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SUMMARY

Study was descriptive in nature and employed both qualitative and quantitative methods of research. Descriptive approach was employed because the evaluation was not experimental.

Findings show that, radio is the most important source of information among farmers (60%) and is followed by word of mouth (14%), TV (10%), Newspaper (7%), cell phone (6%) and others (3%). 96% reported that they had at one point or more ever listened to the Tree Talk radio program. 92% reported that, they had actually received a copy of Tree Talk newspaper in their school. All the beneficiaries exposed to both Tree talk radio and newspapers reported that the content was relevant in terms of their information needs.

The findings reveal that, after the trainings, beneficiaries managed to adopt/apply some practices in their farming. 67% of farmers introduced new crops (intercropping) while 52% of schools that had land introduced new crops. There has been an increase in woodlots i.e. 75% of schools and 83% of farmers enlisted as beneficiaries managed to establish woodlots. Before the beneficiaries were enrolled into the INRM program, 73% of schools had woodlots while 58% of farmers had woodlots. There was an increase in land use with more farmers using 1-2 acres from 30% to 60%.

Though 73% of schools and 69% of farmers owned water filters distributed by the project, findings indicate that, 34% schools, 54% farmers are using the filters. This explains why currently even when the beneficiaries are exposed to unsafe sources of water, 58% of schools and 28% of farmers are actually doing nothing to make the water safe because even those with filters are not using them. This is related to a number of possible challenges including actual availability of water, knowledge of use and attitudes.

Findings also revealed that, 78% farmers owned the Rocket Lorena stove being promoted. Further investigation shows that, 49% built the stoves themselves, 46% were built for them which means energy service providers were able to pass on the skills to beneficiaries who in turn constructed their own stoves hence indicating sustainability.

Beneficiaries mentioned a number of ways in which they have benefited from the project that include; low cost on fuel 57%, low smoke inhalation 23%, cheap maintenance 10%, ability to cook faster 10%, easy weeding 71%, keeping wild fire out 11%, short term products 9%, increased income 3% and better water retention 2% and variety in farm products 2%, access to safe drinking water 80% while 20% reported that, these filters are helping them prevent water borne diseases stemming from consumption of unclean/untreated water.

Economically the stoves have proven to have greatly reduced the cost on wood fuel. In reference to integrating trees and crops, farmers have realised savings in terms of weed management of
woodlots and benefited in the short term through harvesting and selling produce. Using water filters has enabled beneficiaries to save money on treating water borne diseases. Environmentally, the stoves contribute to reduction in trees cut for wood fuel preventing adverse effects to the environment. In relation to health, reduced inhalation of smoke has contributed to a healthy productive population. Using the filters has ensured that beneficiaries do not have to constantly use fire wood as fuel to boil water hence promoting environment/natural resources conservation.
1 Background:

In 2009, the Royal Danish Embassy together with Straight Talk Foundation signed an agreement to undertake a “Tree Talk – Plus, Greening Uganda Project” which implemented activities aimed at:

- Improving the knowledge about climate change adaptation and mitigation and to build resilience among communities.
- Strengthening conservation of key ecological units for the sustainable development of surrounding communities.
- Promoting ecologically responsible natural resource management and economic livelihood options amongst communities in the region.

With the project coming to an end, the intention was then drawn to consolidate project impacts based on the lessons learnt during implementation by adopting an integrated approach to natural resources management focusing on climate smart agriculture with demonstrated social and economic impacts, natural resource preservation and conservation through community based water harvesting and sanitation technologies to reduce disease occurrence at schools and communities as well as improved energy cooking technologies for reduced impacts on the environment through deforestation and forest degradation.

This new approach was based on the principle of Integrated Natural Resources Management (INRM). INRM looked at managing resources sustainably by helping resource users, managers, and other stakeholders accomplish their different goals by consciously taking into account, and aiming to reconcile and synergize, their various interests, attitudes, and actions.

1.1 Project Goal:

The goal was an improvement in attitude and skills by communities to sustainably harness environment and natural resources for improved household livelihoods.

1.2 Overall Objective

The overall objective was to empower communities with skills for improved natural resources management, increased agricultural productivity and better quality of life.
1.2.1 Specific objectives

- To support communities, schools and institutions in establishing ecological agri-business production gardens, energy saving technologies, commercial woodlots and rainwater harvesting schemes and manage them in a manner that exhibit social and economic impact.
- To promote ecologically sound methods of sustainable natural resources utilization and document/disseminate good practices through stakeholder fora, promotional materials, radio programming and the *Tree Talk* Newspapers.
- To provide the desired advocacy for natural resources management in the project area and influence national level decisions.

1.3 Expected outputs

The expected impacts/outputs here below are linked to the specific objectives above.

- Improved yields and income through agri-business production gardens and woodlots
- Reduced firewood consumption through increased utilisation of energy saving technologies
- Conservation of water thereby enabling availability of water for production/watering gardens and safe drinking water at community level and in schools;
- Improved income streams and investment in eco-friendly enterprises
- Increased awareness about integrated approached to natural resources management
- Sustainable green agricultural practices documented, disseminated and promoted
- Planning and programming for natural resources at district level strengthened
- ENR and climate change integrated in District Development Plans

1.3.1 Indicators for measuring achievements

To access performance against targets at the end of this project implementation, a number of indicators were set at project conception to guide the evaluation process and these included;

- 20 agri-business demonstration gardens per district (with demonstrated ecological, social and economic impacts) in 8 districts per year (Total 480 gardens)
- A seed credit scheme established in each district
- 20 energy saving stoves established (households, schools and selected institutions) in 8 districts per year (totaling 480 stoves)
- 5 Energy Service Providers trained per district (totaling 40)
- 20 commercial woodlots (1 hectare each) per district per year (Totaling 480 woodlots, 480 hectare)
- 10 schools with ecological agriculture demonstration gardens per district per year
- Two issues of Tree Talk Newspaper, 250,000 copies each, circulated per year
- Functional rainwater harvesting technologies at 10 selected schools/health centers per district per year
- Stakeholder forum that meets twice a year to discuss governance of environment and natural resources management in the project area.

2 Rationale for the Evaluation

The INRM project was implemented for three years and came to an end on 30\textsuperscript{th} December 2015. For purposes of learning and accountability stated in STF’s M&E manual it is crucial that, each project coming to an end be evaluated.

2.1 Specific Evaluation objectives

- To assess if there is improved access to information on natural resource management resulting from activities.
- Establish adoption of sound ecological practices among beneficiaries as a result of the project.
- Establish the social economic and environmental benefits among beneficiaries accrued to the project.
- Assess level of involvement from stakeholders in advocacy efforts for natural resources management.

3 Methodology:

3.1 Study Design

Study was descriptive in nature and employed both qualitative and quantitative methods of research. Descriptive approach was employed because; the evaluation was not experimental. It was only being undertaken to provide information on behavior, attitudes and practices of the beneficiaries who were exposed to project activities and hence did not require any comparisons. The reason for this selection in method was due to the existence of categorically different beneficiaries and the need to capture stories alongside the quantitative data.

3.2 Proposed study area

The evaluation considered three districts namely Adjumani, Gulu and Kitgum out of the eight implementation districts to represent the two sub-regions (West Nile and Acholi sub-regions) of northern region in this evaluation. In each district, the location of actual respondents was further determined by the list of beneficiaries hence making the whole selection purposive.

3.3 Study Population

Since the beneficiaries of this project were categorized in to two i.e. schools and farmers, the selection of respondents was also purposive. A list of beneficiaries was acquired from project activity reports and this is what the selection was based on. For schools the team interacted in-depth with the contact persons for the project most especially those who were trained as it was anticipated that, they would be in position to avail the required information regarding implementation at school level.

For the farmers, 57\% of those listed in the beneficiaries list were contacted and interviewed while for the schools 43\% of those listed in the beneficiaries list were contacted and interviewed. These proportions of respondents were done due to convenience of the budget allocation for the activity.
3.4 Sample size:
Since the evaluation was not experimental, the sample size was based not on total population in districts but on selected population of beneficiaries. During the three years, 120 farmers and 90 schools were reached in the selected districts. For both samples a confidence level of 95% was relied on. However, farmers sample was based on a confidence interval of 7.7 while that of schools was 12. For the farmers the sample size included all the 23 farmers in each district totaling to 69 and 13 schools making 39 in total selected from the beneficiaries list. Due to challenges like relocation of farmers and schools dropping out of the project, the numbers in some districts fell short of the targets hence reaching 64 farmers and 37 schools.

3.5 Data tools/instruments
Due to the different categories of respondents, the evaluation also employed different tools to gather data. The team applied both qualitative and quantitative tools i.e focus group guided discussion and structured questionnaire respectively.

3.6 Structured Questionnaire:
This was applied to farmers since majority of the implementation activities targeted them particularly. The tool had different sections to ensure that, information for each objective was captured. The in charge in each participating school also had their own structured tool and the research team had in-depth interviews with them on activities they participated in.

3.7 Focus group discussion (FGD):
This was applied to the farmers mainly. The use of the FGDs helped the team to gather information on success stories with relevant examples of benefits that resulted from the project.

3.8 Data quality assurance and Management
The evaluation exercise followed the STF’s M&E manual and employed the following quality control measures to ensure that, the exercise was conducted efficiently resulting in to valid and high quality data. To achieve this, the following measures were employed:

Careful recruitment of experienced research personnel; Qualified and experienced researchers were recruited.
Training of the Research Team – the research team was trained for 1 day to equip them with knowledge and skills to conduct this study.
Pre-testing of Data Collection Tools – Pre-testing of data collection tools was conducted before the actual fieldwork to test the quality of the tools and whether they fit the intended purpose.
Field supervision of data collection – Interviewers were supervised by a team of STF staffs.

3.9 Ethical Assurance Procedures
Still again guided by STF’s M&E guidelines on evaluations, approval was sought at two stages. First with the district leadership, then with the selected respondents.

3.10 Data Processing and Data Analysis
Qualitative data collected through FGDs and KIIIs was verified and cleaned. All interviews and FGDs were conducted and recorded in the language convenient for the respondents and transcribed in English.
Quantitative data was captured using Epi data version 3.1. Data cleaning was carried out to reduce further on the errors in entry and data capture. The data set was then exported to Ms Excel for analysis.

4 Results

The findings from this project evaluation are represented in four chapters each presenting information for the specific objectives of the evaluation. For specific objectives most especially four, the team had to rely on secondary data.

4.1 Demographic Characteristics

Since the evaluation had more than one category of respondents, the characteristics have also been presented in a tabular univariate analysis to clearly describe the types of respondents that were reached.

<table>
<thead>
<tr>
<th>District/location</th>
<th>School</th>
<th>Adjumani</th>
<th>Gulu</th>
<th>Kitgum</th>
<th>Farmers</th>
<th>Adjumani</th>
<th>Gulu</th>
<th>Kitgum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>10</td>
<td>15</td>
<td>27</td>
<td>21</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>32.4%</td>
<td>27.0%</td>
<td>40.5%</td>
<td>42.2%</td>
<td>32.8%</td>
<td>25.0%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>School</th>
<th>female</th>
<th>male</th>
<th>Farmers</th>
<th>female</th>
<th>male</th>
<th></th>
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<td></td>
<td></td>
<td>8</td>
<td>29</td>
<td>12</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>21.6%</td>
<td>78.4%</td>
<td>19%</td>
<td>81%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schooling status</th>
<th>School</th>
<th>Other</th>
<th>Primary</th>
<th>Secondary O level</th>
<th>University</th>
<th>Farmers</th>
<th>None</th>
<th>Primary</th>
<th>Secondary A level</th>
<th>Secondary O level</th>
<th>University</th>
<th>Vocational</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>3</td>
<td>7</td>
<td>9</td>
<td>3</td>
<td>33</td>
<td>1</td>
<td>22</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>48.6%</td>
<td>8.1%</td>
<td>18.9%</td>
<td>24.3%</td>
<td>4.7%</td>
<td>51.6%</td>
<td>1.6%</td>
<td>34.4%</td>
<td>1.6%</td>
<td>6.3%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All respondents met were direct beneficiaries of this project. Though the team planned to meet 60 farmers and 24 schools, they were able to interview 64 farmers and 27 teachers in individual schools. In terms of sex, there were more male respondents than female for both farmers (81%male, 19%female) and Schools (78.4%male, 21.6%female). For schools it was clear as teachers are not employed by sex but for farmers this questioned the level of female involvement directly in the project activities. One of the key issues driving this type of involvement was the aspect of land ownership which majority was male owned hence leading to wives becoming passive beneficiaries.
Access to information

The tree talk project endeavoured to ensure that there was increased access to information on natural resources management. During the project’s life STF used mass media that included radio and newspapers as a means of disseminating information.

To establish relevance of use of these channels to convey information to the beneficiaries, respondents were asked to mention their most trusted source of information and of these which they felt was more reliable.

Findings show that, Radio is the most important source of information (60%) among farmers and is followed by word of mouth (14%), TV (10%), Newspaper (7%), cell phone (6%) and others (3%). Even schools had radio with highest mention (28%) followed by 16% newspapers, 5% TV and 3% cell phones. This indicates that, the project has been using relevant strategies to reach beneficiaries with information most especially with radio programming.

Table 2: Sources of and access to information

<table>
<thead>
<tr>
<th>Sources</th>
<th>Adjumani</th>
<th>Gulu</th>
<th>Kitgum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell phone</td>
<td>3 (10%)</td>
<td>3 (10%)</td>
<td>6 (6%)</td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td>25 (83%)</td>
<td>16 (53%)</td>
<td>62 (60%)</td>
<td></td>
</tr>
<tr>
<td>Newspaper</td>
<td>6 (14%)</td>
<td>1 (3%)</td>
<td>7 (7%)</td>
<td></td>
</tr>
<tr>
<td>Word of Mouth</td>
<td>9 (21%)</td>
<td>6 (20%)</td>
<td>15 (14%)</td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td>2 (7%)</td>
<td>3 (10%)</td>
<td>11 (10%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2 (4%)</td>
<td>1 (3%)</td>
<td>3 (3%)</td>
<td></td>
</tr>
<tr>
<td>School</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell phone</td>
<td></td>
<td>1 (7%)</td>
<td>1 (3%)</td>
<td></td>
</tr>
<tr>
<td>Newspaper</td>
<td>2 (17%)</td>
<td>1 (10%)</td>
<td>3 (20%)</td>
<td>6 (16%)</td>
</tr>
<tr>
<td>Radio</td>
<td>10 (83%)</td>
<td>7 (70%)</td>
<td>11 (73%)</td>
<td>28 (76%)</td>
</tr>
<tr>
<td>TV</td>
<td>2 (20%)</td>
<td></td>
<td></td>
<td>2 (5%)</td>
</tr>
</tbody>
</table>

In terms of reliability findings show that, radio (farmers 60%, school 76%) is most reliable followed by word of mouth (farmers 13%, school 11%), cell phone (farmers 6%), TV (school 5%) and newspapers (farmers 2%, school 3%). This further supports the initial finding on trusted sources of information that indicate radio programming as most relevant source on climate, weather, and natural resource management. This means the project in terms of information provision strategies have been relevant to beneficiaries.

To specifically link this relevance to actual achievement of the intended outcome, respondents were probed on issues related to the projects radio programming and newspaper.
Table 3: Most reliable source of information

<table>
<thead>
<tr>
<th>Sources</th>
<th>Adjumani</th>
<th>Gulu</th>
<th>Kitgum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell phone</td>
<td>2(7%)</td>
<td>1(5%)</td>
<td>1(7%)</td>
<td>4(6%)</td>
</tr>
<tr>
<td>Newspaper</td>
<td></td>
<td></td>
<td>1(7%)</td>
<td>1(2%)</td>
</tr>
<tr>
<td>Radio</td>
<td>22(81%)</td>
<td>15(75%)</td>
<td>12(80%)</td>
<td>49(79%)</td>
</tr>
<tr>
<td>Word of Mouth</td>
<td>3(11%)</td>
<td>4(20%)</td>
<td>1(7%)</td>
<td>8(13%)</td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell phone</td>
<td></td>
<td></td>
<td>1(7%)</td>
<td>1(3%)</td>
</tr>
<tr>
<td>Newspaper</td>
<td>1(8%)</td>
<td></td>
<td></td>
<td>1(3%)</td>
</tr>
<tr>
<td>Radio</td>
<td>9(75%)</td>
<td>6(60%)</td>
<td>14(93%)</td>
<td>29(78%)</td>
</tr>
<tr>
<td>TV</td>
<td></td>
<td>2(20%)</td>
<td></td>
<td>2(5%)</td>
</tr>
<tr>
<td>Word of Mouth</td>
<td>2(17%)</td>
<td>2(20%)</td>
<td></td>
<td>4(11%)</td>
</tr>
</tbody>
</table>

Radio programming was initiated in order to address issues on natural resources management that had not been accorded sufficient space in the Ugandan media. To date the project had been producing regular radio spot messages and live radio talk shows which were broadcast by four radio stations in the project area. The key thematic areas the messages concentrated on were climate smart agriculture, energy saving technology, agro-forestry, woodlot establishment and management, agri-business, rainwater harvesting and sanitation. The primary target for these messages was the communities living in the project districts, reached through this local language radio programming.

Findings show that, approximately 98% of beneficiaries had ever heard of the Tree talk radio program. When it came to listening to the content of the program, 96% reported that they had at one point or more ever listened to the radio program. This indicates that, Tree talk is one of the radio programs that respondents mentioned as a key source of information and reliable.

When asked which would be their most preferred source of information on tree planting, majority overall 36% preferred Tree Talk radio followed by other organisation 21%, government officers 17%, fellow farmers 13%, other radio programs 9% and print material 4%. When it came to individual districts however, Kitgum and Adjumani did not have Tree Talk as most preferred as illustrated below. This indicates that, there is need to incorporate a range of strategies in order to accommodate the varying preferences.
The project anticipated that this would not only become a key source of information but also foster learning among listeners leading to change. Since the radio component directly targeted the community, farmers were assessed on this.

According to findings, all the 96% of farmers who had listened to a Tree Talk radio program reported that, the information acquired gave them advice on how to carry out their farming. With this they further mentioned different ways in which the advice had affected their farming practices. Land use was most mentioned overall 51% followed by intercropping 32%, mulching 8%, water conservation 6% while cover cropping and use of fertilizers had each 2%.

Figure 1: Preferred source of information in tree planting

Figure 2: Effected change in farming
Tree Talk newspapers were started to provide an avenue for sensitization and awareness creation at a national level on issues of environment and natural resources management. To date Tree Talk newspaper has been produced and distributed to schools, institutions, communities and CBOs countrywide, in addition to being inserted in the New Vision newspaper. It was anticipated that Tree Talk would lead to collective learning and informed environmental activism across the country.

Since majority of the distribution of this newspaper was done in institutions of learning, the evaluation concentrated on schools that were direct beneficiaries of this project. Since each school had a focal person who was trained to implement and monitor activities, they were relied on to provide information for each selected school.

Findings show that, all schools had heard about the newspaper 100%, but 92% reported that they had actually received a copy of the newspaper in their school. All the schools (92%) that received the newspaper reported that the content was relevant and informative. Findings show that, in terms of use most schools had been distributing to individual pupils 70%, followed by putting in library 15%, give to clubs 9% and give copy to staff 6%. This indicates that, there was less use of collective learning strategies in utilisation of the paper as more schools concentrated on individual consumption. This means that, schools needed to be helped to adopt strategies like use of clubs, and libraries to foster collective learning.

Figure 3: Use of tree talk newspapers

All the schools that received and consumed the content of the newspaper were satisfied with the information and reported that it was relevant to their farming. When asked if it had influenced the way they were currently doing their farming, a number of practices/technics were mentioned as adopted. Most mentioned was intercropping 53%, followed by ploughing and raw planting each with 3%. The trend was not so divergent when it came to individual districts. This indicates that, information provision was a key strategy in influencing change.
These findings indicate two things about access to information. One is that, farmers have information gaps that need to be addressed and there is need to use more than one avenue to reach them with information which the project has endeavored to do. Secondly, it indicates that, farmers are willing to change and all they need is correct appropriate information to help them change. This was clearly shown by the way they effected changes in their farming practices after accessing the information.

It can be concluded that, in terms of improved access to information on natural resources management, the project has contributed a great deal not only just provision of information but also fostering change among beneficiaries.

**Natural Resources management in practice**

**Adoption of sound ecological practices**

The project through its different strategies also anticipated that, beneficiaries would be able to adopt sound ecological practices. Some of the key aspects were farming practices, use of energy saving technologies and establishment of wood lots.

For findings conducted in a baseline, it was established that beneficiaries were engaging in un-ecological practices of agricultural production that were not sustainable leading to loss of soil fertility, decline in yields, and corresponding income at household level. During the project period, 20 selected beneficiaries in each district per year were trained to demonstrate sustainable, “green” agriculture practices (which is a mix of soil conservation technologies, agro-forestry and sustainable agronomic practices/sustainable agriculture).

**Soil conservation technologies and agri- business**

The approach was run in a business-like manner; where beneficiaries were given practical skills on sustainable investment in gardening, encouraged to sell the produce whilst taking record of costs and income arising from activities on the garden.
The findings reveal that, after the trainings, beneficiaries have managed to apply/adopt some practices in their farming. Among farmers, 67% introduced new crops while 52% of schools that reported they had land to practice farming introduced new crops.

Respondent: To keep your garden productive for a long time, you do not have to burn the bush when preparing land for planting but to plough down so that the vegetation decomposes to enrich the garden with humus. Another way is by making trenches and grass barns/hedge rows to conserve water and to curb soil erosion. After weeding, it is important to leave the dry weeds in the garden to act as mulch and add humus to the soil on decomposition. Mulching is also important, because it enhances water conservation and prevents erosion, keeping the soil productive for a long time. Another way is by ploughing across the hill but not downhill.

![New crops introduced](image)

**Figure 5: New crops introduced**

Findings further show that, beneficiaries have also been able to change their farming practices by incorporating new strategies of managing their land in order to reduce loss in fertility and hence increase yields for both consumption and revenue. Some of the most adopted practices/technics in this management included, expanding area, intercropping, stopping burning, mulching, cover cropping, soil and water conservation, use of fertilizers to improve soil fertility and pesticides to control pests and diseases.

These findings indicate that, there is a willingness of beneficiaries to adopt better resource management practices most especially when it comes to land. It further means that, beneficiaries have implemented the practices and find them to be helpful in their farming hence the continued use to date.

The above is supported by the finding indicating the main reasons for adopting the changes as better yields, markets, climate change, better price, low rainfall amounts, new opportunity to sell, and erratic rainfall. Evidence clearly shows that, the adoption is also directly related to solving already identified problems that included decline in yields and loss in revenue at household level.
Figure 6: Changes in soil and land management

Figure 7: Reasons for adopting change

Due to the new practices beneficiaries further reported improved yield ensuring that they have enough produce not only for their consumption but also to produce for sale. This indicates that beneficiaries have shifted from the chronic concept of hand to mouth where all they produce is for consumption, to farming which allows them to also earn revenue to support them.

Consumption however, was more on the side of schools that never managed to produce on a commercial scale because they cannot produce more than what is enough. This is all illustrated in the figures below showing produce in relation to what was consumed and sold.
It is evident that, the project was able to build the capacity of beneficiary groups to establish agricultural crop production gardens. Farmers were guided to follow technical specification for planting in order to realise better yield. Hence beneficiaries are now equipped with skills for modern crop husbandry, green agriculture approaches and production for markets ensuring sustainability.

**Wood lot establishment**

During the project span, schools and individual community beneficiaries were encouraged to establish woodlots run in a business-like manner; growing trees and intercropping them. This effort was meant to help beneficiaries strike a balance between crop production to sustain food
production and establishment of woodlots for future income. According to records, beneficiaries were given onsite training relating to establishment of woodlots i.e. bush clearing, lining out, pitting as well as management practices including weeding, pest and disease control and fire line establishment.

Findings show that, 75% of schools and 83% of farmers enlisted as beneficiaries managed to establish woodlots. Before the beneficiaries were enrolled into the tree talk program, 73% of schools had woodlots while 58% of farmers had woodlots.

The beneficiaries reported that their main source of seedlings currently is Tree Talk 92% but before the project there was another organisation (70%) that supplied schools while 65% of the farmers purchased their seedlings. Other sources of seedlings mentioned included; fellow farmers and government officials.

This means that, though other projects had been supporting, most especially schools to set up wood lots, it's Tree Talk that is now relied on by 92% of beneficiaries to provide tree seedlings and technical support. It should be noted that the number of beneficiaries with established wood lots increased most especially farmers with inception of the project. This could be attributed to availability of free tree seedlings which cost them money before.

Status of wood lots before and after

<table>
<thead>
<tr>
<th>Source of seeds</th>
<th>School</th>
<th>Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bought them</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Other Organisation</td>
<td>8%</td>
<td>2%</td>
</tr>
<tr>
<td>Tree talk</td>
<td>92%</td>
<td>92%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Had woodlot before Tree talk</th>
<th>School</th>
<th>Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>27%</td>
<td>42%</td>
</tr>
<tr>
<td>Yes</td>
<td>73%</td>
<td>58%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source of seeds before Tree talk</th>
<th>School</th>
<th>Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bought them</td>
<td>7%</td>
<td>65%</td>
</tr>
<tr>
<td>From government officials</td>
<td>7%</td>
<td>11%</td>
</tr>
<tr>
<td>Got from a friend/fellow farmer</td>
<td>4%</td>
<td>19%</td>
</tr>
<tr>
<td>Organisation not Tree talk</td>
<td>70%</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
<td></td>
</tr>
</tbody>
</table>

Findings also show that, before the project, majority of beneficiaries were utilising less than an acre of land for the woodlot establishment or 1-2 acres. The supply of free seedlings resulted into decline in the farmers using less than an acre from 58% to 9% hence giving rise to those using 1-2 acres from 30% to 60%. This indicates that, beneficiaries had land available for woodlot establishment but could have been prevented from expanding their acreages by the cost of buying seedlings as many had reported buying them before Tree Talk came in to supply. Schools on the other hand been unable to change size of wood lots due to not having the space to do so as majority own limited land area.
Adoption of safe water providing technologies

With health statistics showing increases in number of children and people visiting health centers due to consumption of water contaminated by diseases causing pathogens, the project on this basis set out to work with selected beneficiaries to ensure provision of clean safe drinking water to reduce spread of waterborne diseases.

According to activity records, the project managed to purchase, and distribute water filters to a number of beneficiaries. Findings shows that, majority of the sources of water mentioned are actually not protected e.g. streams, rivers, wells, ponds and rain water. The only protected sources of water mentioned were public taps, commercial water springs and piped water at home. This means that, beneficiaries are still exposed to pathogens and the only way to avoid disease infection is by having appropriate water treatment strategies to filter and disinfect water before actual consumption.

Findings show that, currently even when the beneficiaries are exposed to unsafe sources of water, it is surprising that 58% of schools and 28% of farmers are actually doing nothing to make the water safe. Some of the methods mentioned by beneficiaries taking action included; filter (14% school, 39% farmers), using water filter (19% school, 11% farmers), boiling (3% school, 16% farmers) and adding chlorine (8% school, 5% farmers). This indicates that, a large proportion of beneficiaries are still at risk of contracting water borne diseases because they are doing nothing to ensure the water they consume is clean and safe.
According to activity reports, the project managed to distribute a number of water filters to beneficiaries. Findings reveal that, more than 80% of farmers and schools are aware of the water filters. In terms of actual ownership 73% of schools and 69% of farmers reported that, they owned one. To clarify that the filters were actually the ones distributed by the project, respondents were asked how they got the filters. From the findings, 89% schools and 95% farmers reported that they were given the filters. When probed to find out who gave them the filters, 100% of the beneficiaries reported receiving them from the Tree Talk’s project.
When a comparison was made in relation to those who owned a water filter and used one, finding indicate that, 34% schools, 54% farmers own and are using the filters while 8% school and 11% farmers were actually using other ways to ensure drinking water was safe. Surprisingly, large proportions though having filters were still doing nothing to ensure drinking water was safe. This could be related to a number of possible challenges including actual availability of water, knowledge of use and attitudes. This may indicate a need to continually support and monitor the beneficiaries not only train them but also ensure they have full capacity to utilise the resource given to them.

More than 90% of beneficiaries that use the filters reported that, they are very helpful. Some of the areas sited were that, they help them clean water for consumption and also have helped them save fire wood as they do not have to boil water any longer. These findings prove that, innovations like water filters, are a key in natural resources and environmental management.

**Adoption of energy saving technologies**

The selected beneficiary farmers were worked with to popularise the energy saving cook stoves that are easy to construct using locally available materials. Energy Service Providers (ESPs)
according to activity reports were trained, 15 in each of the target districts. During the training they were equipped with skills to construct energy saving cook stoves. The major aim of the stoves was to minimise the consumption of wood fuel and thus cutting down of trees to foster conservation of environment and natural resources.

Findings show that, more than 80% of beneficiaries are aware of the energy saving stoves. For ownership it was revealed that, 70% farmers who were the direct intended beneficiaries of the stoves actually owned one. Further investigation reveals that, 78% of the stoves in mention were the ones being promoted by the project i.e. Rocket Lorena. In terms of how they acquired these stoves, 53% reported they had bought, 40% someone built for them while 7% built for themselves.

Further investigation on Rocket Lorena shows that, 49% built the stoves themselves, 46% was built for them while 6% got by other means. This suggests two things; one is that, the local artisans (energy service providers) were able to pass on the skills to beneficiaries who in turn constructed their own stoves. This is supported by the fact that more than 70% (76% school, 84% farmers) reported receiving training. Secondly building the capacity of ESPs contributed a great deal not only to increasing access to this technology through constructing the stoves but to capacitate the beneficiaries leading to a multiplier effect.

It is evident from these findings that, the use of various strategies in this project has enabled beneficiaries to adopt sound ecological methods that are sustainable and applicable in their own context.

### Awareness of energy saving stoves

<table>
<thead>
<tr>
<th></th>
<th>School</th>
<th>Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heard of energy saving stove</td>
<td>no</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>81%</td>
</tr>
<tr>
<td>Own energy saving stove</td>
<td>no</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>41%</td>
</tr>
<tr>
<td>Which type</td>
<td>Locket lorena</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td>Single shielded stove</td>
<td>53%</td>
</tr>
<tr>
<td>How it was acquired</td>
<td>Bought it</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Built it myself</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>Was built for me</td>
<td>20%</td>
</tr>
</tbody>
</table>

Adoption of these various practices by beneficiaries has also been greatly supported by their attitudes towards the practice. As findings revealed there is a high proportion of beneficiaries with positive attitudes (agree) on tree planting i.e. Trees help making rain water in the soil 89%, Trees provide shade 94%, and Trees fix nutrients in to the soil 88%. This may explain why more beneficiaries not only established wood lots but even expanded the land for this purpose. The only issues is when it comes to economic gain as more farmers feel it takes too long to benefit (55%) and this could threaten efforts to promote the tree planting.
The ownership of the stoves by over 70% of beneficiaries has also been supported by the fact that they appreciate the difference between their designs and purpose as 70% agree fuel energy saving stoves are not different from three stone fire places while 78% disagree with statement that, fuel energy saving stoves are only for rural places.

<table>
<thead>
<tr>
<th>Attitudes of beneficiaries on practices</th>
<th>Negative attitude</th>
<th>Positive attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel energy saving stoves are not different from stone fire places</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Fuel energy saving stoves are only for rural places</td>
<td>22%</td>
<td>78%</td>
</tr>
<tr>
<td>Water is safe for drinking</td>
<td>19%</td>
<td>81%</td>
</tr>
<tr>
<td>Harvesting water is only for rural areas</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>Trees take too long to grow hence don’t benefit directly</td>
<td>45%</td>
<td>55%</td>
</tr>
<tr>
<td>Trees grow on their own in the bush</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Trees fix nutrients in soil</td>
<td>12%</td>
<td>88%</td>
</tr>
<tr>
<td>Trees provide shade</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Trees help retain water in the soil</td>
<td>11%</td>
<td>89%</td>
</tr>
</tbody>
</table>

Figure 15: Attitudes of beneficiaries on practices

*Respondent: Forests are a source of building materials, so this is very important, because from them, we can make shelter for our families. As men we can also make furniture from materials obtained from the forest. Some men love hunting, and when that season comes, we can find wild meat like the wild rat (Anyeri) which is a great local delicacy in our community. Also some wonderful species of birds which interest men like guinea fowls can only be found in the forests.

We can also rare our animals from resources found around and within the forests.*

**Social economic and environmental benefits**

It was anticipated at the start of the project that, implementation of the activities would lead to a long lasting realisation of benefits by the beneficiaries. During this investigation, the team looked at process benefits in terms of support and also direct benefit realised from being involved as a beneficiary directly.

**Support**

During the evaluation, respondents were asked if they had benefited from any type of support provided by the project. Findings reveal that, more than 80% (86% schools and 87% farmers) reported to have received such support. Furthermore, respondents reported main areas of support they benefited from as supply of tree seedlings (81% schools, 85% farmers. Other forms of support mentioned were, training, information, water filters, energy saving cook stoves, crop seed and
extension services. This means that, the beneficiaries valued the support and with the findings showing things like increased land for wood lots, it means they benefited from it.

**Figure 16: Support received**

**Energy saving stove benefits**

Among most especially farmers 98% of those who own stoves and have been using the Rocket Lorena introduced to them by the project find it useful. Beneficiaries mentioned a number of ways in which they had benefited that include; low cost on wood fuel 57%, low smoke inhalation 23%, cheap maintenance 10% and ability to cook faster 10%. Economically the stoves have proven to greatly reduce the cost on wood fuel and cheapen maintenance. Environmentally, the stoves contribute to reduction in trees cut for wood fuel preventing adverse effects to the environment. Health wise, reduced inhalation of smoke has contributed to a healthy productive population.

**Figure 17: Benefits of using locket Lorena stove**

*Respondent: what we can do is we should plant more trees; NGOs and Government should sensitize us about the importance of planting trees. We should stop burning bushes and forests.*
think each family should start planting trees, people should stop cutting down trees for charcoal in the dry season, government should employ people to restrict cutting down of trees.

Benefits of intercropping

The concept was meant to encourage farmers to integrate crops and trees in a bid to promote tree planting. This activity mainly targeted farmers and schools as primary audiences. Findings revealed that, 92% of beneficiaries practicing intercropping felt they had benefited from it. Some of the benefits mentioned included; easy weed management 71%, keeping wild fire out 11%, short term products 9%, increased income 3%, better water retention 2%, and variety in farm products 2%. Economically, the farmers have realised savings in terms of weed management and benefited in the short term through harvesting produce.

Respondent: it’s good because it helps in weeding the trees; if they are left without anything it’s hard to weed them since we become lazy. So mixing them gives us motivation to weed the plantation to manage weeds. Secondly it reduces the amount of dry plant matter in the garden and thus protecting trees from being burnt by fire during the dry season. .Thirdly it also helps in moderating the micro climate and conserves water for good tree growth and survival and also encourages our wives to visit our tree plantations since they have to weed them

Respondent: The dead dry weeds act as mulch, promoting conservation of water, reducing erosion, and adding nutrients to the soil on decomposition making trees to grow well. The food crops grown within the trees, smoother the weeds, keeping trees free from competition that normally retards their growth. Also, during the dry season, when wild fires are set all over the communities, it helps in keeping the woodlots safe, because after harvesting the food crops, the woodlot is left bare without any major weeds which would otherwise catch fire and burn the trees.

<table>
<thead>
<tr>
<th>Benefits from intercropping</th>
</tr>
</thead>
<tbody>
<tr>
<td>better water retention</td>
</tr>
<tr>
<td>Easy weeding</td>
</tr>
<tr>
<td>increased income to household</td>
</tr>
<tr>
<td>keep wild fire out</td>
</tr>
<tr>
<td>reduced flooding</td>
</tr>
<tr>
<td>short term product as we wait for the trees to grow</td>
</tr>
<tr>
<td>variety of farm products</td>
</tr>
</tbody>
</table>

Figure 18: Benefits from intercropping

Benefits of using water filter

Findings show that, more than 80% (85% schools and 98% farmers) who owned the filter found it useful. There were two main benefits mentioned in relation to the filters one being the fact that, beneficiaries using this filter now access safe drinking water 80% while 20% reported that, the filters are helping them prevent water borne diseases stemming from consumption of
unclean/untreated water. Economically as a benefit it means that, beneficiaries can save money on treating water borne diseases and using the water filters also ensures that they do not have to constantly use firewood to boil water hence saving the environment.

Looking at all the benefits mentioned it is clear that, the project had considerable impact on its beneficiaries. Economically they are now saving money through the use of new technologies by using less wood fuel and avoiding diseases caused by long term smoke inhaling and drinking contaminated water. In the long run this has directly and indirectly contributed to carbon sequestration and natural resources management as well environmental conservation.

5 Lessons Learnt

- If beneficiaries are made aware of the importance of natural resources management and its benefits they are willing to adopt practices to promote this. For example how farmers increased land use for woodlots by 30% after the project.

- The strategies bring on a sustainable component to programming as beneficiaries are able to acquire skills through peer to peer learning and also at the same time become self reliant as they can also get own seed and seedlings to continue with activities even after project closure.

6 Conclusions

- Strategies provided relevant information on natural resources management and have since inception become the most reliable access points of information. Radio programming is still the most relied on source of information for both farmers and schools. It is evident from findings that, information acquired has impacted beneficiaries in specific actions most especially on tree planting. It can therefore be concluded that, strategies being used are indeed relevant to ensuring information access. The main challenge remains with internal use of newspapers where collective methods of learning are still lacking as papers are distributed to individual pupils.

- It is evident from these findings that, the use of various strategies in this project has enabled beneficiaries to adopt sound ecological methods that are sustainable and applicable in their own context. Some of these included; intercropping, use of energy saving cook stoves, establishment of woodlots and use of water filters. This has ensured the shift from the chronic concepts and practices like hand to mouth, consumption of water from contaminated sources and high rate of cutting of trees for wood fuel.

- Looking at all the benefits mentioned it is clear that, the project had considerable impact on its beneficiaries. Economically they are now saving money through the use of new technologies by using less wood fuel and avoiding diseases caused by long term smoke inhaling and drinking contaminated water. In the long run this has directly and indirectly contributed to carbon sequestration and natural resources management as well as environmental conservation.
7 **Recommendations**

- There is need to have more support supervision visits to monitor beneficiaries and be able to assist them when they need further capacity support to implement what they learned.

- Introduce role modeling where farmers or schools that have had success in their implementation of activities are able to support others through peer to peer learning. This will promote sustainability and ensure continuity even after project closure.