
MADFA	Maracha District Farmers Association
NH	Natures Harvest
OWC	Operation Wealth Creation
PAT	Autonomous Province of Trento
SETA	Safeguarding the Environment Through Afforestation
WENDA	West Nile Development Association
YDFA	Yumbe District Farmers Association

1. SUMMARY OF THE MAIN FINDINGS

'Safeguarding the Environment Through Afforestation' (SETA) was a one-year project implemented by Associazione Centro Aiuti Volontari (ACAV) with funding from the Autonomous Province of Trento (PAT), Italy. The project covered the four Ugandan Districts of Arua, Koboko, Maracha and Yumbe. The scope was to support 400 farmers who were trained in the establishment and management of forest areas through the planting of various species of trees. The seedlings distributed to the farmers were raised by 20 farmer groups across the four districts. The capacities of these farmer groups were equally built in tree-nursery bed established and managed with the support of ACAV and partners. All-in-all, 200 farmers were trained in raising tree seedlings which were then planted by the 400 individual farmers.

The **overall objective** of the project was to improve the living conditions of the inhabitants of the Districts of Arua, Koboko, Maracha, and Yumbe. The **specific objective** was to contribute to the preservation and improvement of the afforestation status in the named districts by ensuring that existing wooded areas are maintained, so that they do not suffer adverse decrease. More into details, the intervention aimed at establishing 400 forests on a land area totaling to 320 hectares (800 acres) planted with 220.000 cocoa tree seedlings, 25.000 musizi seedlings and 8.000 grafted mango seedlings. Each of the selected and trained farmers was expected to plant an average of 400 to 500 seedlings.

The study conducted to evaluate the project found out the following:

I. **Farmers were selected, trained and supported to afforest the target area as foreseen in the project plan**

A total of 385 farmers were surveyed out of 400 targeted, representing 96,3%. Overall, 251.418 seedlings were distributed and planted. At the time this study was conducted, 187.160 trees were found to be surviving and thriving (74,44% survival rate), including 164.753 cocoa trees, 5.920 mango trees and 16.487 musizi trees.

The conclusion from the survey is that the overall results point directly to the success of the project. The findings show that all the interviewed farmers have profoundly owned the project. The farmers were also able to plant additional seedlings of cocoa, mangoes, citrus and coffee thanks to the support provided by other local partners like Natures Harvest (NH) and Operation Wealth Creation (OWC).

Nevertheless, because of the effects of the prolonged drought in some areas, there is a need to do gap filling for those plants which had dried up. Moreover, ACAV and its implementing partners need to continue with technical support to all farmers in order to ensure the environmental and economic benefits that will contribute to the improved and sustainable livelihoods.

II. Overall positive survival rates for the three species of seedlings were registered across the target area

While it should be remembered that seedling's survival rate varied from farmer to farmer, district to district and also from tree type to tree type, positive percentages of plants surviving and thriving were registered overall. Cocoa registered the highest survival rate (75,48%), followed by mango and musizi with lower rates (respectively 74% and 66,55%). The average survival rate for the 3 types of trees was the highest in Koboko at 77%, followed by Yumbe at 72%, Maracha at 71%, while Arua registered the lowest at 67%.

However, it should be noted that these results are generalized averages: they should not negate the fact that some farmers across the four districts recorded tremendous performances of 100% survival and very good success rates. High survival rates could be attributed to three elements: a. favourable weather conditions; b. compliance with agricultural methods and techniques acquired through training; and c. inputs and extension support.

III. The SETA project contributed to the maintenance of wood areas in the four districts

The maintenance of wood area highly benefited from the training and technical support of farmers, the establishment and training of nursery groups and the promotion of relevant agronomic practices also with the support of local partners.

IV. The unreliability of rainfalls was pointed to be the main challenge faced by beneficiary farmers involved in the afforestation activities

The wide majority of respondents (85%) indicated unreliable rainfalls as the main challenge faced in the carrying out of the afforestation activities. Other problems frequently mentioned by interviewed farmers were pests (61%), the lack of finances to support the operations (54%) and the lack of water for irrigation (52%).

2. INTRODUCTION

The project called “Safeguarding the Environment through Afforestation’ (SETA) was a one-year project implemented by ACAV in partnership with WENDA, ICAM and the District Farmers Associations of Arua, Koboko, Maracha, and Yumbe. The project targeted 400 farmers across the four Districts of Arua, Koboko, Maracha, and Yumbe in West Nile sub-region, Uganda.

The evaluation study was commissioned by ACAV to assess the progress of farmers and the level of adaptation to good agronomic practices. The results herein contained will inform ACAV:

- a. To document best practices and lessons learnt throughout project implementation;
- b. To identify challenges faced by farmers and propose remedies;
- c. To providing insights for similar future interventions;
- d. To define lessons learnt that will provide a basis for replication and redesigning strategies for similar intervention;
- e. To provide data that will be useful in planning for gap filling, especially for cocoa, mango and musizi.

Based on the project background, the following were the key evaluation questions informing the study:

1. Did the SETA project increase the afforestation status in the targeted area?
2. To what extent did the tree seedlings supplied under the SETA project survive?
3. How relevant and effective has SETA project been in maintaining the wood areas across the four districts?
4. What were the challenges faced by the beneficiary farmers under the SETA project in the four districts?

2.1 Project objectives

The objective of the SETA project was to contribute to the preservation and enhancement of the afforestation status in the four districts of Arua, Koboko, Maracha, and Yumbe, while improving the farmers living conditions.

The intervention targeted the maintenance of wooded areas existing in the four districts as a way to ensure that these areas do not suffer any significant environmental degradation. The planting of 253.000 tree seedlings was expected to afforest 400 agroforestry plots for a land size totalling to 320 hectares (800 acres). The choice of cocoa, musizi and mango as species to be planted was meant to increase the income of beneficiary farmers so bettering their living conditions.

In order to achieve the planned number of seedlings to be planted, 20 nursery farmer groups were formed and trained on how to establish and manage tree nursery seedlings for planting. The total number of individual farmers technically

trained in the production of forestry seedlings amounted to 200. The seedlings which were produced were later distributed to the beneficiaries for planting across the four districts.



Picture 1: A nursery group working on their cocoa seedlings in Koboko

2.2 Main project activities

Some of the key activities conducted in the project were as follows:

1. Selection and training of project staff;
2. Awareness of authorities and communities on the proposed project's objectives and activities;
3. Selection and training of 400 farmers to establish 400 agroforestry woodlots;
4. Technical and financial support to groups that created nursery beds and produced seedlings for establishing agroforestry woodlots;
5. Distribution of seedlings to the farmers who were trained to plant the trees;
6. Technical assistance in the field to beneficiary farmers.

3. STUDY METHODOLOGY

The analysis here outlined relies on the qualitative data collected in the field by different research teams. Two sets of questionnaires were used to conduct interviews: one designed for the beneficiary farmers and another for the nursery groups. The questionnaires comprised both open-ended and multiple choice questions, which were in-depth and simple. The questions guided research assistants in data collection. Field research included individual observations and other investigation methodologies to estimate for example acreages and spacing among others.

3.1 Data collection methods and sampling

Data collection was primarily through the use of the questionnaires. Yet interviewers did not limit themselves to review farmer records, but they also adopted observation methods to ascertain variable required (e.g. measuring land size). The questionnaire was administered individually to the beneficiaries so as to gauge personal experience and practical knowledge in the project.

The field research team reached and assessed the progresses made by 385 farmers out of the 400 individuals benefitting from the afforestation activities. This represents some 96,3% of the beneficiary farmers across the four districts. Whilst the study originally aspired to cover all farmers who benefited from the project, the extensiveness of some districts like Yumbe and Arua, coupled with the available timeframe to undertake the survey, made practically impossible to reach all beneficiaries. Below the breakdown of the interviewed farmers per district and gender.

District	Male	Female	Total
Arua	72	28	100
Koboko	95	5	100
Maracha	90	5	95
Yumbe	88	2	90
Grand total	345	40	385

Table 1: Total number of beneficiary farmers reached per district and gender

As shown in the table above, out of the interviewed beneficiaries 345 were male (representing 89,6%) and 40 female (representing 10,4%). The highest number and percentage of female respondents was in the district of Arua (28 women, meaning 28% of total participants), while the lowest was in Yumbe (2 women, 2,2%).

3.2 Data analysis and presentation

The data here presented are structured according to the survey questions and emerging themes as well as other key issues considered to be very essential to inform future project programming. The data were analysed by using pivot tables in excel and SPSS package to identify correlations between certain key independent and dependent variables. Data are presented as to gain insight and understanding of the effectiveness as well as relevance of the project.

It should be noted that the questions asked were generally designed in a way to not foresee a counterfactual analysis, even though the field research teams were expected to keep record of such whenever and wherever it was necessary.

3.3 Ethical considerations

The research team made every effort to address the ethical concerns related to this study in all different stages of research (i.e. research designing and planning, data collection, data analysis, presentation of findings). Verbal consent was obtained from each respondent before interviews were conducted. No financial or other incentives were provided to participants. The evaluation team had access to anonymous raw data so to preserve the privacy of interviewees.

4. FINDINGS

4.1 Did the SETA project increase the afforestation status in the targeted area?

The project pursued an improved afforestation through the planting of three species of seedlings: cocoa, musizi and grafted mango. Among the three species, cocoa trees were those planted the most as well as those registering the highest average survival rate across the four districts.

District	Cocoa seedlings provided and planted	Cocoa seedlings withered	Cocoa trees surviving	Survival rate (%)	Seedlings withered (%)
Arua	53.348	15.416	37.932	71,10%	28,90%
Koboko	59.507	11.860	47.647	80,07%	19,93%
Maracha	58.258	15.699	42.560	73,05%	26,95%
Yumbe	47.150	10.537	36.614	77,65%	22,35%
Grand total	218.265	53.512	164.753	75,48%	24,52%

Table 2: Afforestation status and survival rate for cocoa per district

Five main information about the afforestation status can be inferred from the data collected:

- Across the four districts, the overall number of cocoa seedlings distributed and planted by all 400 beneficiary farmers was 218.265. This means that each farmer planted an average of about 545 cocoa seedlings with a spacing of 3m², occupying about 485 acres of land (about 196 hectares).
- Across the four districts, the surviving and thriving cocoa plant population stood at 164.753, translating to 75,48% of the total cocoa seedlings distributed.
- Across the four districts, 53.512 (24,52%) of the cocoa seedlings which were planted withered.
- Koboko district registered the highest survival rates at 80,07%, while the lowest rate was recorded in Arua with 71,10%. The difference in terms of losses by district may be associated to the diverse grade of severity of the dry spell across the different areas as well as divergent practices by individual farmers (e.g. planting more shade trees in the garden or the hand watering of the plants).
- The agronomic properties of the land where cocoa seedlings were transplanted appear to play an important role in the surviving of the plants, which require shade to thrive. While some farmers deliberately intercropped the garden with pigeon peas to provide the additional shade, others planted

bananas on their own to allow cocoa to get a conducive environment to grow and thrive.



Picture 2: A cocoa seedling planted close to a banana tree stems in a garden in Logiri sub-county, Arua district

The table below provides information about the survival rates of musizi seedlings in the four districts.

District	Musizi seedlings provided and planted	Musizi seedlings withered	Musizi trees surviving	Survival rate (%)	Seedlings withered (%)
Koboko	6.885	2.410	4.475	65,00%	35,00%
Arua	4.306	1.378	2.928	68,00%	32,00%
Maracha	7.070	2.121	4.949	70,00%	30,00%
Yumbe	6.892	2.757	4.135	60,00%	40,00%
Grand total	25.153	8.666	16.487	65,55%	34,45%

Table 3: Afforestation status and survival rate for musizi per district

With regards to musizi, the following can be deduced from the collected data:

- While the total number of Musizi seedlings distributed and planted across the four districts was 25.153, the average survival rate was 65,55%.
- The district with the highest survival rate registered was Maracha with 70%, while the lowest was Yumbe with 60%.
- As for cocoa, also musizi seedlings appear to better grow and thrive when planted in shadow.

District	Mango seedlings provided and planted	Mango seedlings withered	Mango trees surviving	Survival rate (%)	Seedlings withered (%)
Koboko	2.000	300	1.700	85,00%	15,00%
Arua	2.000	760	1.240	62,00%	38,00%
Maracha	2.000	580	1.420	71,00%	29,00%
Yumbe	2.000	440	1.560	78,00%	22,00%
Grand total	8.000	2.080	5.920	74,00%	26,00%

Table 4: Afforestation status and survival rate for grafted mango per district

As grafted mango is concerned, each district received the same quantity of seedlings (i.e. 2.000). Yet the variation in terms of survival rates across the districts depended on different factors. For instance, the agricultural techniques and methods adopted by individual farmers remain a key factor in determining the percentage of plants surviving and thriving.

Overall, the following can be said about this plant species:

- a. At the time this study was conducted, the total number of mango seedlings growing was 5.920, constituting 74% of the planted trees. Such high rate of survival could possibly relate to the rootstocks upon which the grafting was done. The rootstocks were from indigenous mango seedlings that had adapted well to the harsh weather conditions. In parallel, it is important to stress that the attention paid by farmers to the proper planting and growing of plants also play an important role in the survival of the seedlings.
- b. With regards to the percentage of survival in the districts where the project was implemented, Koboko registered the highest rate of mango survival at 85% compared to Arua that stood at 62%. Koboko's farmers past experience and skills in handling grafted mangoes could have played a significant role in the higher survival rate registered.

All-in-all, the SETA project improved the afforestation status of the area of implementation through the planting of 251.418 seedlings of cocoa, musizi and mango, of which 187.159 were found to be thriving at the end of the activities.

4.2 To what extent did the tree seedlings supplied under the SETA project survive?

As outlined in the previous section, the survival rate of the different species varied considerably according to the district. The following table summarised the average survival rate per species.

Seedling type	Project target	# of seedlings distributed and planted	# of seedlings surviving and thriving	Survival rate (%)
Cocoa	220.000	218.265	164.753	75,48%
Musizi	25.000	25.153	16.487	65,55%
Mangoes	8.000	8.000	5.920	74,00%
Total	253.000	251.418	187.160	74,44%

Table 5: Summary of project targets against seedlings distributed and planted, and seedlings surviving

These figures can be considered to be an indicator of the success of the SETA project as such survival rates show generally positive percentages of seedlings surviving and thriving. It is important to keep in mind that the rates presented above and in the previous section are based on the rule of generalization with average percentages that may bias individual performances which vary from farmer to farmer and from district to district. All-in-all, all individual farmers performed very well.

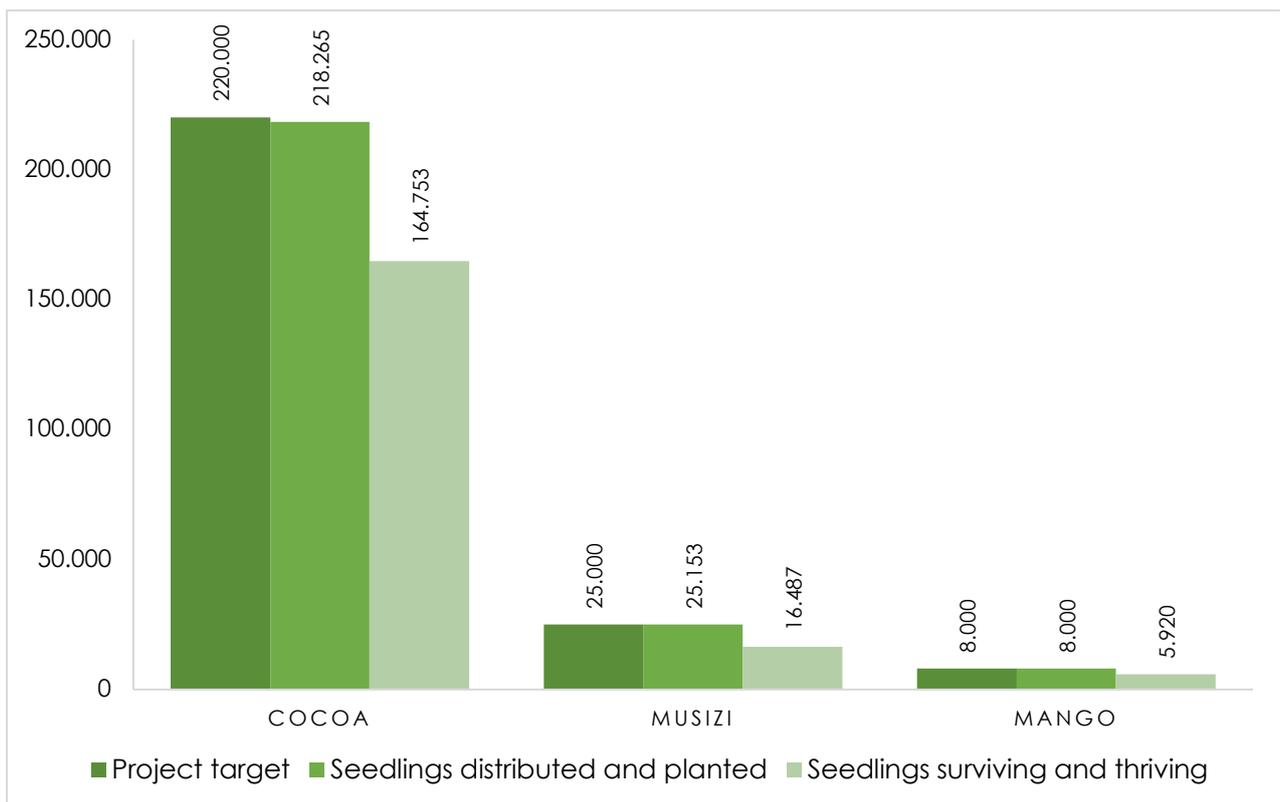


Figure 1: Summary of project target against seedlings distributed and surviving

The overall high survival rates can be attributed to three major factors:

1. *Weather:* rainfalls during the project period were in average reliable, thus enabling the planted seedlings to thrive;

2. *Training*: the training provided by ACAV and its partners to the beneficiary farmers helped them to apply the agricultural and agronomic knowledge they gained to the field practice while planting cocoa, musizi and mango trees;
3. *Inputs and extension support*: some farmers benefited of an higher quantity of seedlings (cocoa, mango and coffee) which they received from other partners like NH and OWC. Furthermore, the technical assistance and extension services provided by the DFAs, ICAM Uganda and local authorities proved to be helpful to the work of the farmers.

Conversely, in those specific areas where relatively low survival rates were registered, three major factors appear to have had a negative effect:

1. Harsh weather conditions characterized by unreliable rainfalls during the rainy season and severe drought at the peak of the dry season, when some water reservoirs dried up. Consequently, certain farmers were not in position to easily access water to adequately irrigate the planted seedlings;
2. The planting of some of the species foreseen by this project, especially cocoa and musizi, was a first-time experience for some farmers. Hence, they operated within a learning curve;
3. Specific agronomic practices and agricultural conditions related to the land where trees were transplanted. For example, cocoa seedlings planted in areas with much shade registered higher survival rates compared to those seedlings planted in open field with scanty or no shade at all.

In general, the SETA project significantly fulfilled its objectives considering statistical figures of tree seedlings distributed, planted and thriving as for the survey. However, due to the short implementation period of the project, it would be prudent to engage other partners like Operation Wealth Creation, Natures Harvest and the District Farmers Associations to support where possible the farmers in gap filling and in the provision of additional extension services.

4.3 How relevant and effective has SETA project been in maintaining the wood areas across the four districts?

The evaluation set out several themes to assess the effectiveness and relevance of SETA activities in the maintenance of wood areas or supported farms. These range from training of both 20 nursery groups and 400 farmers on various agronomic practices, to technical extension services provided to the farmers, to collaborations and linkages to other partners in order to leverage on existing opportunities and synergies.

The following findings can be extracted from the data set:

- a. *Training*: All interviewees reported to have been trained on the establishment and management of trees at Jabara Agricultural and Vocational Institute Koboko (JAVIK), generating 100% response score of “Yes”. The survey did not investigate the training content and duration. The training succeeded in building the capacity of the farmers to raise their own seedlings and improved their ability to manage the agroforestry trees that they planted. This is said well aware that at intermediate level the farmers success is dependent on interwoven variables/factors which are discrete in nature, for instance reliable rainfall, resistance of varieties to pest and diseases, and those agronomics practices within his/her discretion. Therefore, there is no collinearity of training as predictor of success independently.
- b. *Nurseries and sources of seedlings*: as part of the project, 200 farmers were trained to raise seedlings at individual level or group. The data collected reveal that at least 10 farmers out of 385 assessed raised their own seedlings, while the remaining 97,4% accessed seedlings raised by the 20 nursery groups across the 4 districts. These 20 nursery groups were established at various districts and supervised by the agronomists of the DFAs¹. The research conducted at field level revealed that some of the nursery groups and some individual farmers who were trained by ACAV have adopted the skills and continued to raise cocoa and other tree seedlings on their own. Therefore, a consistent quantity of cocoa, mangoes and musizi seedlings are raised and produced within the region, especially by the farmers who were trained under the project.

Some farmers also reported to have received additional seedlings (cocoa, mango and coffee) from other partners like OWC and NH.

- c. *Agronomic practices*: relying on the assumption that good agronomic practices are key determinants for good agroforestry farming, the project focused on the teaching of these practices to farmers in order to ensure the effectiveness of their farm management. The data collected show that all farmers applied to some extent what learnt during the training. Hence, one can observe the existence of a significant relationship between the survival of cocoa and independent variables such as emergency irrigation with use of bottles, extension support and presence of shade. While these independent variables appear to have an higher effect on survival rate than others, their significant effect depends on the quality of the data and also taking into consideration drought as a risk multiplier. This does not negate the

¹ The District Farmers Associations engaged under SETA project were: 1. KODFA: Koboko District Farmers Association; 3. YDFA: Yumbe District Farmers Association; 3. ARUDFA: Arua District Farmers Association; and 4. MADFA: Maracha District Farmers Association.

effectiveness and relevance of the other agronomic practices which work well in combination.

4.4 What were the challenges faced by the beneficiary farmers under the SETA project in the four districts?

Interviewed farmers were asked about the key challenges faced in the implementation of the project activities. More than one challenge could be mentioned by respondents. The table below summarises the responses.

Statistics										
	1. Poor soils	2. Diseases	3. Pests	4. Unreliable rainfall	5. Inadequate extension services	6. Inadequate farming tools	7. Capacity gap/ inappropriate skills	8. Lack of water for irrigation	9. Lack of labour	10. Lack of finances to support operations
Respondents	385	385	385	385	385	385	385	385	385	385
Multiple response "Yes".	46	144	235	329	93	94	100	200	96	207
% Response	12%	37%	61%	85%	24%	24%	26%	52%	25%	54%

Table 6: Challenges faced by beneficiary farmers under SETA project

About 85% of the respondents said that their main challenge was the unreliability of rainfalls. Even those who had attempted to establish some methods of irrigation lacked the necessary water. In some areas, wetlands dried up, thus affecting the survival of the trees to some extent. Among the others, one respondent was quoted saying “I would rather use the little water for home use than to irrigate [...]”. This reasoning was common across all the districts, showing that afforestation projects needs to be supported with modest investments in simple irrigation technologies. Only in this way farmers can enjoy the benefits attributed to conservation amidst cruelties of climate change as a risk multiplier.

Other challenges frequently mentioned by respondents were pests (61% of respondents) and lack of finances to support operations (54%). In particular, the problem of pest relates to the limited rainfalls: indeed, diseases like vascular streak dieback and pests like termites and ants tend to devour more than they would have done when there was rain. In this sense, the responses reflect the existing connection between unreliable rainfall, pests and plant withering.

5. RECOMMENDATIONS

The following recommendations are based on the data collected as well as on other considerations about what ought to be done to see continuity and sustainability of SETA project's outcomes and impact.

- i. Additional support is needed to back the farmers with gap filling for the seedlings lost because of negative weather patterns.
- ii. In order to ensure the surviving and thriving of those tree kinds which are either new or less common in the sub region (i.e. cocoa and musizi), there is a need for continuous technical support to the beneficiary farmers by the DFAs and the animators.
- iii. ACAV should continue to conduct technical backstopping of the beneficiary farmers through its existing structures as these trees reach another stage of development.
- iv. To explore the opportunities of additional strategic collaborations and synergies with existing government programs like Operation Wealth Creation as well as other development partners and the private sector which are involved in cocoa promotion for market linkages and value addition that will be beneficial to the farmers across West Nile sub region and beyond.
- v. There is need to integrate SETA in similar ongoing projects that ACAV is implementing in West Nile sub region, especially the fruit growing project so as to optimize available resources.
- vi. The timeframe for implementing agroforestry related projects, which are long-term in nature, should be longer. Three years or more would allow beneficiary farmers to be technically guided throughout the different stages of the plant growth and value chains.
- vii. The lessons learnt through SETA project should be a basis for future programming of similar projects which can be replicated in West Nile sub region and beyond.

5.1 Lessons learnt

Three main lessons can be drawn from the evaluation of the project:

1. Cocoa plants thrive best where shade crops provide them with shadow and protection. Farmers who planted their seedlings intercropped with cassava, bananas and pigeon pea, etc. had higher survival rates and better plant heights than those who did not.
2. Older farmers managed their newly transplanted tree seedlings better than the young farmers. Where youth are involved, there should be continuous

engagement to fine-tune their expertise and enable them to perform as good as the older farmers.

3. Unreliable weather patterns related to climate change have a negative effect on the survival and thriving of trees, thus requiring early warning mechanisms for farmers to adapt. Therefore, investments in simple rainwater harvesting and storage technologies for irrigation by smallholder farmers should be promoted as safety nets to sustainably improve farmers livelihood.

6. CONCLUSIONS

The evaluation study reveals that the SETA project was largely successful, although the cruelties of nature in terms of drying up of some planted seedlings and the initially limited farmers' skills. Unreliable weather conditions and farmers' inexperience are variables which can be mitigated through good planning and additional investments in similar projects.

The greatest asset of the SETA project was the ownership of this intervention by the farmers as well as the existing leverages from other partners like Natures Harvest, Operation Wealth Creation and ICAM who were able to support the beneficiaries with additional seedlings of cocoa, mangoes, citrus and coffee alongside technical extension services.

In order to ensure a long-term the impact to this project, additional investments are needed to do gap-filling with hope that rainfalls will be stable and reliable. In the long run, the planted trees, if well-managed, will have a huge potential of sustainably improving smallholder farmers household incomes, food security and livelihood opportunities.

