NATIONAL BEST PRACTICES REPORT
UGANDA

NBI / NTEAP / MGP

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Table of Contents

Contents **Pages**

Acronyms and Abbreviations:

BP	Best Practice
CBO	Community Based Organization
CSO	Civil Society Organization
IGA	Income Generating Activities
KTC	Kyotera Town Council
KBESP	Kukuuma Butonde Environmental Support Project
MGC	Micro Grant Coordinator
MGL/NSC	Micro Grant Local/National Steering Committees
NB	Nile Basin
NBEM	Nile Basin Environmental Management
NGO	Non-Governmental Organization
NPC	Nile Project Coordinator
NTEAP	Nile Transboundary Environmental Action Project
PSC	Project Steering Committee
RAWESE	Rakai Women's Effort to Save the Environment
SIP	Sustainability Investment Plan
SVP	Shared Vision Program
ToR	Terms of Reference
UN	United Nations
YES	Youth Environmental Service

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Executive Summary:

The Nile Transboundary Environmental Action Project (NTEAP) is one of the eight projects under the Nile Basin Initiative (NBI) Shared Vision Programs (SVP). The main object of NTEAP is to provide a strategic environmental framework for the management of the transboundary resources and environmental challenges in the Nile River Basin. The NTEAP has 5 components, including the **Community-Level Land, Forest and Water Conservation Component.** The component supports pilot activities in geographic and thematic areas of transboundary significance. It demonstrates the feasibility of local level approaches to land and water conservation, including mitigation action for erosion, non-point source pollution, invasive weeds, environmental awareness and non-governmental organization (NGO) networking. The component consists of three sub-components, one of which is the Nile Transboundary Micro Grants Program that supports community-driven interventions to address transboundary environmental threats on local scale.

The NTEAP has established major activities on the ground as well as other activities that are of significant importance to the Nile Basin (NB) countries and have an impact on the environment of the basin. All these activities are implemented by NTEAP in collaboration with government officials, communities, NGOs, community-based organizations (CBOs), school teachers and students. The collective objective of these activities are to pilot innovative approaches to land and water conservation measures at the national level that face the NB; and enhance the technical co-operation among the NB countries.

Therefore, within the 2007 and 2008 implementation years, it was NTEAP's intention to focus on deriving and documenting best practices from activities at the national and regional level. Through national consultative workshops, countries including Uganda, selected candidate best practices which were presented and discussed at a regional best practices workshop in August 2007 in Kigali.

The best practices which were identified in Kigali were to be further scrutinized and validated using various tools through the services of two national consultants in each country: an environmental consultant who is expected to review the Best Practices presented in Kigali with the view of validating the technical appropriateness and relevance to the Nile Basin Environmental Management (NBEM) issues; and a media /communications /knowledge management expert to document the Best Practices in a presentable fashion that will facilitate this replication and/or up-scaling. This report is the output of the environmental and media and communications consultant.

Through the activities of the Solid Waste Management in Kyotera Town Council Project, the members of RAWESE have been able to exchange ideas and acquire expertise in crafts' production, vegetable production techniques, recycling and waste utilization and raising pigs at the household level from locally formulated feeds. By each woman's group having a diversified source of income, group viability was enhanced and household members appreciated time devoted to solid waste management. Even now that the project has ended, RAWESE can continue various operations

With regard to the project Kutuuma Environmental Support Proejct, the technologies for raising tree seedlings in nurseries and further plantation, the operation of solar cockers and domestic water harvesting are relatively simple, manageable and easily replicable initiatives. Towards the end of the project more than 20, 000 seedlings were raised in project nursery and further distributed to end users. In this regard, 15,000 seedlings were planted as group's woodlot, 5, 000 seedlings were given out to over 30 individual group members to be planted in their own land. With regards to rainwater harvesting, 12 tanks were constructed by 12 households which were supplying water to about 96 people.

A key lesson learnt during the implementation of the Solid Waste Management in Busia Town Council Project was the creation of a successful collaboration / networking / partnership. While these parameters significantly contributed to the success of the project, it also enabled adequate information sharing in a multi-ethnic community setting. Furthermore, the project was successful because it emphasized equal gender roles in its activities. The public-private collaboration has resulted into a dramatic reduction in the volume of solid waste previously left unattended to where all the five parishes of the town council were covered. The YES – BTC partnership demonstrated how an NGO can work in partnership with Town Council Authorities and involve community members to adequately address town-based environmental problems.

The integrated fish farming activity has high potential for success when feed is locally available and the fish is processed to increase its value. The group needs to keep good records of costs and revenue in order to adjust their activities where necessary so that they realize more profits from fish farming. In addition, a good marketing strategy is required to ensure that the various products in the integrated fish farming system are sold at good prices.

The Ecosystem Restoration Project is a good demonstration of a river ecosystem restoration. The project can be replicated and easily sustained. It is recommended in areas where watershed areas have been degraded and where soil erosion is too much. It is also recommended that Kubbi community members be given more skills through training in grafting and proposal writing. This will widen their income and improve their food security. The work requires dedication, as it is in most cases voluntary and to operate at minimal investment costs, the community needs to be innovative.

The integrated Sustainable Use of Biodiversity Project can be easily sustained and replicated and ARCOD should be given the necessary support especially from the district leadership. The replicability will be given a boost if the planned by-law by the district forcing the farmers to increase area or acreage under food production are made. Enforcement of public smoking laws is also an important aspect that can make the project be sustained as this will leave chili growing as the only cash crop in the district

1. Introduction:

Best Practice (BP) is a management idea which asserts that there is a technique, method, process, activity, incentive or reward that is more effective at delivering a particular outcome than any other technique, method, process, etc. In other words, with proper processes, checks, and testing, a desired outcome can be delivered with fewer problems and unforeseen complications. A BP can be selected generally from several competing options and defined. The notion of BP does not commit people or companies to one inflexible, unchanging practice. Instead, BP is a philosophical approach based around continuous learning and continual improvement. BP's do not have one template or form for everyone to follow. It is a concept that a good process and planning is being followed in the execution management of a project plan, and that changes to the initial plan, dependencies, and goals are being tracked and documented.

BPs are identified by asking the right questions in the right sequence and giving equal value or weighting to each question. The common questions are: (a) what is the problem (challenge) at hand; (b) are the interventions (policy, strategy, process, practice) an innovation; (c) does the intervention have a demonstrated positive impact; (d) is it currently being used; and (e) can it be replicated or up-scaled?

Best Practices are initiatives around the world by people and communities/governments to solve critical social, economic and environmental problems. The idea here is to document initiatives addressing environmental concerns or issues in the Nile Basin (NB) countries so as to: (a) *illustrate* innovative approaches to addressing environmental issues; (b) *facilitate* the exchange of lessons learned from experience; and (c) *promote* policy dialogue and behavioral change.

2. Best Practice Concept: Basic Definition

Generally, within the NTEAP, the art of best practice is defined as a visibly sustained impact of an innovative project/Programme brought about by a particular design, a technique, a process, a methodology and finally delivered with fewer problems and unforeseen complications.

Specifically, in environmental management, the concept of best practice is literally defined as the most efficient and effective series of outcomes that have proven desirable and further generate sustained impact, both on the resource base and beneficiaries. As such, they could be further replicated or up-scaled in similar ecosystems; advisably with a recorded multiplier value.

As a conduit for knowledge management, the best practice concept facilitates wide exchange of information, enhances trading of sustainable good operating systems" and promotes cross-border, transboundary and regional cooperation.

3. Best Practice (1): Solid Waste Management in Kyotera Town Council

3.1 Problem Statement:

The area lies in a modified equatorial climatic zone with high temperatures and heavy rainfall almost all year round. There is a relatively dry season around January and February, and another in June, July and August. However, these dry periods are occasionally mitigated by a few light falls. A principal peak is due around March – April and May, whereas the minor peak is around October and November. The mean annual rainfall vary from 1,350 mm to 2,125 mm which decreases to 850 mm and 750 mm in some parts. Two dry seasons occur with the more pronounced one in June-July-August and September while the other is between December and February. The area generally records around 25^0C mean annual maximum temperatures. Relative humidity ranges between 80-90% in the mornings and decreases to between 61% 66% in the afternoons during the months of January to May. From June to August, the morning records decrease to around 77% and so are the afternoon recordings that decrease to around 56% and 57%.

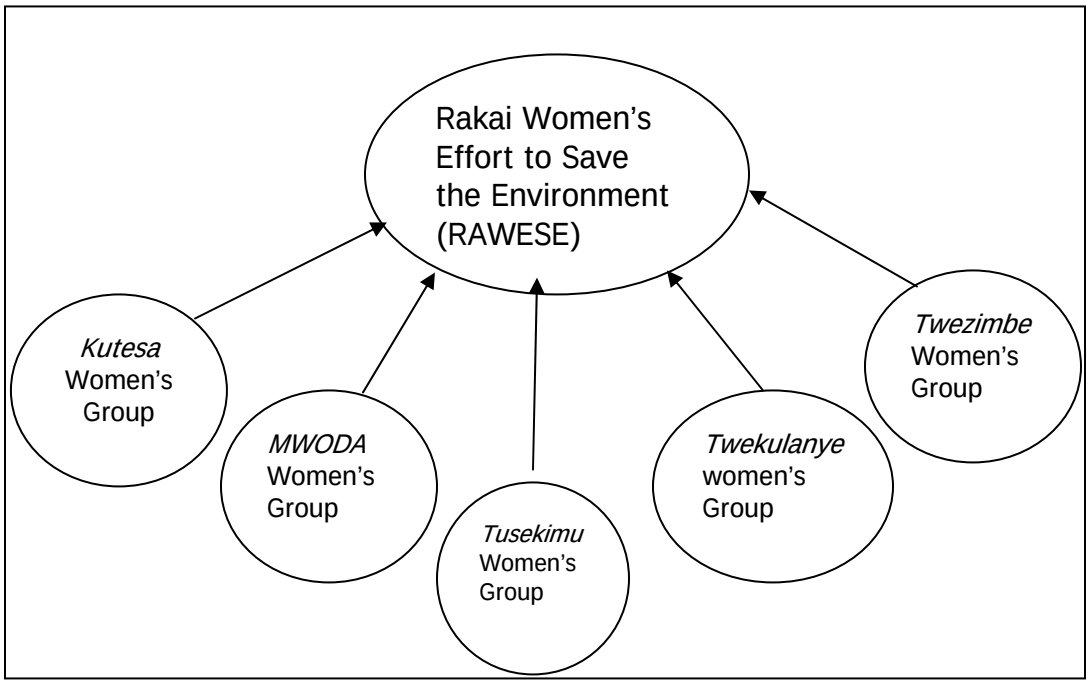
The dominant tribes include Baganda, Banyankole, Bahima and Banyarwanda. According to the 2002 population Census, the total population in Kyotera Town Council was 7, 678 with 3, 488 males and 4,190 females growing at an average rate of of 3.4% per annum. Soil degradation is one of the most important environmental problems in the area. The main degradation process is soil erosion which is influenced mainly by topographic factors as well as soil types. The most serious problem in the area is waste disposal.

On the average, the urban population in Uganda generates about 1.0 kg of solid waste per person per day. Using the national average conservative growth rate of 3.4% per annum, the population of Kyotera Town Council (KTC) should now be approaching 10 000 people. Therefore, residents of KTC generate on the average about 10 metric tonnes of solid waste per day. The quantity varies with the season of the year, being less during the dry season. The increasing quantity of solid waste is a growing environmental problem where large volumes of solid waste is produced and further constitute an enormous public health hazard. The largest proportion of solid waste is disposed of by open dumping, open incineration, refuse pits and others. Uncollected and inappropriately disposed solid waste provides good living conditions for rats, flies and mosquitoes, which themselves are vectors of disease such as malaria, plague and various waterborne diseases. That in addition to fire hazards, odour nuisances, atmospheric and water pollution which is carried directly into Lake Victoria and ultimately the River Nile.

3.2 Justification for Selection (innovativeness):

Among the projects supported by NTEAP, at least, three of them dealt with solid waste. The first one in Busia, was selected because of its public–NGO partnership arrangement. The second one in Kyotera was qualified as a best practice because it features a consortium of five women CBOs/NGOs. The consortium in turn entered into a partnership with the Kyotera Town Council.

Fig (1)



The Rakai women consortium voluntarily came together, just out of a tragedy, to deal with the problem of solid waste when one lady lost her husband from tetanus infection due to inappropriate solid waste handling methods. It also dawned on the women that inappropriate disposal of solid waste impacts them more than other members of society and, therefore, adequate management is in their interest. While the Sanitation Scouts, employees of KTC each earn 20 000 per month (Team leader receives UShs 35 000 per month), the members of RAWESE receive no such remuneration or allowance. Instead, RAWESE provides funds for family projects such as rearing local chicken (Fig 1). True, the NTEAP support catalyzed the formation and energized the operations of RAWESE, but by and large, the initiative was voluntary, spearheaded by already income generating CBOs. While altruism is a common feature of civil society organizations, the women's groups also saw some immediate financial benefits. These groups make crafts such as mats and hats for sale to the public. Traditionally, the raw material for making crafts products were the leaves of a palm (*Phoenix reclinata*) and banana stem/leaf fibers. Unfortunately, these natural materials are becoming scarce and therefore relatively more expensive. So the women's groups are now substituting plastic drinking straws in place of the natural materials thus offering an opportunity to recycle some of the plastics in the solid waste streams. The drinking straws can be collected and processed for more cheaply than procuring the natural materials.

3.3 Technical Approach: Design and Methodology:

The project strategy is two-fold: firstly, enhance solid waste management in Kyotera Town, hence contributing to reduced pollution of Lake Victoria; and secondly, contribute to increased household incomes of the communities in Kyotera Town Council by relating income generating activities through waste recycling mostly, compost for organic farming (fruits and vegetables), poultry, selling fuel briquettes and bee-keeping. The project's implementation strategy included the following:

- conducting a baseline study and information needed for situational analysis;
- conducting training of community members and an additional 13 trainers in waste management;
- procuring and distributing equipment and protective clothing to the trainers, including the procurement of audio-visual equipment for training;
- training 5 women's groups in enterprise development, bee-keeping, poultry and organic farming of commercial fruits (passion fruit) and vegetables (cabbages, tomatoes);
- organizing "clean-up" days and competitions for schools and other communities;

- conducting out-reach porgrammes to communities in Tanzania and other parts of Uganda with similar objectives; and
- follow-up visits and monitoring and evaluation.

3.4 Partnership:

The residents of KTC were the general beneficiaries. Direct beneficiaries were the 150 members of the five women's groups that make up RAWESE. Kyotera Town Council is a key stakeholder since, under normal circumstances, solid waste management is the responsibility of KTC. Other stakeholders, partners of RAWESE, are UN Habitat and Centenary Rural Development Bank. The Urban Waste Network is a stakeholder since RAWESE is a member. Four schools (such as Town View Junior Academy) which have established Sanitation Clubs are also key partners and hence stakeholders.

3.5 Essence of the Best Practices: Benefits and lessons learnt

The essence of a best practice porject takes into consideration three key issues namely, accrues benifits and lessons learnt, sustainability and replicability. For the Solid Waste Management Proejct, at the onset, it managed to build the confidence of the members of the women's groups as evidenced by eloquent presentations and group discussions during the interviews held to assess the success of the project. A tangible evidence of the success of the project was the clean looking of the streets in Kyotera Town. In the art of the business, at least, 70 households in Kyotera Town Council involved in stable income-generating activities. More specific indicators of success included namely 10 farmers involved in commercial bee-keeping, 20 farmers involved in commercial poultry farming, 2 women groups making and selling fuel briquettes made out of waste material and 40 women involved in commercial organic farming of fruits and vegetables.

Through the activities of the project, the members of RAWESE have been able to exchange ideas and acquire expertise in crafts production, vegetable production techniques, recycling and waste utilization and raising pigs at the household level from locally formulated feeds. By each woman's group having a diversified source of income, group viability was enhanced and household members appreciated time devoted to solid waste management. Even now that the project has ended, RAWESE can continue various operations. Other areas of strength included strong local government support, the market for crafts is available thus facilitating sales and the presence of a strong customer demand for products made from recycled materials (plastics). Reportedly, the average household income was estimated at US$ 400 per season.

3.5.1 Sustainability:

The fact that the scope of the income generation activities has been widened in support of the CBO/NGO to implement larger projects and a strong partnership was built, do indicate that the project can be sustained.

3.5.2 Replicability:

The success of RAWESE has encouraged other women's groups to apply for joining. In order to maintain a successful track record, RAWESE requires that new groups are duly registered as CBOs or NGOs, and the applicant groups need to show evidence of previous successful dealings with development partners. Hence opportunities exist for up-scaling. Replication is also possible, since interest has been expressed by neighboring urban councils (Kalisizo and Rakai town councils) to get into the business.

3.5.3 Limitations and Challenges:

One key limitation is the poor solid waste carrying capacity of RAWESE, since only one vehicle is operational at the moment. Unlike other urban areas in central region, Kyotera neither have a bye-law governing solid waste management nor have a suitable mechanism in place for the safe disposal of biohazardous waste. For more efficient involvement in solid waste management, RAWESE has to register itself as a company to be eligible to tender for KTC's annual solid waste management contract. Should the bid comes successful, it would eventually contribute towards the organization's financial sustainability.

4. Conclusion:

Through the activities of the project, the members of RAWESE have been able to exchange ideas and acquire expertise in alternate source of income such as crafts production, vegetable production techniques, recycling and waste utilization and raising pigs at the household level from locally formulated feeds. By each woman's group having a diversified source of income, group viability was enhanced, women were empowered and household members appreciated time devoted to solid waste management. Even now that the project has ended, RAWESE is actually continuing various operations. Other areas of strength included strong local government support, the market for crafts is available thus facilitating sales and the presence of a strong customer demand for products made from recycled materials (plastics) proved to be a good indicator for the sustainability and replicability of the project.

5. Best Practice (2): Kukuuma Butonde Environmental Support Project

5.1 Problem Statement:

The project area lies in the semi arid zone of Rakai District which is characterized by fragile ecosystem and extensive wet lands leaving behind too shrinking cultivable lands. The area is also highly populated and of the 471 806 people In Rakai District 96% is rural, way higher than the 85% national average.
The high population density and hence the consequent economic activities have led to the loss of forest cover and further removal of biomass for firewood and the supply of charcoal to the urban centers of Kalisizo, Kyotera and Rakai townships. In addition, there is severe soil erosion brought about by both wind and water factors which means reduced agricultural productivity. Apart from the deforestation and the edaphic problems, the weather, in general, is relatively unpredictable (onset and cessation of rains). In view of the limited resources, there is serious conflict between farmers and herdsmen, rampant poverty and misunderstandings of the purpose of promoting fruit husbandry.

5.2 Justification for Selection (innovativeness)

The Nyanga Kentale Kukuuma Butonde Group was supported by LVEMP in raising fruit tree nursery for a period of three years until the UNDP/GEF Small Grant Project (MGP) came up with additional support, taking into consideration that three years appeared to be very short before full benefits could be reaped out of an Integrated Conservation and Development Project (ICDP) such as this.

The qualification of the project as a best practice is five-fold: firstly, it initially demonstrates sustainability (handover from LVEMP to GEF/MGP); secondly, creation of a wider membership; thirdly, a unique income sharing formula was created where risks could be shared between all parties (table 1); fourthly, each member of the group designates an heir to his/her interests; and fifthly, each member is also supplied with seedlings to plant on their own land holdings which means a stronger conservation zeal that encourages others to join.

Table (1)

Item	**% share of income**
1. Income shared among members	60%
2. Bank reserve (money put in the bank as the group's reserve or savings)	20%
3. Administrative costs	10%
4.Lease fees paid to landlord	5%*
General maintenance/purchase of inputs	5%
Total	100%

** Often this rate can go up to 10% depending on the result of negotiations.*

5.3 Technical Approach: Design and Methodology:

The Kukuuma Butonde Environmental Support Project is located in Rakai District. The mean annual rainfall varies from 1 350 mm to 2 125 mm in the wetter parts of the district and decreases to between 750 mm and 850 mm in the drier parts. The mean annual maximum temperature is 25^0C. On the other hand, the mean annual minimum temperature is 17^0C in the eastern parts decreasing to 15^0C in the western parts of the district.

The biggest percentage (96%) of the population lives in rural areas and depends on subsistence agriculture growing bananas, beans, maize, irish potatoes, groundnuts, cassava, sweet potatoes, coffee and tobacco as the main crops. There are about 150 fishponds in Rakai District. There are no serious environmental concerns, because fish farming as yet is at subsistence level with little material input. Apiculture, pig farming and bee keeping are important income generating activities. There are 42 maize mills and 33 coffee processing plants in the district. Two fish processing factories have come up based on the fish products from Lake Victoria.

With the above profile of the area the best practice project was designed to up-scale the initiatives that the Nyanga Kentale Kukuuma Butonde Group had started with the support of Lake Victoria Environment Management Project which targeted income generating activities, health, environmental protection and alternative renewable energy use. The operational strategy of the project included the following:

- conducting training in natural resources management;
- providing support to the tree nurseries;
- raising seedlings for establishing group woodlots on leased land and for individual members to plant on their own lands;
- constructing soil erosion control bunds;
- conducting rainwater harvesting at household level;
- holding outreach porgrammes to communities in Tanzania and other parts of Uganda facing similar problems; and
- holding rigorous monitoring and evaluation sessions.

In order to achieve the above, the project has put forward a number of success indicators which included the following: (a) 20, 000 seedlings raised in project nursery; (b) about 15,000 seedlings planted in the group's woodlot (s); (c) 5, 000 seedlings given out to over 30 individual group members to be planted in their own land; (d) rainwater harvested in tanks by 12 households (12 water tanks were estimated to supply clean water to about 96 people); (e) over 500m of soil erosion control bunds constructed; and (f) 15 sun ovens to be used by 15 households on a regular basis.

5.4 Partnership:

The members of Nyanga Kentale Kukuuma Butonde Group, the main implementer of the project, are the key stakeholders. The first project of LVEMP was also a stakeholder and by extension being a regional organization, the Lake Victoria Basin Commission was also a stakeholder. The NTEAP/MGP and through it the entire NBI are main partners.
Also the herdsmen in the surrounding are important partners. Moreover, the local administration, CBOs in the area and the heirs nominated by each group member are also key partners.

5.5 Essence of the Best Practices: Benefits and lessons learnt:

The essence of a best practice porject takes into consideration three key issues namely, accrues benifits and lessons learnt, sustainability and replicability. For the Kutuuma Environmental Support Porject these could be further elaborated as follows:

The technologies for raising tree seedlings in nurseries and further plantation, the operation of solar cockers and domestic water harvesting are relatively simple, manageable and easily replicable initiatives. Towards the end of the project more than 20, 000 seedlings were raised in project nursery and further distributed to end users. In this regard, 15,000 seedlings were planted as group's woodlot, 5, 000 seedlings were given out to over 30 individual group members to be planted in their own land. With regards to rainwater harvesting, 12 tanks were constructed by 12 households which were supplying water to about 96 people. On soil erosion control, over 500 meters of erosion control bunds had been constructed. In order to enhance energy conservation 15 sun ovens were put on use by 15 households on a regular basis. This had saved, at least, 1.2 tonnes of woodlots per annum costing approximately US$ 4,800.

5.5.1 Sustainability:

This initiative in itself is a follow up to the project that the Nyanga Kentale Kukuuma Butonde Group had started with the support of Lake Victoria Environment Management Project which targeted income generating activities, health, environmental protection and alternative renewable energy use. This means that the accrued benefits form the replica, which was supported by NTEAP/MGP, were enough to sustain it.

5.5.2 Replicability:

The technology for raising tree seedlings in nurseries and the operation of solar ovens are relatively simple and allow for easy replication. The Nyanga Kentale Kukuuma Butonde Group was able to up-scale its operations from the LVEMP support and accommodate interventions under the GEF/UNDP/SGP. This follow up arrangement is actually a replication of the former project.

5.5.3 Limitations and Challenges:

The main limitations were that: firstly, the group did very little advocacy on the achievements of the project; and secondly, the local governments appear to be least involved in the activities of the group, despite the fact that the local government could be effective in controlling the damaging activities of the herdsmen through appropriate bye-laws.

6. Conclusion:

This initiative in itself is a follow up to the project that the Nyanga Kentale Kukuuma Butonde Group had started with the support of Lake Victoria Environment Management Project which targeted income generating activities, health, environmental protection and alternative renewable energy use.

The technologies for raising tree seedlings in nurseries and further plantation, the use of solar cockers and domestic water harvesting are relatively simple, manageable and easily replicable initiatives. To that effect, towards the end of the project more than 20, 000 seedlings were raised in project nursery and further distributed to end users. In this regard, 15,000 seedlings were planted as group's woodlot, 5, 000 seedlings were given out to over 30 individual group members to be planted in their own land. With regards to rainwater harvesting, 12 tanks were constructed by 12 households which were supplying water to about 96 people. This entails that the concerned government entities should work within a wide range of communities to further disseminate the outcomes of this project.

7. Best Practice (3): Solid Waste Management in Busia Town Council

7.1 Problem Statement:

Whereas the resident population of Busia Town Council is about 38 000 people, its day time population is a multiple of that due to the presence of Customs Post. This means that the capacity of the Town Council to manage due solid waste generated by both resident and transient populations is inadequate. Moreover, the incremental financial resources needed to manage the solid waste discarded by transient population is just a nightmare. During the pre-project situation, there were no solid waste disposal facilities, but instead solid waste was discarded haphazardly on streets and in alleys between buildings by both the resident and transient populations alike. Open burning of the solid waste was also carried out randomly thereby exposing the vulnerable segments of the population to noxious and often carcinogenic fumes. There were virtually no attempts at recycling, although some re-using was taking place. Apart from the immediate health effects on the population, poor solid waste management in Busia Town Council has the potential to pollute first, River Sio (the River that is the border between Kenya and Uganda), then Lake Victoria where the river ends and ultimately the River Nile. The result is the impairment of the quality of the water.

7.2 Justification for Selection (innovativeness):

There is now a new paradigm on public-private partnerships (PPP) in carrying out a number of development initiatives. Many activities which were originally defined as exclusive responsibility of the public domain are now often implemented by the private sector through financial donations. In fact the past mistrust between the public and private institutions has been eliminated by the new concept.

Henceforth, the successful collaboration between Busia Town Council (a public institution) and Youth Environmental Service (YES), a non-governmental organization, constitutes a good example of putting the above partnership into operational perspective. This new arrangement blends the innovative nature of the waste management project.

7.3 Technical Approach: Design and Methodology:

The project strategy was five-fold: firstly, collection of solid waste; secondly, training of community members in waste management; thirdly, promotion of sorting of waste; fourthly, transportation of waste to the dumping site; and fifthly, recycling of polythene materials. The main operational strategy included the following:

- training volunteer youth from the community members in waste management, including collection, sorting, disposal and recycling;
- procurement and distribution of containers and other inputs for waste management;
- waste collection and management using volunteer youth;
- recycling polythene materials to make ceiling boards; and
- mounting outreach visits; and
- monitoring and evaluation.

Practically, in situ, garbage was advised to be collected in dustbins instead of being scattered along roads and around buildings. Also there was a rigorous sorting of waste into biodegradable and non-biodegradable components for further disposal. The number of ceiling boards made out of waste polythene material was taken as a management success indicator.

7.4 Partnership:

The community at large is the principal partner and a beneficiary of this project. The Busia Town Council (BTC) is a key stakeholder, since solid waste management is their responsibility. The NGO YES (114 members of whom 80 are men and 34 women) is another instrumental partner to the project. NGOs in Kyotera, Iganga and Malaba town councils are also important partners in constituting the Waste Managers Network. Lastly NTEAP/MGP is a main partner in funding the project.

7.5 Essence of the Best Practices: Benefits and lessons learnt:

The essence of a best practice porject takes into consideration three key issues namely, accrues benifits and lessons learnt, sustainability and replicability. For the Solid Waste Management in Busia Town Council, these could be further elaborated as follows: A key lesson learnt during the implementation of the project was the creation of a successful collaboration / networking / partnership. While these parameters significantly contributed to the success of the project, it also enabled adequate information sharing in a multi-ethnic community setting. Furthermore, the project was successful because it emphasized equal gender roles in its activities.

The public-private collaboration has resulted into a dramatic reduction in the volume of solid waste previously left unattended to where all the five parishes of the town council were covered. The YES – BTC partnership demonstrated how an NGO can work in partnership with Town Council Authorities and involve community members to adequately address town-based environmental problems. In connection to this, the NGO YES established a fully operational communal solid waste collection centre. Sixty containers (dust bins) were distributed to shops and restaurants, as a demonstration, to train business owners and their clients in proper solid waste disposal. Through the partnership, the project has been able to demonstrate the value of recycling the polythene plastics *(buveera)* to make table and chair tops, among others. The total cash value of these products is estimated at US$ 820. YES is also encouraging its members to go into organic composting, having secured a market from Busitema University. Cash earnings from compost is approximately US$ 200 per month. The BTC was able to develop a Sanitation Bye-Law in order to govern the whole solid waste management process. As an important outcome, the total amount of removed waste is estimated at 65 tonnes per year, which was otherwise found to litter the whole town.

On improving the capacity of the members of the community in solid wate management, YES trained 30 young volunteers and they have also been quite instrumental in the day-to-day training of community members and in collection of waste around the skips. The multiplier value of this training among the community members was that, at least, 300 individuals received proper orientation in solid waste management.

In order to involve people in addressing their own problems, the NGO YES managed to introduce Volunteerism as a key community value. In order to widen the scope of this project, YES had succeeded to create a network of waste managers by linking with NGOs in Kyotera, Iganga and Malaba town councils. On advocacy and publicity/social sides, YES used drama and radio talks to increase the awareness of the community on issues related to solid waste management.

These methods, together with meetings and orientation workshops, enabled the organization to reach out to almost 50% of the resident population in Busia town, including people from all walks of life.

7.5.1 Sustainability:

A key enabling feature is that YES enjoys a strong political support from the local leaders which would enable them to interact with many town councils on solid waste disposal. Moreover, the NGO has a strong organizational structure and acquired solid skills in waste management and advocacy under a strong notion of helping people to help themselves. With these areas of strength YES has managed to establish a viable public- private partnership which enabled pooling of resources to enhance waste management. In addition many people from the community had been trained in waste management, which was so instrumental in the art of conduct of business. An innovative undertaking is the recycling of polythene waste into useful items such as table tops and chair parts which provides a source of income to the people. Lastly, YES was able to establish a solid waste networking with parties in other towns which would enhance wide-scale waste management in the country and exchange of knowledge. With all these successes the project can easily be sustained.

7.5.2 Replicability:

Initially the project had planned to cover 3 of the 5 parishes of Busia Town Council. In view of the success made, the project was able to cover all the 5 parishes of the town council. NGOs in other neighboring urban areas such the case of Tororo Municipality, have expressed interest in the work of YES in urban waste management and further invited YES to conduct appropriate training for some people in the council. Moreover YES has managed to establish a strong waste management networking involving NGOs active in neighboring town councils using its aggressive advocacy skills. All the above constitute an enabling environment for the replication of the outcomes of this project.

7.5.3 Limitations and Challenges:

The key limitations include: (a) inadequate funding; (b) high expectations by the community which might weaken the logic of the project; (c) lack of information, education and communications materials; and (d) the technology used by the NGO YES was slow in converting waste material into valuables or income-generating products.

8. Conclusion:

The fact that the scope of the income generation activities, within Kyotera Solid Waste Management Project, has been widened in support of the CBO/NGOs in order to allow for the implementation of larger projects, build a stronger partnership and ensure sustainability. The success of RAWESE has encouraged other women's groups to apply for joining. In order to maintain a successful track record, RAWESE requires that new groups should be registered as CBOs or NGOs and the applicant groups need to show evidence of previous successful dealings with development partners. Replication and up-scaling are also possible, since interest has been expressed by neighboring urban councils (Kalisizo and Rakai town councils) to get into the business.

The environmental support project in Kukuuma in itself is a follow up to the project that the Nyanga Kentale Kukuuma Butonde Group had started with the support of Lake Victoria Environment Management Project. The initial LVEMP supported project targeted income generating activities, health, environmental protection and alternative renewable energy use. In connection to this, it was found that the accrued benefits form the replica, which was supported by NTEAP/Micro grants Programme, were enough to sustain it. Also the technology for raising tree seedlings in nurseries and the operation of solar ovens are relatively simple and, as such, they allow for easy replication and up-scaling.

Finally, with regard to the solid waste management project in Busta, a key enabling feature is that YES enjoys strong political support from the local leaders which would enable them to interact with many town councils on solid waste disposal. Moreover, the NGO has a strong organizational structure and acquired solid skills in waste management and advocacy under the strong notion of helping people to help themselves. With these areas of strength YES had managed to establish a viable public- private partnership which enabled pooling of resources to enhance waste management. In addition many people from the community were trained in waste management, which was so instrumental in the art of conduct of business. An innovative undertaking is the recycling of polythene waste into useful items such as table tops and chair parts which provide a source of income to the people. Lastly, dwelling on its strong advocacy, YES was able to establish a solid waste networking with parties in other towns which would enhance wide-scale waste management in the country and exchange of knowledge. With all these successes the project can easily be sustained. The project had also initially planned to cover 3 of the 5 parishes of Busia Town Council. In view of the success made, the project was able to cover all the 5 parishes of the town council. NGOs in other neighboring urban areas such the case of Tororo Municipality, have expressed interest in the work of YES in urban waste management and further invited YES to conduct appropriate training for some people in the council. All the above constitute an enabling environment for the replication of the outcomes of this project.

9. Best Practice (4): Ssisa Integrated Fish Farming Project

9.1 Problem Statement:

In Uganda, fish is the second highest foreign exchange earner after coffee. Over the past two decades, the activity has become mainly export-oriented. Fish-processing factories buy most of the fish for export living very little for domestic consumption. Thus, local communities can no longer afford to buy fresh fish regularly. In terms of employment, the fish-processing factories have marginalized the local women who used to dominate fish processing and trade.

In addition, the Nile Perch species which was introduced to Lake Victoria during the late 1950s has eaten up many of the indigenous fish species in the lake leading to a decline in fish catches. As the amount of fish decreased, the local fishermen became desperate and started using destructive fishing methods such as poisoning and nets with small holes which catch young fish. This has worsened the fish scarcity. Occasionally, fishermen are asked to stop fishing for some months so that the fish in the lake grows in size and number. This renders the fishermen redundant.

Ssisa Youth Farming Association (SYFA) was established in the year 2000 by a group of fishermen who resorted to agricultural activities and fish farming after being affected by the decline in fish in Lake Victoria. It was registered as a Community-Based Organization (CBO) in 2004 at Wakiso district. Currently, the association has 40 members: 18 women and 22 men. The main objectives of the association are to increase fish availability and improve food security while conserving the environment.

9.2 Justification for Selection (innovativeness):

The Ssisa Youth Farming Association is implementing a combination of activities to improve the welfare of the members as well as the neighbouring community. The members used to fish in the open lake but they decided to construct fish ponds on their farmlands so that they produce their own fish and reduce dependency on Lake Victoria. In addition, the association is practicing cage fish farming in Lake Victoria. This technology is fairly new in Uganda.

The cage fish farming technology is innovative as it allows production of selected fish species, e.g. tilapia, catfish, and Nile Perch that are slowly becoming endangered in Lake Victoria. The fish farmer can market the fish well in advance because s/he can make a good estimate of the expected production and knows the species of fish that s/he will supply.

In order to improve the value of the fish before selling it, SYFA has bought a solar oven which is used to roast the fish and sell it at about twice the price of the raw fish yet solar energy is free. This boosts the incomes of the members of the association. Furthermore, the association produces fish fry or fingerlings which are sold to other farmers to stock their fish ponds. Sometimes, the fingerlings are used as bait, by fishermen, to catch other fish species such as Nile Perch. By producing fish fry, the association contributes directly to the conservation and multiplication of particular fish species such as tilapia, catfish, and Nile Perch. Considering that the association has been involved in fish farming for more than 5 years, other organizations both in and outside Uganda occasionally hire them to conduct training in fish farming, including pond construction. Training was conducted for groups in Uganda, South Sudan and Tanzania. This activity is therefore transboundary and has been replicated at a regional level.

The fish farming activities are further supplemented by geese production and vegetable growing. The geese and vegetables are sold throughout the year to pay for farm labour, some staff salaries, and buy fuel for the pick-up truck. This contributes to the sustainability of the association. The waste from the geese feeds the fish in the ponds.

9.3 Technical Approach: Design and Methodology:

The project strategy is two-fold: firstly, reduce dependency on the endangered fish species in Lake Victoria by using cage aquaculture and fish ponds on farmland; and secondly, contribute to increased household incomes of the communities in Ssisa sub-county of Wakiso district by selling fingerlings, processed fish, geese, vegetables and conducting consultancy work in fish farming. The implementation strategy includes the following:

- Conducting a baseline survey to collect information about fish production, processing, consumption, and marketing
- Conducting a series of meetings with local leaders and community members to get a common understanding of the objectives of the project and the activities involved
- Constructing fish cages, stocking the cages, and raising fish in the cages
- Training community members and other interested parties in cage aquaculture and pond fish farming
- Purchasing solar oven and training group members in the proper use of the oven to process fish
- Rehabilitating existing fish ponds and hatchery
- Maintain the production of geese as their waste forms part of the feeds in the fish ponds

- Follow-up visits, visits to partner organizations, and monitoring and evaluation.

The association identified the following **indicators** to guide them in assessing the achievement of their objectives: Increased number of fish and species produced, processed and sold; amount of income from the fish; number of people benefiting directly from the project through increased incomes; number of people who will learn the skills in fish farming and eventually set up their own ponds or cages.

9.4 Partnership:

The key beneficiaries are the youth in Ssisa sub-county who are involved in the fish farming activities. The direct beneficiaries are the 18 men and 22 women who are members of SYFA. The association works closely with the Ssisa sub-county extension staff as well as the Wakiso District Fisheries Officer who provide technical advice, especially on pond fish farming. Manzala and Domiatte Fish Farm in Egypt provided training and technical advice in cage fish farming. In addition, Tochi Heights Fish Farm in Gulu district, Uganda, provides information on fish breeding, cage farming and ponds. Other stakeholders who have benefited through training conducted by SYFA include: 1,500 people trained in pond construction in Tororo and Masaka districts, and in South Sudan; and two groups in Rakai and Tanzania trained in cage fish farming.

9.5 Essence of the Best Practices: Benefits and lessons learnt

The essence of a best practice takes into consideration three key issues namely, accrued benefits and lessons learnt, sustainability and replicability. For the Fish Farming Project these could be further elaborated as follows: The major past achievements of SYFA are the construction of 12 fish ponds and a fish hatchery which produced over 35,000 fingerlings per month in 2008. The production can increase to over 200,000 fingerlings per month after rehabilitating the hatchery. The association makes an average of $ 3,000 per year from selling fingerlings. It has bought a pick-up truck from the fish sales. Last year, the association made $ 1,250 from the sale of geese; $ 14,000 from consultancies and training activities; and $ 300 from vegetables. The procurement of the sun oven has also helped to almost double the price of the fish by selling processed fish that is ‘ready to eat’. The training offered by SYFA has benefited about 1,500 people. Twenty-three groups were trained in pond construction in Tororo and Masaka districts as well as South Sudan. These groups have constructed 36 fish ponds as a result of the training. In addition, 2 groups were trained in cage fish farming - one in Rakai district and one in Tanzania.

9.5.1 Sustainability:

Fish farming generally requires high costs. The initial cost of establishing a fish pond with dimensions of 60m by 30m is US $ 1,750. SYFA has managed to maintain this activity over the years by integrating it with raising geese, producing vegetables for sale, and consultancy work in fish farming.

9.5.2 Replicability:

The fish farming activity is replicable as the evidence from the trained groups indicates that 36 ponds were constructed. The activity requires a constant labour supply as well as a continuous water source. The water should have a pH of 6.5-7.5 with iron, magnesium and calcium. Feeds for the fish should be readily available and the group or individual should be committed.

9.5.3 Limitations and Challenges:

One of the major challenges in fish farming is the cost of feeds. This can be overcome by integrating fish farming with poultry production. Another option is to produce some of the ingredients that make up the feeds and processing the feeds at the local level. Another challenge is the predators like birds and snakes which eat the fish thus reducing production. In addition, the association would like to buy a refrigerated truck in future so that it can transport its fish safely without losing quality.

10 Conclusion:

The integrated fish farming activity has high potential for success when feed is locally available and the fish is processed to increase its value. The group needs to keep good records of costs and revenue in order to adjust their activities where necessary so that they realize more profits from fish farming. In addition, a good marketing strategy is required to ensure that the various products in the integrated fish farming system are sold at good prices.

11. Best Practice (5): Ecosystem Restoration Projects in Rivers Nyagak and Namrwodho Water Catchment Areas, Nebbi District (NEP/002/UG/2006).

11.1 Problem Statement:

Nebbi District is located in North-Western Uganda between $2^0$30' and $2^0$45' north of the equator and $30^0$10' east of the prime meridian. The district if bordered by Arua District to the north, Gulu district to the east, Masindi district to the south-east and the DRC to the west and south west.

It covers 3,288 sq km of which 62% is arable land, 29.1% game reserves, 6.4% open water and swamps and 2.5% forest reserves.

Nebbi District exhibits a purely tropical climate due to itsr location within the tropical rainfall zone of Eastern Democratic Republic of Congo. The dry and sub-humid climate is associated with orographic rainfall and rain/thunderstorms. Rainfall is bimodal in nature with peaks in May and October. The first short and usually unreliable rainfall is from late March – May, while the second and more reliable rains falls in the July – October period. Dry spells are experienced in June through July and December to early March. Temperatures are generally high except in Okoro and parts of Padyere County. The vegetation is predominantly Savannah. However, the patterns of distribution vary distinctly. Padyere is made up of wooded dry and moist Savannah grassland, and open grassland in Okoro.

According to the 2002 Population and Housing Census, the Population of Nebbi district is 433,466 composed of 48% males and 52% females. The population distribution is 90.2% rural and 9.8% urban. The population growth rate is 2.69% per annum. The Fairly high population densities have an important effect on the original vegetation. Wooded areas are being cleared for agriculture, provide construction materials (poles) for the semi-permanent houses and fuel wood which is used by 99% of the population.

The major surface water bodies in Nebbi district include Lake Albert and the Albert Nile with tributaries originating from the inland upland terrain. The rivers Nyagak and Namrwodho among others are permanent although the volume fluctuates with seasons. The district is made up of various ethnic groups including Alur, Jonam, Kebu, Lendu, madi and Lugbara all of whom have diverse origins. With the good climatic conditions and fertile soils, Nebbi District offers great investment opportunities in the agricultural sector, ranging from production, Agro-business to Agro-processing and manufacture of Agro-inputs. Poverty in rural areas is in a vicious cycle. Over 80% of the population derives livelihoods from agriculture which is the natural resource based.
However, most of the agriculture is subsistent, with small proportion for sale to get money for basic items like paraffin, salt, soap, clothing, graduated tax and school fees.

Because of insecurity in some parts of the Democratic Republic of Congo (DRC), refuges from the DRC have entered the Nebbi. As a result, the environment has been put under stress. The demands for building materials like poles, timber and bricks have risen. The demand for arable land has also risen putting more pressure on the forests to provide land for cultivation. The pressure on the natural resources and the nature of the main economic activity in the district has resulted into rampant degradation of the environment.

Key environmental issues in the district include uncontrolled bush burning, poor waste management, uncontrolled tree cutting / deforestation, reclamation of wetlands, over fishing and soil degradation. The main causes of these problems are related to land uses, production, distribution and consumption patterns of environmental resource. The water resources in the district have also been affected. There has been destruction of the catchment areas/water sheds due to uncontrolled seasonal fires, settlement and agricultural practices. These practices have enhanced deforestation / biomass loss and furthered soil erosion. There has also been siltation of the water resources due to poor methods of farming that has caused soil erosion especially in Okoro County. The farmers plough upwards the hills instead of across the hills. Besides, the riverbanks are degraded by cultivation and thus affecting the water volume and yields.

As a result of the above, tree cover has been decimated and a lot of siltation has ended up in the river systems especially Rivers Nyagak and Namrwodho. Namrwodho River is the main source of water supply to Nebbi Town the seat of the Nebbi District Administration. To ameliorate the environmental degradation Nebbi district local government developed a project proposal to mobilize and involve the local community in the restoration process of the two river ecosystems around rivers Nyagak and Namrwodho. The main objective of the project was to restore the river ecosystem and at the same time contribute to the sustainability of the Hydro Electricity Power and Water supply projects for West Nile power distribution and Nebbi Town water supply on rivers Nyagak and Namrwodho respectively.

11.2 Justification for selection (innovativeness):

The Nebbi district administration sought to involve the local communities in dealing with the environmental degradation because the local community was the causal factor. The district administration sought to mobilize the residents and sensitize them explaining to them the impacts of their activities. It also enlisted their full involvement in the restoration activities.
It dealt with organized groups (NGOs and CBOs) in the area, including Kubi Community and Orphans at Risk. These groups are duly registered with the Nebbi District Local government. The innovative nature of this project was on: (a)) improvement on farm practices (soil and water conservation measures); (b) the use of the ecosystem approach in the restoration process; (c) the enlisting of local community support; and (d) the incorporation of income generating and food security activity in the restoration process.

11.3 Technical Approach: Design and Methodology:

The project strategy involved: firstly, enhancing soil erosion control measures through ecosystem restoration.

By doing so, the top most fertile soils were protected which enhanced the soil fertility. Secondly, contribute to food security and household incomes of the communities through introduction of high values crops - Irish Potato seedlings in the project areas. Thirdly, teaching the community in high quality tree seedling production through training of the local community in nursery bed establishment and maintenance.

The project's implementation strategy included the following:

- Sensitization of the land users / farmers within the river banks of Nyagak and Namrwodho;
- Tree planting to demarcate no encroachment zones within the river banks;
- Tree nursery establishment within the Nyagak and Namrwodho river banks;
- Provision of improved seeds for the farmers within the affected riverbanks;
- Establishment of fish ponds for two farmers groups;
- Establishment of fruit tree woodlots for two farmers groups;
- Training of 80 farmers on sustainable farming methods through demonstrations within the riverbanks and hilly areas;
- Enforcement and compliance monitoring.

11.4 Partnership:

The main partners to the project included the community members living along the Nyagak and Namrwodho Rivers system, Nebbi District Local governments and National Environmental Management Authority (NEMA).

11. 5 Essence of the Best Practices: Benefits and lessons learnt:

The essence of this best practice is that it took into consideration the following key issues: (a) the benefits accruing from the activity, and; (b) the sustainability of the activity. The two key issues are elaborated further below.
The implementation of the project started in July 2006. 1) Community Tree nurseries were established and managed in two communities living in the ecosystems of Rivers Nyagak and Namrwodho. The main aim of establishing the tree nurseries was to produce seedlings for planting in the degraded ecosystem, as well as supply schools and needy farmers with tree / fruit seedlings. 2) Procured improved varieties of food crops. Improved Irish potato seeds were procured from Kabale (Western Uganda). Other crops varieties procured included improved cassava (Longe I-5 TMS), improved maize (Longe 1-5), and improved beans (K132). 3) Farmers were mobilized, sensitized and trained on concept and practices of soil and water conservation with in hilly areas and riverbanks. 4) In a bid to enforce the wetlands policy, no encroachment zones where demarcated along the river banks and the demarcated area planted with trees. 5) One fish

pond is being constructed to help the community access fish for their consumption and the surplus for sale.

Plate (1): Tree Nursery at Namrwodho

As a result of the implementation of the above activities, improvements were registered in the Nyagak and Namrwodho river ecosystem and the socio-economy of the local community. One million tree seedlings were produced and planted or supplied to different institutions. Over 400,000 tree and fruit seedlings were distributed for free to over 100 households. Twenty five thousand (25,000) tree and fruit seedlings (10,000 cypress, 300 teak, 4260 fruits, 460 khaya, 2500 gravellia, 4000 Sambia, and 40 Umbrella trees were supplied to WFP Nebbi. This was in exchange for 5.9 tons of food items like maize and beans. Other institutions supplied with tree seedling have included Nebbi Catholic Diocese and Community Renewed Ownership of West Nile Schools (CROWNS), whose objective is to raise woodlots for the schools. A community forest has been planted with over 78,000 trees (covering 45 hectares) with different species of trees including Graviellia, Pines, and Mahogany along Namrwodho River Bank in Agwechi Village, Pacaka Parish, in Erussi Sub-County.

No encroachment zones were created by demarcating off 10 metres on Nyagak and Namrwodho riverbanks. The 10 metre no encroachment zone along the river banks were planted with *Khaya spp*. About Seventy eight thousand (78,000) tree seedlings have been planted within the slopes and hills within Nyagak and Namrwodho areas. In addition mixed woodlots of Pines, cypress, Khaya spp, Grivillea spp have been established along rivers Nyagak and Namrwodho River Banks by the communities. Eighty (80) farmers were trained on the concept and practices of soil and water conservation with in hilly areas and riverbanks. The farmers gained the skills of controlling soil erosion through planting of contour grass and practicing fanya kin / fanya jju method. Thirty Five (35) of the farmers were women.

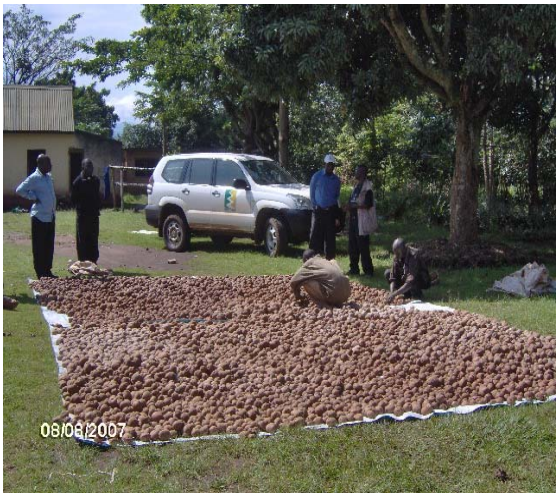


Plate (2) Irish Potato Field

For food security, sixteen thousand (16,000) mixed fruit seedlings (mangoes, jackfruits, passion fruits and avocado) were procured & supplied to the farmers to establish an orchad. In addition twenty five (25) bags (2 tones – 2,000 kgs) of improved Irish potato seeds were purchased and distributed to the farmers groups. The community was able to plant the seeds and harvested 55 bags (4,400 kgs – 4.4 tones). Thirty eight (38 bags – 3,000 kg – 3 tones) were sold at the cost of Ugx 15,000 (US$ 7.5) per bag, earning the community a total of Ugx 2,250,000 (US$ 1,125). Eighteen bags (18 bags – 1,400 kgs – 1.4 tones) were distributed to 50 families for food and seeds. In 2008 the community planted Thirty bags (30 bags – 2,400 kgs – 2.4 tones but due to unfavorable weather, only 38 bags (3,000 kgs – 3 tones) were harvested. They sold 32 bags (2,600 kgs – 2.6 tones) earning the community Ugx 1,950,000 (US$ 975). Five bags (5 bags – 400 kgs) were eaten.

The above achievements have had a positive impact on the ecosystem. The area now looks much greener than it used to be. The no encroachment zones demarcated along the river banks have resulted into natural vegetation regeneration along the river.
The vegetation has been instrumental in considerably reducing soil erosion into the rivers especially river Namrwodho. As a result the water running in the river is much cleaner than it used to be before the implementation of the project. Testimonies from the Small Water Project of Nebbi Town (managed by JOWA Engineering) indicate that during rainy seasons the extraction point of the small water project used to be clogged with enormous amounts of silt, leaves and other debris. Now silt is no longer a big problem and the amount of debris and leaves have considerably reduced. The time spent clearing the debris and leaves has also considerably reduced. The cost of water treatment in terms of chemicals used to be high but now it has become low and this is attributed to the project.

Records with JOWA Engineering at the water works indicate that before the implementation of the project, the works was using 30kgs of chlorine per month to purify and treat the water. This eventually decreased to 13 kgs per month in 2008 to present (2009).

The project has provided employment at the nursery bed and also tree planting itself. Kubbi Community established the tree nursery bed to contribute to tree planting. As pointed out already, over 78,000 trees (covering 45 hectares) have been planted with different species of trees including Graviellia, Pines, and Mahogany by the community. One mature pine tree can yield US$57 in income. There are approximately 700 trees in One hectare and for forty five (45) hectares the total projected income out of the community forest that has been planted will be US$ 1,795,500. Some of the seedlings are planted while others are sold to other communities in the District. Recently, Nebbi District Local Government procured quality tree seedlings worth Uganda shillings 7 million (US$3,300). Because of their had work, other projects like – Community Renewed Ownership of West Nile Schools (CROWNS), whose objective is to raise woodlots for schools in the region has also been procuring tree seedlings from Kubbi Community. The community has attracted such investments. They are saving money. Records from Kubbi community indicate that Ugx 32,700,000 (US$ 16,350) was raised in 2006 out of sale of tree seedlings. Ugx 34,980,000 (US$ 17,490) and Ugx 37,935,000 (US$ 18,967.50) were earned by the community through sale of assorted tree seedlings in 2007 and 2008 respectively. The proceeds are used to fund education of their children in Secondary Schools and one student at University.

There was scarcity of fire wood in the area. But as a result of the tree planting, the situation has a bit improvement. Woodlots have been planted and also the branches pruned off the planted trees in the community forest provide fire wood. The improved seeds provided for food security enhancement has improved the nutrition of the community. The growing of the Irish potatoes has continued with 50 more community members being able to access Irish Potato seedlings. It is hoped that the fish ponds being constructed will further lead to improved nutrition within the community.

The project has also helped build good ties within the community and between the district and the community. When the community needs technical assistance they approach and consult the district. The communities interact freely amongst each other and other communities.

11.5.1 Sustainability:

The project implementation strategy has enabled to build managerial and practical skills within the community. These skills will enable the community sustain project activities beyond the project.
The implementing communities were trained in tree nursery establishment and management. They continue raising tree seedlings for sale and planting. The community hopes to recycle some of the income raised through sale of products e.g. seedlings and fruits to sustain the activities. There is also the membership fee of Ugx 5000 per person per year which helps to meet the operational costs.

Because of hard work and success by the implementing community groups, the activities were incorporated into the district development plan. The District Natural Resources Office will be contributing to the community through direct budget and technical support. Also linkages are being forged with the Farm Income Enhancement Project under the National Forestry Authority. The Farm Income Enhancement Project is promoting tree planted on community and private farms. The district plans to further empower the community through training in grafting skills. They can then produce grafted mangoes, grafted oranges, and other high value seed crops for sale and growing. The communities have also taken up tree planting on their own land. Donations from other institutions and organization will help sustain the project activities. Agency for Accelerated Regional Development (AFARD) gives money for OVC's (Orphan and Vulnerable Children).

11.5.2 Replicability:

The project is a good demonstration of the restoration of the river bank ecosystem through community participation. It has demonstrated that once a project enlists the support of the local community, it succeeds. Because of its success and the changes it has brought to the area, it has rendered it attractive and other districts are bringing their communities to learn from them. Also communities within Nebbi district have started copying what this community has done. However, for successful replication the following aspects have to be considered: (a) communities should be empowered through Training and equipping the community with nursery bed establishment and management skills; (b) sensitization on environmental issues.

This slowly changes negative behavior towards the project activities; (c) an initial capital to buy requirements like equipments such as hoes, pangas, polythene tubes, watering cans, wheel burrows, spades, Rakes, slashers, barbed wire, nails, hammers and spraying pumps is essential; (d) a permanent water source to suitably locate the nursery bed must be available;

(e) in most cases the work is voluntary and therefore dedication on the part of the community is very essential for successful replication; and (f) innovation is also an important aspect to keep operational costs at a minimum. For example, instead of wasting funds on polythene tubing, recyclable material can be used like local brew Sackets to pot the seedlings.

11.5.3 Limitations and challenges:

The community is still having a small capital which is therefore limited by:

- the nursery bed inputs especially the tubing for the potting of the seedlings.
- the rising cost of the seeds is a limitation to the work of the group. One (1) kg of Pine in December 2008 was costing Uganda shillings One Million Five Hundred Thousand (Ugx 1,500,000 – US$ 750). By end of April 2009, one (1) kilogram cost Uganda shillings Two million (Ugx 2,000,000 – US$ 1,000).

Among the challenges, bush burning especially in Nyagak is a big problem. Stray animals especially during the dry season destroy the tree seedlings as they graze. The district is trying to make by-laws especially concerning bush burning and stray animals. Inadequate funding from sponsors to buy the required materials for the nursery bed. Even with the little funding that was approved, the flow was not timely and this tended to limit the timely implementation of the intended activities. The districts are recommending them to other projects and donors for funding. The district has also started providing funding for the group in their annual budget. The weather changes due to climate change are posing a big challenge. Rains do not come on time and when they do, they are not enough. Land disputes - Neighboring communities who are not members of Kubbi Community are claiming ownership of the land which is about 600 hectares which was given to the government to establish community forestry. The case is still in court. Because of land disputes, some individuals are uprooting the planted trees. Much as Kubbi community take tree planting as an interest, other land owners do not take tree planting and environment conservation as a priority. Those who are interested do not have access to tree seedlings.

12. Conclusion:

The project is a good demonstration of a river ecosystem restoration. The project can be replicated and easily sustained. It is recommended in areas where watershed areas have been degraded and where soil erosion is too much. It is also recommended that Kubbi community members be given more skills through training in grafting and proposal writing. This will widen their income and improve their food security.

The work requires dedication, as it is in most cases voluntary and to operate at minimal investment costs, the community needs to be innovative. The resenting community also needs continuous sensitization on environmental issues. This will slowly change their behavioral attitude towards the project activities.

13. Best Practice (6): Integrated Sustainable Use of Biodiversity through Agro-forestry- as an alternative source of income for enhancement of rural livelihood and environment conservation – Uganda. (NEP/003/UG/2008)

13.1 Problem Statement:

Arua and Nyadri Districts are situated in the northwestern corner of Uganda. Sudan and DRC border Arua and Nyadri Districts in the North West and in the west border respectively. The districts lie between latitudes $2^0$30' and $3^0$30' and longitudes $30^0$30' and 31^0 east. The two districts have a total land area of 6,100 km2. The predominant soils are ferralitic and sand loams. These soils are fine textured with loose structure which is easily erodible and easily leached. Most soils are acidic. Arua and Nyadri Districts have a bimodal rainfall pattern with light rains between April and October. The wettest months are normally August and September which receive 120 mm / month. The average total rainfall is 1,250mm. The period December – February is dry with less than 60mm/month.

Temperatures are generally low during the dry season nights (December - March) and high during day hours, whereas during the wet season temperatures remain high throughout. The mean maximum temperature is 25^0C, while the mean minimum temperature is 21.5^0C.

The natural vegetation is characterized by open lands with equatorial type of savanna grasslands, with small pockets of natural forests on hills, especially a long the Sudan border and northern parts of the districts.
The original vegetation of Arua and Nyadri Districts was composed of mixed woody savanna, which has greatly been reduced by subsistence farming that currently occupies about 80% of the total land area.
The remaining woody vegetation is dominated by the *Combretum – Acacia – Butyrospermum* complex occupying about 52% and bush covering about 13%. The post cultivation vegetation mainly composed of *Imperata – Panicum – Hyperrhenia – Pteridium* complex has been reduced to smaller patches.

According to the 1991 Population census, Arua & Nyadri districts are largely inhabited by the Lugbara who constitute 80% of the population. Other tribes include the Kakwa, Madi, Alur and Lendu. Like many other district in Uganda, Arua and Nyadri districts are dependent on agriculture which employs over 80% of the total population.

Agriculture is mainly subsistence (80%) and takes place on small holdings of approximately two acres using mainly simple farming tools. Only 0.5% of the populations are engaged in commercial agriculture. Both food and cash crops are grown. Tobacco is the major cash crop and is the main source of livelihood for the majority of the population in the districts. However, the tobacco monoculture farming has not impacted positively on the income of the farmers since it was introduced in 1950s *(Source: The District State of Environment Report – DSOER 2004)*. Tobacco also has enormously negative effects and impact on the ecology and environment of the two districts.

Tobacco cultivation (the major cash crop) has contributed enormously to the degradation of the environment. It has resulted into deforestation, pollution, soil erosion, loss of land fertility and food insecurity. Deforestation has caused wells and streams to dry up. Other negative effects of tobacco cultivation are soil erosion and pesticide leaching into water supplies. To ameliorate the environmental degradation in Arua and Nyadri Districts caused by Tobacco growing, Arua Rural Community Development developed a project proposal to mobilize and involve the local community in the planting of trees through agro-forestry practices and introduction of an alternative source of income, the chilli growing enterprise.

13.2 Justification for Selection (innovativeness);

Integrated Sustainable Use of Biodiversity through Agro-forestry- as an alternative source of income for enhancement of rural livelihood and environment conservation is justified by the fact that:

- Red bird eye chili has no environmental degradation effects on the land unlike tobacco farming. This will enable the rural farming communities to sustainably manage their natural resource base.
- Agro forestry is the only method where farmers can address environmental degradation while at the same time creating income.
- Chili is a bi-annual crop that will diversify agricultural production and boast farmers' income earnings resulting into improved standard of living of the farming community hence poverty is reduced.
- It is a potential way forward to food security & socio-economic growth. Chili crop will substitute sale of food crops hence the problem of rampant and excessive sale of food crops (locally and cross border) to meet the demand of family & upkeep will be minimized..
- Red bird eye chili has a productive life of two to three years with one stand of plant yielding 3 kg per annum. It can be intercropped hence farmers will be encouraged to grow chili along side their traditional crops.

13.3 Technical Approach: Design and Methodology:

The project entailed two main strategies 1) promotion of agro forestry and 2) both short and long term strategy of income generation. The African red bird eye chili is a bi-annual crop and *Prunus africana* tree is a medicinal plant both demand driven-value chain biodiversity commodity. The practice of agro forestry conserves the environment, restore soil fertility, diversify agricultural farming, provide fruits for food and boast farmers' income resulting to increased standard of living. The mode of project implementation involved technology transfer through capacity building and training, media campaign promotions (local radio stations), extension services, research, having collective nursery bed centers and having central sales and marketing and collaboration with private sector to market produce.

13.4 Partnership:

The main partners to the project included the community members living in the focal sub counties in both Nyadri and Arua District, Arua and Nyadri District Local governments, local NGOs (like Vurra Patriotic Entertainers Group – VUPEG & Logiri Community Action for Development - LOCADE) and National Environmental Management Authority (NEMA).

Plate (1): Partners at Work

13.5 Essence of the Best Practice: Benefits and lessons learnt

The essence of this best practice takes into consideration 1) land degradation control, 2) diversification of sustainable subsistence farming, 3) Improving the standards of living of the rural communities through commercialization of chili farming, 4) Technology Transfer, 5) training programs in Eco-friendly farming techniques, post harvest handling, 6) Extension services, 7) Market Development, 8) Media Campaign Promotion, and; 9) Research. These key issues are elaborated further below.

Plate (2): Nursery at Vurra Sub Country

The implementation of the project started in July 2008 with the sequence: Firstly, establish community tree nurseries in seven sub counties including Bileafe, Manibe, Oluko, Dadamu, Vurra, Logiri and Tara. The main aim of establishing the tree nurseries was to produce tree seedlings for planting in the degraded ecosystem, as well as producing and supplying chili seedlings to the community farmers as an alternative to tobacco growing. Also it was meant to promote agro forestry trees for land regeneration, soil health and fruits for food security and medicinal trees for income generation. Secondly, establish demonstration sites for ultra Violet Solar drying of chili in participating parishes. The purpose of the demonstration sites was to show the communities how to dry chili in a controlled environment so to produce chili of the required standard.

Thirdly, link the local communities to markets for their produce – specifically chili markets. Fourthly, carry advocacy, publicity and sensitization compgains on biodiversity conservation and Bio-Trade Initiatives. Fifthly, conduct eco-friendly training programs in chili production techniques and post harvest handling. The training was supplemented by provision of extension services for red bird eye chili growing.

Plate (3): Women Picking Chili

As a result of the implementation of the above activities, 1) Seven hundred Sixty five (765) farmers have received training and capacity building techniques in Chili growing and post harvest handling. Fourteen (14) rolls of 5.8 x 44 U.V. materials was procured and supplied to the farmers. Seventy five (75) Ultra Violate solar drier houses have so far been constructed. Farmers have also received training in post harvest handling and marketing. 2) Assorted nursery bed equipments were procured and distributed to seven communities in seven sub counties. The equipment assisted the community in establishing seven (7) community nursery centres in seven sub-counties. The centres have produced over 646,109 assorted tree seedlings and over 1.8 million Chilli seedlings. The tree seedlings and the chili seedlings have been given away free of charge. One thousand two hundred seventy two (1,272) farmers have so far collected chilli seedlings for planting. 3) Farmers have been linked to the internal and external markets. As a result, 437 farmers have sold over 1,300 kilograms of Chilli earning them Uganda shillings three Million nine hundred thousand only (Ugx 3,900,000 – US$ 1,950). This is an increase of 260% from the previous years' production.

Most farmers are still experimenting and so much of this production has been from back yard cultivation. Four agroforestry promotion campaign has been conducted including involvement of three FM Radio Station.

Plate (4): Chili Drying

The project has raised assorted tree seedlings including Pine, Fruit trees – Avocado, Guava, Paw paws, Jack Fruits, Mangoes. These trees have been given away free of charge. The impact is not yet felt but it is hoped that in a few years time, the tree cover will have increased and the districts will look much greener than they have been. Other sub counties in which project activities are not being implemented have come to learn from what ARCOD is doing. There has been overwhelming demand by local people and districts leaders to extend the tree nurseries to other sub counties in the two districts.

Chilli production has supplemented income for several families. So far 437 farmers have sold over 1,300 kilograms of Chilli earning them Uganda shillings Three Million nine hundred thousand only (Ugx 3,900,000 – US$ 1,950). These are just a few farmers who took up chili growing for experimental purposes in their back yard. It is hoped that when fully operational, the chili enterprises will be a big income earner for the farmers in the two districts.

These few farmers have appreciated the chili growing enterprise. Several have testified that chili takes only 6 months up to processing stage. Tobacco takes over 12 months and is labor intensive. The chili growing has been mainly embraced by women who have been looking for an alternative source of income.

Farmers have also testified that chili earns more money than tobacco. One acre that is well managed can produce income of about Uganda Shillings Four million (Ugx 4,000,000 – US$ 2,000). A well managed acre of Tobacco can yield income of Uganda Shillings Five Hundred Thousand Only (Ugx 500,000 – US$ 250). The other advantage with chili growing is that it can be intercropped, which is not the case for tobacco. One female farmer interviewed revealed that she earned Ugx 80,000 (US$ 40) out of her first harvest whose seedlings she planted in November 2008. She used Ugx 20,000 (US$ 10) to buy clothe and Ugx 60,000 (US$ 30) to buy two goats. She has since been able to pay school fees for her children. The male farmer said in the first harvest he earned Ugx 90,000 (US$ 45). He was able to buy one goat, pay offertory in the church during Easter and saved balance for school fees. A number of known tobacco farmers have picked chilli seedlings for chilli growing after realizing that it is more beneficial to grow chilli than growing tobacco. Marketing links have been established through ARCOD internally and also externally to the European market. The demand for the chili in the European market is high and at the moment they cannot commit themselves because the production is not yet stable.

Pine Trees are being planted for income. This is the case in Vurra and Logiri sub counties where farmers have preferred to plant pines to other tree species. Other shade trees are also being planted because chili grows best under shade. The tree planting will in future benefit the environment as they (trees) will stay longer without being cut in order to provide shade for chili. Chilli grows under shade of big trees with time production of more chilli will mean increased tree cover and better environment.

13.5.1 Sustainability:

The fact that the project activities have potential to generate significant benefits to the community indicates it can be easily sustained. Key factors conducive to sustainability of the project include the high returns from the chili enterprise. The fact that chili can be intercropped implies it can be grown together with other food crops. The little time chili takes to mature is another incentive to perpetuate the chili enterprises. It also requires little inputs compared to tobacco growing which requires fertilizers, pesticides, and firewood to cure.

The farmers and ARCOD have plans of reinvesting the income from chilli. ARCOD is at the moment doing the marketing up to a time when production has tremendously increased.

ARCOD bulks the chilli and later sells it to the buyers, since they want bulky amounts. There are plans also to network with CBO's and other organization that can incorporate chilli growing and the project in general into their programmes. Arua and Nyadri districts have taken up the initiative of chilli production and promotion. The districts have incorporated ARCOD activities in the Districts Local government development plans for 2009/2010 – 2010/2011. The districts will be providing technical support and at times financial support.

13.5.2 Replicability:

The project is a good example to demonstrate the agro forestry concept to the local people in the districts. . It is a good demonstration that you can grow food crops and cash crops together and at the same time having benefits for the environment. The potential of growing chili in six months, with less labor struggles and in the end earn big compared to tobacco which has long been the only cash crop, has provided a big incentive for replication. Many farmers from sub counties that are not focus for this project have come to the project sites to learn and some have started replicating the activities. Replication of the activities requires sensitization of the communities to understand well the concepts agro forestry. Market research and land availability are also other aspects to consider while planning replication.

13.5.3 Limitations and challenges:

Funding in order to expand activities to other districts that are demanding for the services is a limiting factor. The farmers require close follow up and support. Logistics has not been enough and this has limited the supervision and expansion of the activities. Competition from tobacco growing which has political backing of some district officials is a big challenge. Changing people's attitude from tobacco growing to chili production has also proved a challenge. Many people have pointed out that tobacco growing earned them money which they used to educate their children. They claim changing from tobacco to chili will deprive them of an income source. There is reservation by district officials to speak against tobacco growing. During radio talk shows district officials decline to join ARCOD on the talk shows. Other challenges have included:
Delayed funding has been a big challenge to the implementation of the activities. Chili production is still in isolation and the scale of production is still low and can not meet the market demands. Post harvest handling of chili outside market need standardized production. Chili should be dried under uniform controlled environment in ultra-violet houses. Not all farmers have ultraviolet driers / houses. Insect pests which eat the chili leaves and the birds commonly known as boro boro which eat ripened chili. Chili is labor stressing at the time of harvesting and it must be done on a daily basis.

14. Conclusion:

The project can be easily sustained and replicated and ARCOD should be given the necessary support especially from the district leadership. The replicability will be given a boost if the planned by-law by the district forcing the farmers to increase area or acreage under food production are made. Enforcement of public smoking laws is also an important aspect that can make the project be sustained as this will leave chili growing as the only cash crop in the district. ARCOD should also make people understand the analysis of long term benefits visa viz the short term benefits accrued from tobacco growing. Through the research ARCOD should also introduce a better variety of chili which is easier to harvest e.g. by shaking. To develop a complete chili enterprise, a chili processing plant for value addition should be sourced. This will resulted in more income for the farmers as they will be selling processed products to the markets. Establishment of linkages with the BIO-Trade programme under the Ministry of Trade and Industry will assist the project to get more market links for their products.