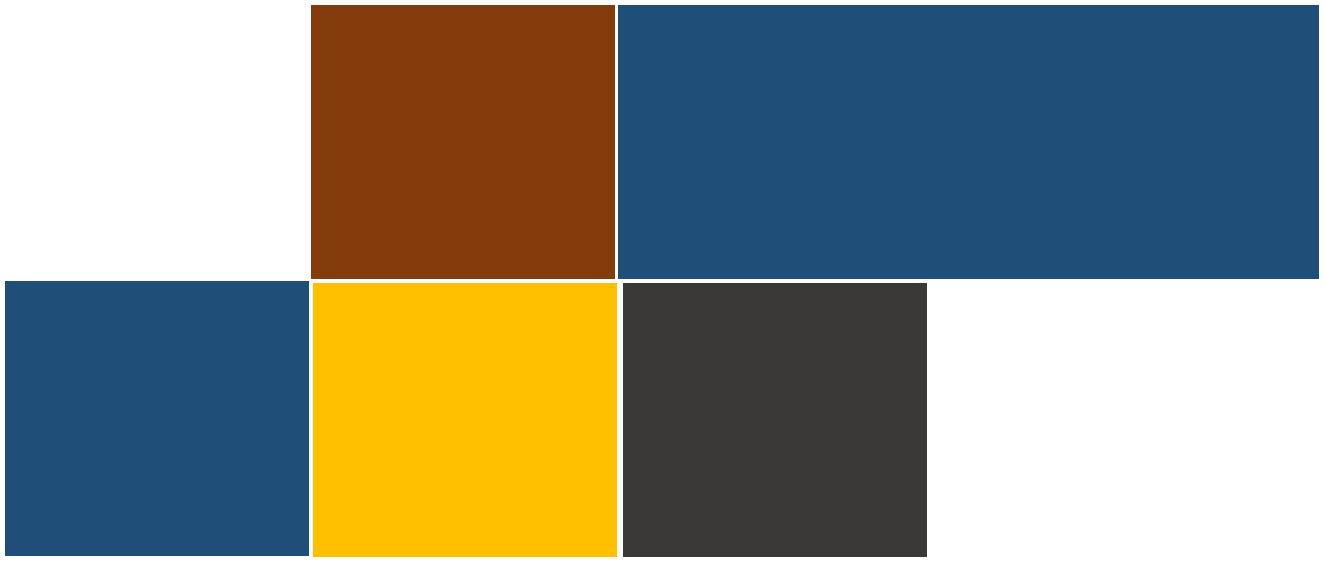

Integrated Waste Management for Improved livelihoods among the Marginalized Youngsters

FINAL PROJECT

REPORT

March 2021

EXECUTIVE SUMMARY

Consciousness to the environment is one among other major principals embraced in Don Bosco interventions in Tanzania. In apprehending this principle it is pre-requisite that some actions must contribute to a sustainable world and must, in turn, enhance the achievement of other institutional development objectives. The integrated waste management proposal design and implementation was focused on instigating Don Bosco's action towards environmental conservation through the establishment of dispersed waste management (WM) scheme at Don Bosco Oysterbay VTC and Morogoro Novitiate house, thereby improving the Institutions' environment conservation whereas also ensuring cost-effectiveness within the identified institutions.

This report provides a narrative overview of the implemented project which primarily focused on enhancing the utilization of produced (liquid and solid) wastes in developing and promoting more efficient and cleaner environments at the two institutions (Don Bosco Oysterbay VTC and Don Bosco Novitiate House), equipping about 500 youth (both male and female) at Don Bosco Oysterbay VTC with the requisite technical skills and knowledge on how to sustainably and effectively manage wastes as well as increasing the Institution's financial sustainability through cost-effective mechanisms. The report comprehensively highlights the rationale towards the design of the project detailing the particular factors which drove to the establishment of the project in the identified project locations. The report further highlights all the undertaken activities from the tendering to the construction completion detailing all the procedures followed in the successful establishment of the sustainable waste management facilities at the institutions.

The implemented project which fairly complements Don Bosco's EMP (environmental Management Plan) and its significant agendas as well as actions that have been taken by different Environmental Protection Agencies, actors, and others to protect human health and ecosystems from particular threats. The project design and implementation provide the utmost platform for Don Bosco institutions to effectively preserve and manage the environment in a sustainable manner. The project creates a foundation to enhance and conserve ecosystems and habitats in a sustainable base ensuring the protection, preservation, management, or restoration of natural environments and the ecological communities that inhabit them.

Through the design and implementation of the project it has been apparent that the project operation is scalable and presumably fairly easily replicable in terms of technology, operations, and marketing, we hope to scale it up to all Don Bosco institutions and centers countrywide and in so doing expanding Don Bosco's actions towards the environment in Tanzania as well as Eastern Africa in general. The project looks technically and economically sound and will definitely impact the lives of the enrolled marginalized youngsters at the institution at a greater extent.

CONTENTS

ABBREVIATIONS AND ACRONYMS

CBET-Competency-based Education and Training
DBNET- Don Bosco Networks Tanzania
DBYES- Don Bosco Youth Educational center
MOEVT-The Ministry of Education and Vocational Training
OVC-Orphans and Vulnerable Children
PVC-Polyvinyl chloride
SDB-Salesians of Don Bosco
TANAPA-Tanzania National Parks
Tshs-Tanzanian Shillings
TVET- Technical Vocational and Educational Training
URT-United Republic of Tanzania
USD-US Dollar
VETA- Vocational Education Training Authority
VET-Vocational Education and Training.
VTC's- Vocational Training Centres

SECTION ONE: INTRODUCTION AND BACKGROUND

1.1. ORGANIZATIONAL BACKGROUND

1.1.1. GENERAL BACKGROUND

The Salesian Society is one of the largest orders of the Catholic Church that provides education and human development programs for poor, disadvantaged, and abandoned children and youths across the world. The Society was founded in 1859 and now includes over 20,000 priests and brothers (Society of St. John Bosco, SDB) and 17,000 sisters (Daughters of Mary Help of Christians, FMA). In furthering their vision and reaching out to more young people in need, they are assisted by thousands of lay supporters and employees in over 135 countries. To date, Salesians run more than 3,500 Salesians schools that include formal and non-formal secondary schools, vocational-technical schools, and agriculture schools, orphanages, and youth centers. In addition to the various institutions, Salesians have a wide variety of youth programs for character development organized across their provinces. Headquartered in Rome, Salesians are highly decentralized with each province being highly autonomous. Most provinces are locally registered as NGOs.

1.1.2. DON BOSCO'S BACKGROUND IN TANZANIA

The Salesians of Don Bosco (SDB) East African province consist of four countries namely; Kenya, Tanzania, and Sudan, and Sudan South with its headquarters in Kenya, Nairobi. Salesians of Don Bosco arrived in Tanzania in 1980, settling first in Oysterbay area of Dar es Salaam. With the aim of empowering the young people in East Africa, the Salesians sought to establish vocational training and youth empowerment centers across Tanzania. The Salesians of Don Bosco use education as a means to empower the youth to achieve economic self-sufficiency and improve their lives. Using the Salesian educative system has indeed succeeded in making a difference with other schools, it stands out that in the Salesian school it is not just purely academic, technical, and vocational training, but it is designed to educate the holistic formation of the young person i.e. body, heart, mind, and spirit. This unique educative system has enhanced the understanding of the youngsters' roles in society and enables them and thus able to make a significant contribution to the well-being of their families and communities through honest and upright living.

Today, there are a total of 11 Salesians houses, with four located in Dar es Salaam (Oysterbay, Upanga, Kinyerezi, and Bunju) and the rest located in Morogoro, Moshi, Arusha, Iringa, Dodoma, Shinyanga, and Mafinga. Through these centers, the congregation animates six institutions i.e. the technical institute (VTC's), Secondary schools, youth center, OVC centers, parishes as well as Youth Educational center (YES). In Tanzania, there are thirteen institutions which include four secondary schools, four technical schools, three parishes, two formation houses, and one youth center across the country, Don Bosco's work/institutions are acknowledged and appreciated especially for youth formation programs and TVET training considered as a model by the Ministry of Education in Tanzania.

"The young poor and in danger[1] continues to be the Salesian Congregation's main priority and is the heart of the Salesian mission. "Poor" in material and spiritual aspects and "in danger" of facing serious violations of their fundamental rights in the family, at school and at work.

1.1.3. DON BOSCO OYSTERBAY VOCATIONAL TRAINING CENTRE

Don Bosco Oysterbay Vocational Training Centre is a private Vocational Training Centre which mainly focuses on providing VET training primarily among the marginalized youngsters in Dar es Salaam and other small towns across the city. The marginalized youngsters trained at the institution mainly comprise of primary school leavers and secondary school dropouts. Equally targeted are students who completed formal education but lacked skills to secure them jobs. Currently, the institution has a total of about 433 students enrolled in different trades. Male trainees account for 61% of the institution's total population whereas Female trainees account for 39% of the total population. The Male-female ratio at the institution is 2:1.

Don Bosco Oysterbay Vocational Training Centre is among the oldest and popular Vocational Training Centres in Tanzania. The Institution traces its history back to 1990 when the Salesians were handled the institution from the Catholic Parish of St. Peters. The institution was successfully registered to the Vocational Education Training Authority in 1990 and has grown in terms of students' intake, academic units as well as programs.

Currently, the institution specializes in the provision of 8 major courses which are VETA certified. Courses provided at the institution include electrical installation, Masonry, Motor vehicle mechanics, IT/secretarial, Fitter Mechanics, Tailoring & Screen Printing, Carpentry and Joinery as well as Welding & Fabrication. Through outstanding qualifications, the Centre has attained over years of operation, the Institution provides a holistic and diverse range of educational trainings among trainees. The later has created and developed a wide range of career prospects which have in turn guaranteed high levels of employability as the result of outstanding qualifications the centre provides.

1.1.4. DON BOSCO MOROGORO NOVITIATE HOUSE

Don Bosco Novitiate is situated on the Morogoro – Dodoma road, from Morogoro junction six kilometers. Preparation of the Novices to give themselves completely to God knowingly and freely in their First Profession and to promote human maturity, intellectual preparations, deepening of the consecrated life of the Salesian religious life by study of the Constitutions, initiation into apostolic work and, into the Salesian educational method forms the foundation of the Institution. Further the institution also focuses on caring for and promoting the young people in the neighborhoods by giving them opportunities for sports activities, skills and talent promotion in arts and music.

The institution was officially started operation on the 8th December 2009 with the blessing of the house by the then Apostolic Nuncio to Tanzania, Archbishop Joseph Cennoth on the feast of Immaculate Conception. As a community in response to the call to holiness in the Salesian way, the institution is a family bound by fraternal love accepting each other with an open heart and relationship permeated by mutual respect and

[1] Salesian Society of St. John Bosco. General chapter 27

trust, together with the formation guides and with a spirit of shared responsibility, committed to growth in responsible freedom.

The Formation house enrolls an average of 15 – 25 novices who stay the institution for one year for their formation to religious life. Currently the institution enrolls novices from Tanzania, Kenya Southern Sudan and the Sudan. The enrolled novices go through the formation program, carry out activities including sports, music, band, arts as well as animation of the young people.

SECTION TWO: PROJECT RATIONALE

Don Bosco institutions in Tanzania place significant emphasis on the environment as a major cross-cutting theme in their interventions. The institutions display sensitivity to issues like climate change, waste management, and adopt environment-friendly practices taking necessary actions such as – energy conservation, rainwater harvesting, waste recycling, carbon-neutral, etc. The latter is focused on creating sustainable environments for future interventions and future generations.

Through time-bound auditing of various resource consumption, DB institutions have generated an action plan (EMP) that accommodates all the environmentally friendly practices at different DB institutions. Among other plans, DB institutions aim to embark on monitoring and controlling the unnecessary wastage of its scarce resources. It is against this background that the designed and developed project proposal aimed at promoting improved waste management through integrated waste management schemes at Don Bosco Oysterbay VTC and Don Bosco Morogoro Novitiate house.

The identified project sites (DB Oysterbay VTC and Don Bosco Morogoro Novitiate house) were selected based on the increasing populations at the respective institutions as well as the audit findings which indicated significant operational expenses in the treatment of liquid wastes at the institutions which is usually done by the municipal council. Further, the selection also capitalized on the audit findings which further indicated challenges on the time duration of the collection of both solid and liquid wastes which are a result of different activities undertaken by the institutions. DB institutions face significant challenges due to the frequency (once in two to three months) of the service provider's visits to collect the wastes at the institution. The latter which is attributed to a number of reasons made the management of liquid and solid wastes at the institutions difficult especially during rainy seasons.

The designed project aimed at starting up bio-digester waste management and sewage systems as well as installation of a charcoal briquette making system at Don Bosco Oysterbay VTC and Don Bosco Morogoro Novitiate House. The established systems aimed at improving the Institution's environment, Ensuring cost-effectiveness, increasing the institution's income generation, and offering continuous entrepreneurship training to youngsters from socially and economically disadvantaged groups. The implemented project aimed at producing water that is rich in nitrogen to be used for irrigation purposes as well as flushing purposes in toilets and methane gas (known as biogas) which will be harnessed for cooking purposes. The implementation of the project also engrossed on the production of charcoal briquettes as a source of cooking energy at Don Bosco Oysterbay VTC

The implementation of the project aimed at creating waste diversion and recycling of liquid and solid wastes to optimize the institutions' budget and creating a positive impact. The project in particular aimed at treating and recycling water wastes into usable water for domestic activities at Don Bosco Oysterbay VTC including mopping, flushing, irrigating of plants, animal feeding (cows), as well as construction, works, in turn, ensuring cost-effectiveness in the number of funds that are spent on a monthly basis on water. Moreover, the project also aimed at producing methane gas and charcoal briquettes to be used for cooking purposes at Don Bosco Oysterbay VTC and Novitiate House ensuring cost-effectiveness on the funds used to purchase charcoal and liquefied petroleum gas.

SECTION THREE: PROJECT DESCRIPTION

3.1. PROJECT OBJECTIVES:

1. To enhance the utilization of produced (liquid and solid) wastes in developing and promoting more efficient and cleaner environments at Don Bosco Oysterbay VTC and Don Bosco Novitiate House by the end of 2020.

2. To equip about 500 youth (both male and female) at Don Bosco Oysterbay VTC with the requisite technical skills and knowledge on how to sustainably and effectively manage wastes by the end of 2020.

3. To increase the Institution's financial sustainability through cost-effective mechanisms by the end of 2020.

3.2. IMPLEMENTED ACTIVITIES;

The major activities in the project implementation period focused on establishing waste management infrastructures at the identified project location site and to capacitate the direct and indirect beneficiaries on effective uses of the developed structures for promoting sustainable environments. The construction activities focused on establishing biodigester system and a charcoal briquette system at DB oysterbay VTC as well as three biogas systems at Morogoro Novitiate house respectively.

TENDERING ACTIVITIES:

As Don Bosco's standard financial guidelines and procedure tendering activities were adhered to before awarding the consultancy to Joshua Erasto Kisyoky Enterprises, Eco septic Tanzania as well as Kuja na Kushoka tools manufactures**.** A call for tenders that specified all the requirements was disseminated publically. Basing on the stipulated deadline the institutions (DB Oysterbay & Morogoro) acquired quotations from different service providers who demonstrated interests in the assignment. The assigned tendering task force analyzed the acquired quotations and based on the stipulated criteria selected Joshua Erasto Kisyoky Enterprises to implement the consultancy services at DB Novitiate House and Eco septic Tanzania and Kuja na Kushoka tools manufactures to implement the consultancy services at Don Bosco Oysterbay VTC. The selection criteria of Joshua Erasto Kisyoky Enterprises, Eco septic Tanzania as well as Kuja na Kushoka tools manufactures was based on the vast experience of the companies, the cost propositions for the establishment of the systems at both institutions as well as the post consultancy services proposed by the companies.

SURVEYING AND DESIGNING OF THE BIODIGESTER PLANT

Before the commencement of the construction activities, the constructors surveyed both locations and developed design layouts of the envisioned tanks/plants/machines and prototypes of what they would look like in the end. The latter was used to estimate the number of materials needed and the estimated costs of the construction projects. Moreover, the survey conducted provided the consultants with an idea of the waste produced from the sites.

CONSTRUCTION ACTIVITIES

The construction activities during the project implementation focused on developing and installing biogas systems as well as a charcoal briquette making machine at DB Oysterbay VTC

BIOGAS

Biogas is a mixture of gasses that is produced by anaerobic digestion of organic materials as agricultural wastes, animal dung and human excreta. The main compounds of biogas are methane (roughly 60%) and carbon dioxide (roughly 40%), along with other trace gasses. Methane is a flammable gas that is produced by anaerobic fermentation of materials of organic matter by activities of micro-bacteria. If properly mixed with air, this gas burns with a blue flame and no smoke is produced.

The primary end use application of domestically produced biogas is cooking; However, especially.in remote rural areas where electrification does not exist, biogas is also used for illumination purposes. The residue of the biogas process, bio-slurry, can be collected relatively easy and can be used as organic fertilizer and soil improver.

CHARCOAL BRIQUETTES:

A briquette is a compressed block of coal dust or other combustible biomass material (e.g. charcoal, sawdust, wood chips, peat, or paper) used for fuel and kindling to start a fire. The use of briquette fuels is one among the suggested alternative sources of energy in most African countries. The production of Charcoal briquettes in this project was meant to offer an economical solution to the rising costs of cooking fuel which is increasing exponentially overtime.

CONSTRUCTION OF A BIODIGESTER SYSTEM

Construction of a Biodigester System at Don Bosco Oysterbay:

The construction of the Biodigester system at DB Oysterbay was mainly meant to cater for the provision of water for irrigation purposes and soil improvement. The construction of the biodigester tanks mainly involved digging and breaking as well as steel fixing. Because it was envisioned to have a biogas tank separate, it was required to cut a section of the bigger tank to incorporate the gas tank holder. The top portion of the digester tank was removed just enough for the tank to fit and the width to allow for the free movement of the gas tank. The removed top portion of the gasholder was then placed on top of the digester tank. It was required to leave some space, (about 20 mm on all sides), then the guideline for cutting was marked. Using a hacksaw, slots on top of the projected portion of the digester tank were cut with the hacksaw blade, along the guideline, and the top part was removed. After all the piping and cementing was done, the gas holder tank was put by gently lifting the gas holder tank and place it over the digester tank so that the 40 mm dia guide couplers fixed on the sides of the gas tank sits over the 32 mm dia couplers on the digester.

Construction of a Biodigester System at Don Bosco Morogoro:

The construction of a biodigester system at Don Bosco Morogoro Novitiate House focused on the establishment of a three fixed dome digesters of 13m.The reason for this was the institutional low maintenance requirement and reliability. In addition, the establishment of the system required only locally and widely available materials for construction, such as stones, bricks, clay and cement. This type of

biodigester only had fixed parts, which were not affected by erosion or rust, and was constructed underground to protect it from physical damage. Resulting in a lifespan of more than 20 years.

Moreover, the decision to use the underground construction was meant to help to attain a stable temperature regime to stimulate the bacteriological processes. Additionally, the underground construction was meant to save space.

Installation of the Charcoal Briquette Machine:

For the Charcoal Briquette production Don Bosco procured a Charcoal briquette machine to facilitate the production of the charcoal briquettes. The developed machines was designed according to the available solid waste materials produced at the institution particularly the production units. The machine was installed in a conducive area suitable to facilitate the production of charcoal briquettes.

CAPACITY BUILDING

The capacity-building component of the project mainly involved training the youngsters' enrolled and key responsible workers at the institution on the use of the biodigester, charcoal briquette machine and the environmental aspect piece of the installed facilities. This was designed purposefully to create more awareness among the youth and novitiates on the environment and instigate more innovative interventions aiming to effectively preserve the environment

3.3. PROJECT OUTPUTS

-INCREASED ENVIRONMENT CONSERVATION PRACTICES

The installed biodigester septic tanks and briquette machine change the environment in so many ways. First and foremost the installed tanks eliminate foul smell which was initially generated as a result of blocked toilet chambers due to untimely disposal or untreated cow compost. Further, given some amount of water will soak into the surrounding soil, the surrounding environments will have fertile soils which can promote gardening or agriculture hence reducing resources allocated for manure and procurement of some food materials such as vegetables, tomatoes as well as onions. Moreover, the use of charcoal briquettes will reduce air pollution as well as reduce deforestation in Tanzania.

-INCREASED COST-EFFECTIVENESS

Initially as indicated in the environmental audits Don Bosco Institutions of Oysterbay and Morogoro used significant funds on water as well as gas for cooking purposes. However, with the introduced biodigester plants and charcoal briquettes the institutions are in a sole position to save up to 120 USD on a monthly basis (equivalent to 1440 USD on an annual basis) on costs used to pay for water bills, gas, and charcoal for cooking purposes as well as expenses used to pay to the municipal for waste disposal within the institutions.

SECTION THREE: CONCLUSION

Over the past decades, environmental problems have attracted enormous attention and public concern. Many actions have been taken by different Environmental Protection Agencies, actors, and others to protect human health and ecosystems from particular threats. Despite some successes, many problems remain unsolved and new ones are emerging. Increasing population and related pressures, combined with a realization of the interconnectedness and complexity of environmental systems, present new challenges to policymakers and regulators. The project design and implementation provide the utmost platform for Don Bosco institutions to effectively preserve and manage the environment in a sustainable manner. Further, the project creates a foundation to enhance and conserve ecosystems and habitats in a sustainable base ensuring the protection, preservation, management, or restoration of natural environments and the ecological communities that inhabit them.

APPENDIXES

Picture 1 &2: showing the construction of the biodigester system at DB Oysterbay.

Picture 3: showing the constructed of the biodigester system at DB Morogoro

Picture 4: showing Training to a gardener on how to mix the cow dung before release it in the digester

Picture 5: showing Training of the cooker on how to use the biodigester stove

Picture 6: showing Training of the produced charcoal briquettes produced