Technical Assistance Closure Report: Mauritius

Objective of the technical assistance (TA) Closure Report:

- To communicate publicly in one document a summary of progress made and lessons learned during the TA towards the anticipated impact (sections 1-4).
- To document qualitative and quantitative data collected during TA, for use in donor and UN reporting (Annex 1).

Steps for completing the TA closure report:

1. The lead TA implementer submits the closure report at the end of the technical assistance as a final deliverable. The TA closure report will capture outputs, outcomes and impacts of all activities conducted under the TA. Please copy and summarise relevant material from previous TA outputs/deliverables and the Response Plan, as relevant.
2. A CTCN Manager will review and revise the closure report before final approval by the CTCN Deputy Director.

Important note on public and internal use of the closure report:
Once approved by the CTCN Deputy Director, the TA closure report will be a public document available on the CTCN website www.ctc-n.org. Selected content will be used for targeted communication activities. Annex 2 is for internal use only and will not be publicly available.

Closure Report for CTCN Technical Assistance

1. Basic information

Title of response plan	Feasibility study of anaerobic digestion of the organic fraction of solid wastes in Mauritius
Technical assistance reference number	2020000014
Country / countries	Mauritius
NDE organisation	Ministry of Environment, Solid Waste Management and Climate Change
NDE focal point	Mr. Jogeeswar Seewoobaduth
NDE contact information	jseewoobaduth@govmu.org
Proponent focal point and organisation	Mr. Bhagutsing Beerachee Director, Solid Waste Management Division Ministry of Environment, Solid Waste Management and Climate Change bbeerachee@govmu.org
Designer of the response plan	1. CTCN
Implementer(s) of technical assistance	1. Council for Scientific and Industrial Research 2. University of Mauritius
Beneficiaries	1. Ministry of Environment, Solid Waste Management and Climate Change 2. FAREI *3.* Ministry of Energy and Public Utilities/ Central Electricity Board
Sector(s) addressed	1. Solid waste (organic) 2. Renewable energy production 3. Increasing crop resilience and productivity
Technologies supported	1. Integrated solid waste management 2. Landfill gas power 3. Municipal solid waste 4. Organic agriculture
Implementation start date	(17/ 03/2021)
Implementation end date	(30/04/2022)
Total budget for implementation	USD 126 040.00
Description of delivered outputs and products as well as the activities undertaken to achieve them. In doing so, review the log frame of the original response plan and refer to it as appropriate	**Overview:** This report represents a summary of Outputs 1 – 7 as articulated in the Technical Assistance plan for Mauritius, through a partnership between the Councill for Scientific and Industrial Research and the University of Mauritius. Some of the most significant contributions of this technical assistance under the CTCN was ***Output 6:*** *Cost and revenue analysis and development of business model* and **Output 7:** *Development of an implementation plan including a preliminary proposal for a Public-Private-Partnership.* The NDE has acknowledged that the outcomes of this work were a significant contribution to a parallel work undertaken by a Technical Advisor appointed by Mauritius for other projects.

	• ***Output 1:*** **Development of an implementation plan and communication documents** The Solid Waste Division of Mauritius provided data transferred to all six transfer stations across the island nation – most this waste ends up at the Mare Chicose landfill site which is fast approaching its saturation point. With the end of stablishing a new biogas plant in mind, the idea behind this output was to capitalise on the distance of the waste feedstock to where there a need is to generate energy. In support of the Solid Waste Management Division who are pursuing the implementation of the resource recovery and recycling strategy. An inception workshop chaired by the CTCN was held on 16 April 2021 with participants from the CSIR, University of Mauritius, Ministry of Environment, the Solid Waste Management Division (of Mauritius) and other stakeholders invited by the National designated Entity (NDE). Planned activities were discussed, including a description of the expected impact. There were at least two key requests: 1) inclusion of pig manure in the study and a written full proposal for GCF. The former was included as a recommendation in the reports as data were not available; and for the latter, the CTCN indicated that further decisions will be taken once this study is completed. • ***Output 2:*** **Status quo and baseline analysis of organic waste** The meeting report (Deliverable 2.1) comprises the main discussions held during the kick-off meeting between the different stakeholders and was submitted as to the CTCN as part of immediate deliverables. This report presents Deliverables 2.2 and 2.3. The analysis of the current value chain for organic waste provides a situational analysis of the value chain for organic wastes from collection, transportation, treatment to ultimate disposal. An in-depth analysis of the source of organic waste generation is made while the collection, transportation, treatment and disposal systems existent in Mauritius are also reviewed. This report also includes a gender and youth perspective in the analysis of the current value chain for organic wastes in Mauritius. • ***Output 3:*** **Anaerobic digestion analysis including quantification of biogas / methane and energy production potential** The third deliverable is divided into two parts: • Quantification of biogas and energy production potential. • Identification, quantification, and valorisation of by-products.

	The deliverables for Output 3, i.e., activities 3.1 and 3.2, are presented in this report. The previous study on Output 2 quantified and characterized the organic fraction of municipal solid waste that is generated in Mauritius. Output 3 focused on determining the biogas/methane production from the solid organic fraction waste, including quantifying the electricity generation and heat recovery potential from 100 tons/day anaerobic digestion of food waste (FW) supplemented by yard waste (YW). The calculations were based on the quantities and characteristics determined in Output 2. The work further explored the potential of recovering liquid and solid fertilizers, and any other valuable by-products from the digestate. • ***Output 4:*** **Identification of best available and appropriate technologies and of suitable sites** Deliverable 4 consists of three components namely: • An overview of identified technologies and processes • An overview of identified sites • Meeting report including selected technology and site The report on the overview of identified technologies considers the different types of anaerobic digestion systems that exist based on the total solids (TS) content of the wastes processed, the mode of operation and the number of stages employed. The sizes of the digesters, the estimated costs of the technologies as well as the existing biogas storage systems are also overviewed, as far as practically possible. The report on the overview of identified sites lists potential sites for the eventual commissioning of a biogas plant in Mauritius and considers several aspects including site accessibility, land extent available, waste supply and connection to the grid network. The final report under Deliverable 4 consists of a meeting report that summarises the discussions held between all relevant stakeholders in connection with the choice of the anaerobic digestion technology and the site to set up the biogas plant. • ***Output 5:*** **Schematic design of the biogas plant** This output documents the design, mass, and energy balance of the proposed 100 tons/day anaerobic digestion facility. This output used the information from the 2 previous deliverables as input for the design. Design of plant focused on the process flow diagram, isometric diagrams and sizing of some of the units in the plant. The mass and energy balance calculated the material and energy flows within the plant. A list of equipment and building that are required is provided. The latter part of the document focuses on requirements and opportunities for integration of the biogas plant into the existing organic waste value chain and the energy and digestate supply

	chains while also considering the aspects of gender and youth. • ***Output 6:*** Cost and revenue analysis and development of business model Deliverable 6 consists of four components namely: • Cost Analysis • Revenue Analysis • Cost-Benefit Analysis • Business Model Deliverable 6 looks at the 'Cost and revenue analysis and development of business model' of the anaerobic digestion of the organic fraction of solid waste from households, hotels, and markets in Mauritius. Essentially, the economic costing relies on secondary information drawn from a wide range of similar projects elsewhere in the world contextualised to the designed biogas plant for Mauritius (see Output 5). Deliverable 6 thus uses variables from preceding sections of the project. A central feature of biogas technology (as for many other renewable energy technologies (RETs), and other than for conventional energy sources), is that almost all expenses need to be financed upfront (Capital Costs), with relatively lower operating expenses (operation and maintenance costs) thereafter. The economy of an anaerobic digester is characterised by high initial investment costs. This is problematic where poverty is endemic. Although the biogas industry is usually characterised by zero to low feedstock cost (if any, it is mostly due to the transportation cost), large-scale production will also be limited by local feedstock organic fraction of solid waste resource availability. • **Output 7:** Development of an implementation plan including a preliminary proposal for a Public-Private-Partnership Deliverable 7 consists of four components namely: • An implementation plan • A draft public-private-partnership (PPP) proposal • Capacity building material and report • Closure meeting report Deliverable 7 comprises an implementation plan including a preliminary proposal for a PPP. The implementation plan consists of an overview of the required activities for implementing the anaerobic digestion project on a PPP basis in Mauritius, including an overview of the business model developed in Output 6 as well as the required investments, timeline for development of project activities and responsibilities of all concerned stakeholders. Deliverable 7 also includes a draft PPP proposal that outlines the general arrangements with the key stakeholders in this project. A capacity-building component is also provided as part of Deliverable 7 to ensure that all the relevant stakeholders in this project are

	well acquainted with the anaerobic digestion technology. Finally, a closure meeting under Deliverable is scheduled to present the key findings of the feasibility study.
Methodologies applied to produce outputs and products	Data obtained from Solid Waste Management Division. Methane and electricity generation determined using data from the Solid Waste Management Division and widely accepted equations. Interview questionnaires also used to assess the gender and youth aspect in the organic waste value chain. Cost-benefit analysis made using costs from literature review and from quotations received.
Reference to knowledge resources	No UNFCCC Technology Executive Committee (TEC) knowledge products have been used in the implementation of the TA.
Deviations	There has been no deviation from the response plan against the actual implemented activities, outputs and products. All activities, outputs and products have been implemented as planned.
Anticipated follow-up activities and next steps	*The Solid Waste Management Division of Mauritius suggested the following as a way forward:* "The results of the feasibility study will now be used as inputs to a Transaction Advisory Consultancy Services procured by the Solid Waste Management Division. The Transaction Advisor will use the key findings of the feasibility study and prepare a detailed PPP proposal and the request for proposal documents to invite potential project promoters to submit their bids for the setting-up and operation of a biogas plant in Mauritius. This project will not only alleviate the issue of solid wastes in Mauritius but also assist in the mitigation of greenhouse gases through the production of renewable energy." • In addition, Mauritius has the opportunity to explore further funding opportunities through the GCF Readiness Progamme, and further refine the PPP arrangements via the Transaction Advisor based on recommendations from this study. This includes the construction of the new Biogas Plant as proposed by this study. • The CSIR and the University of Mauritius facilitated a training workshop primarily for the Solid Waste Division personnel – where results of a proper feasibility study were presented. Based on the results of the study, Mauritius has various options based on the price of electricity and PPP to implement the recommendations from the study. • The CTCN can disseminate the report through its information channels.

	The next steps: • Through a separate programme, the Government of Mauritius has committed to provide households with refuse bins to sort out waste at household level, so that solid organic waste can be directed to a biogas facility. • Mauritius to approach the CTCN about participation in the GCF Readiness Programme around Solid Waste Management • Preparation of a formal proposal to GCF. • Formalization of the Public-Private sector Partnerships/ • Use of new expertise and implementation of activities designed by the CTCN. • This CTCN invention is anticipated to fast-track the implementation of the resource recovery and recycling strategy in Mauritius, through the Solid Waste Management Division. *In summary:* *Procurement of the Consultancy Services of a Transaction Advisor to carry out the following:* • Commissioning of a report to assess the commercial viability of the anaerobic digestion project on public-private-partnership basis; and • Preparation of a request for proposal document for the setting-up and operation of a biogas plant in Mauritius on a public-private-partnership basis. Submission of a draft law/policy developed by the CTCN to cabinet/parliament. • Follow-up and formal submission of funding proposal drafted with support from the CTCN. • Implementation of activities designed by the CTCN. • Dissemination of report drafted by the CTCN. • Use of new expertise acquired during training led by CTCN.

2. Lessons learned

	Lessons learned	**Recommendations include**
Lessons learned from the CTCN TA process	• The initial approval of outputs by the proponents of the TA was a significant improvement, as it places ownership of the products on the country that made the TA request. • In Mauritius, this project was led by experts: both from the University and Solid Waste Management	• It would be great if no new requests are included in the TA, especially during the inception of the project. • Furthermore, and requested major changes need to be brought to the attention of the CTCN. For example, any change in a component of the design of the biogas plant affect other components and the entire structure. This add smore time to complete tasks per activity plan.

	Division of the Ministry of Environment. That enabled generation of great quality products acceptable to the CTCN. • Regular communication was very important between the CTCN, CSIR and Mauritius. It enabled corrections to be made timeously, despite the working challenges presented by the global COVI-19 pandemic. • The CTCN Secretariat was quick firm, but professional, in ensuring that the project was completed within budget, plus an additional month due to finalization of logistics. • There were staff changes during the project which meant the team had to be flexible enough to learn by going. • Having a proactive collaborator on the ground made a significant difference and improvement to the outputs from this project. It was easier to engage the Solid Waste Division and the Office of the NDE because of continuous briefing by our collaborator based at the University of Mauritius.	• The cost-benefit modelling in this study could benefit similar projects under the CTCN's TA requests. • The CTCN should continue being firm in managing the expectations of countries seeking technical assistance. This will lessen the burden on implementing partners to review the scope of the work – especially, if the outputs are to be first endorsed and validated by the NDE before CTCN's approval. • Countries should be more transparent in ongoing related projects, to minimize repeat of efforts and learn from best practices. • The designed biogas plant should be constructed via the PPP arrangement as proposed, and scaled up, or similar size plants should be built at strategic locations across Mauritius.
Lessons learned related to climate technology transfer	• The application of Biogas Technology is well established within the CTCN, including the derivation of fertilisers from processing of the solid organic waste material. A successful bidder to generate electricity from solid waste in Mauritius will	*Recommendations include* • Electricity generation from the use of solid organic waste should part and parcel of the circular economy approach in Mauritius. • Nutrient analyses should be conducted of material coming off the digestion process.

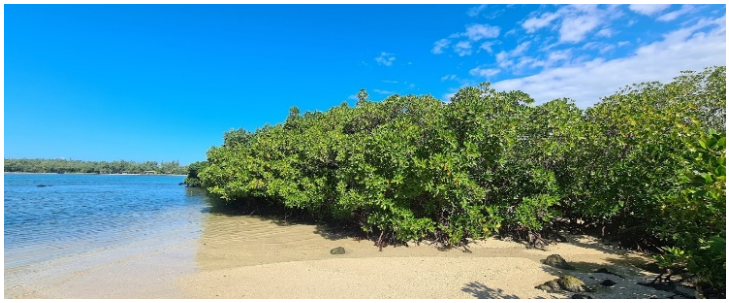
	also generate fertiliser for the agriculture industry. • Mauritius should institutionalise more awareness programmes about the value of (solid) organic waste, so that money is not wasted! This an area where women and girls who often prepare meals could be empowered in the waste recycling process. • Issues associated with health when dealing organic waste should be addressed in Mauritius.	• Infrastructure to feed electricity into the grid should be scaled up in Mauritius. • Risk mitigation measures are essential – as biogas production is not a linear process. • Need to continue with the capacity building measures for the Solid Waste Management Division of Mauritius. • Mauritius should also consider getting solid organic waste from neighbouring island nations to increase electricity output. This will also increase opportunities for regional funding opportunities. • Through the TA, the CTCN should also introduce/inform countries how they can be part of the GCF readiness programme, and be more aware of ongoing parallel projects and programmes.

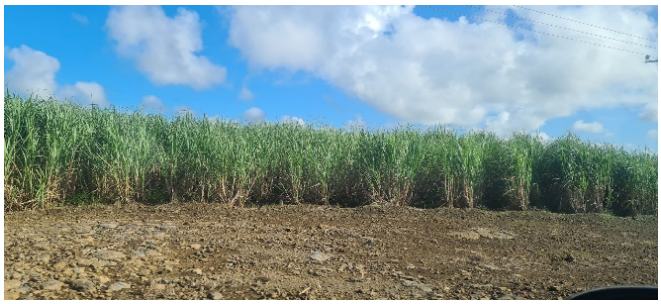
3. Illustration of the TA and photos

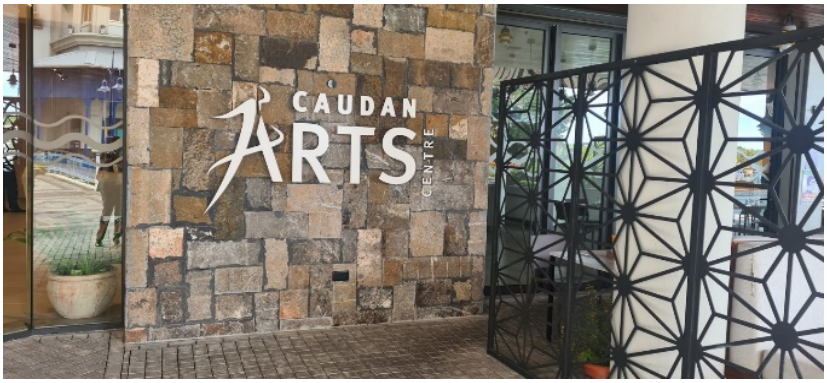
CTCN Mauritius Technical Assistance

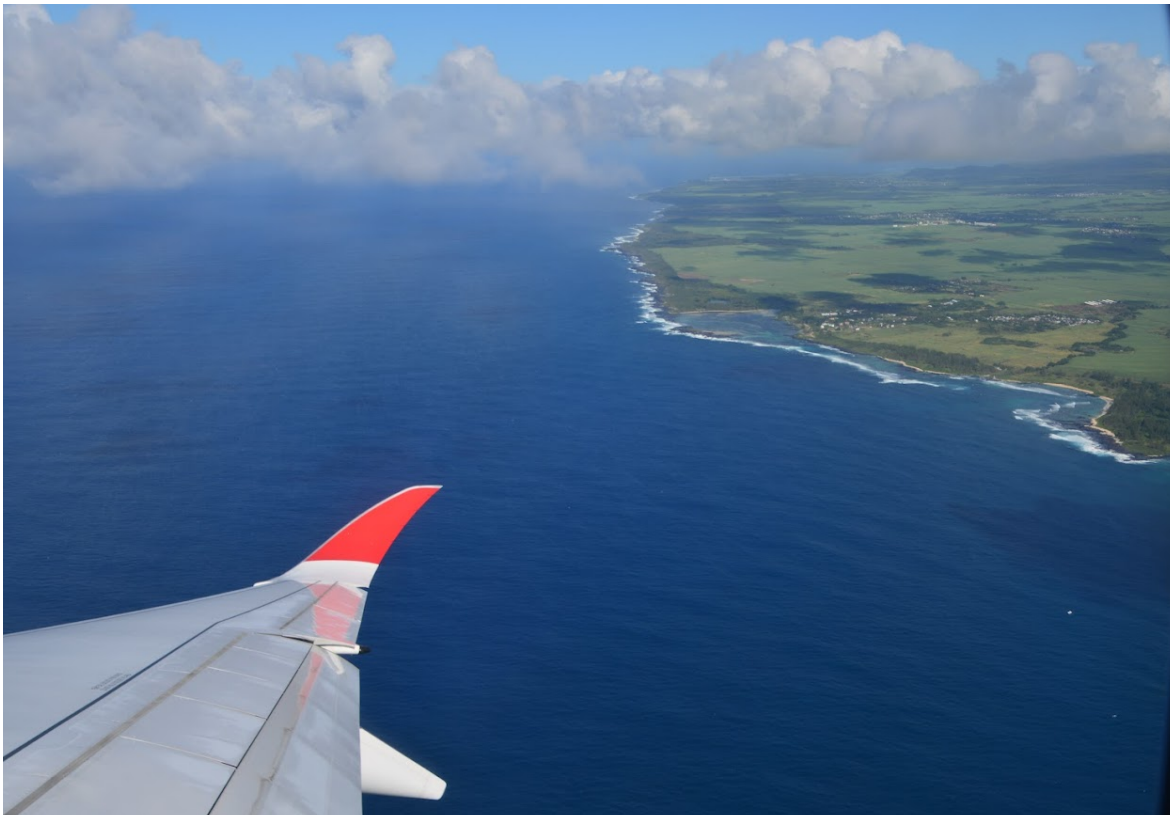
Capacity building workshop on anaerobic digestion with the Solid Waste Division: 28 April 2022

The workshop in pictures

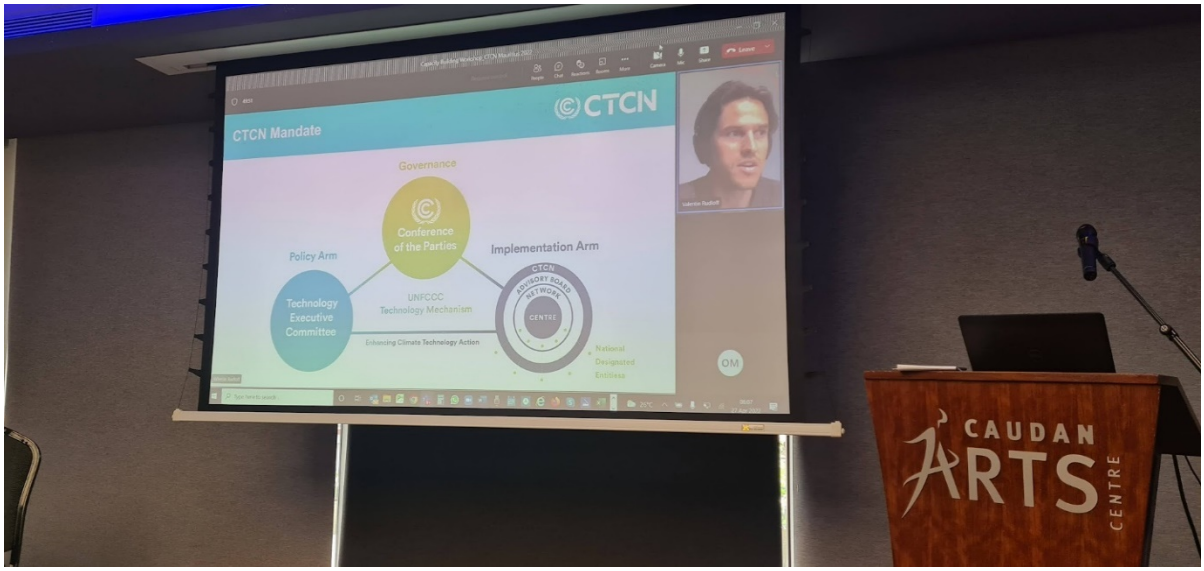


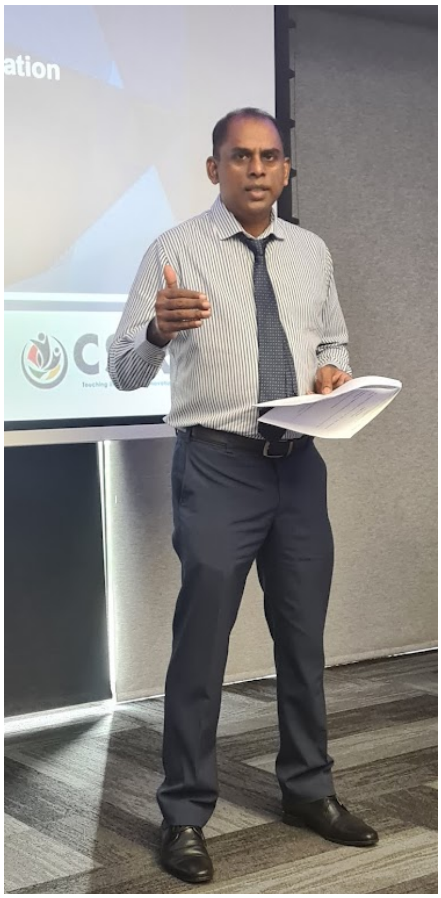


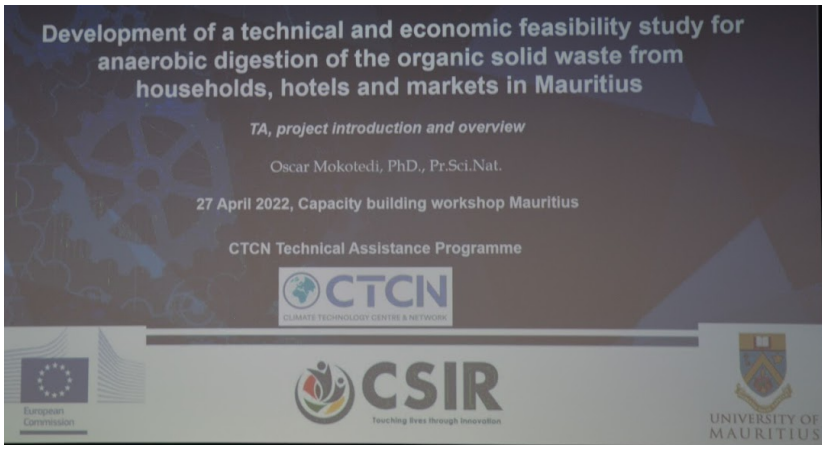




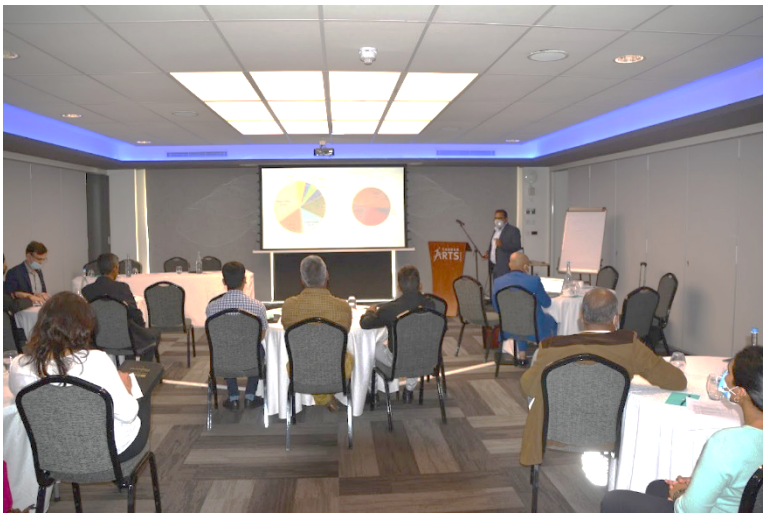
Opening remarks….

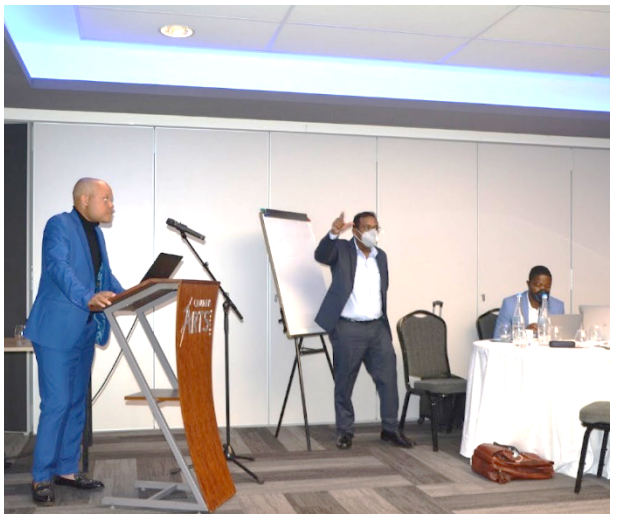


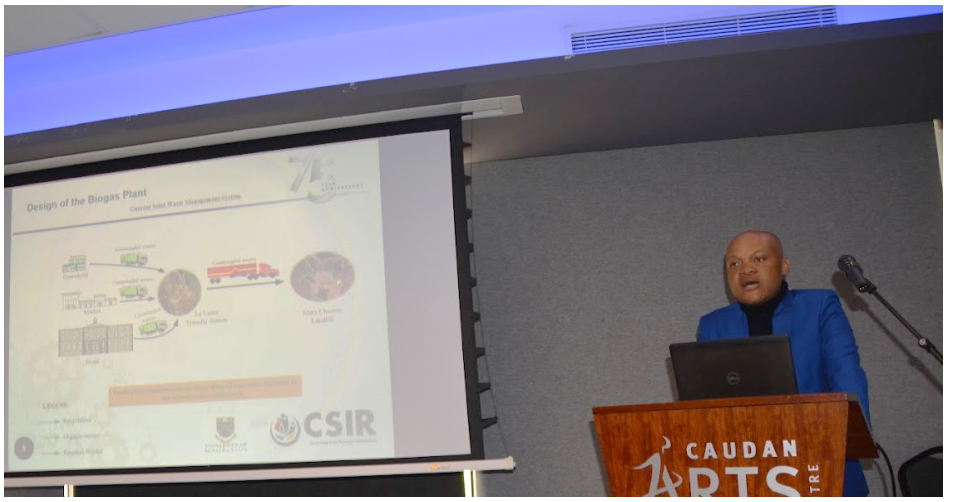


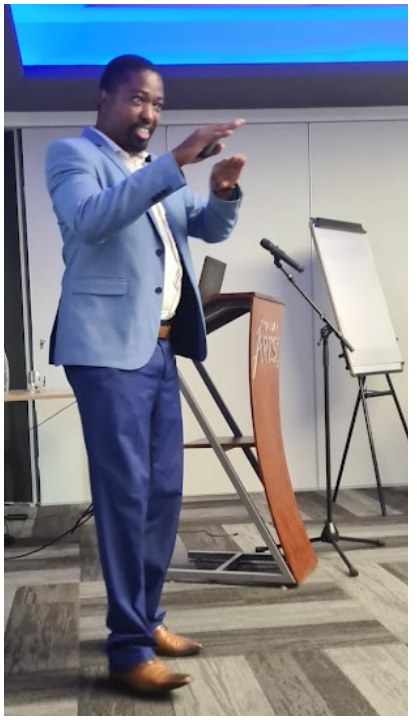


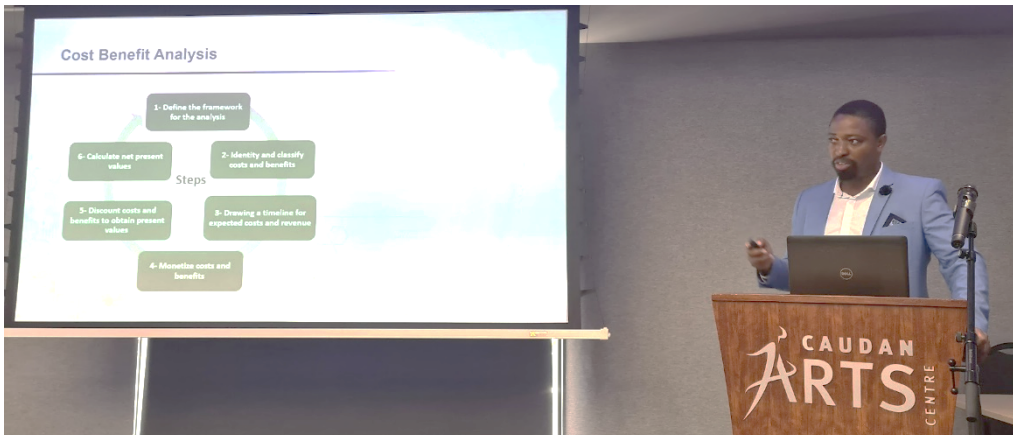
Presentations…

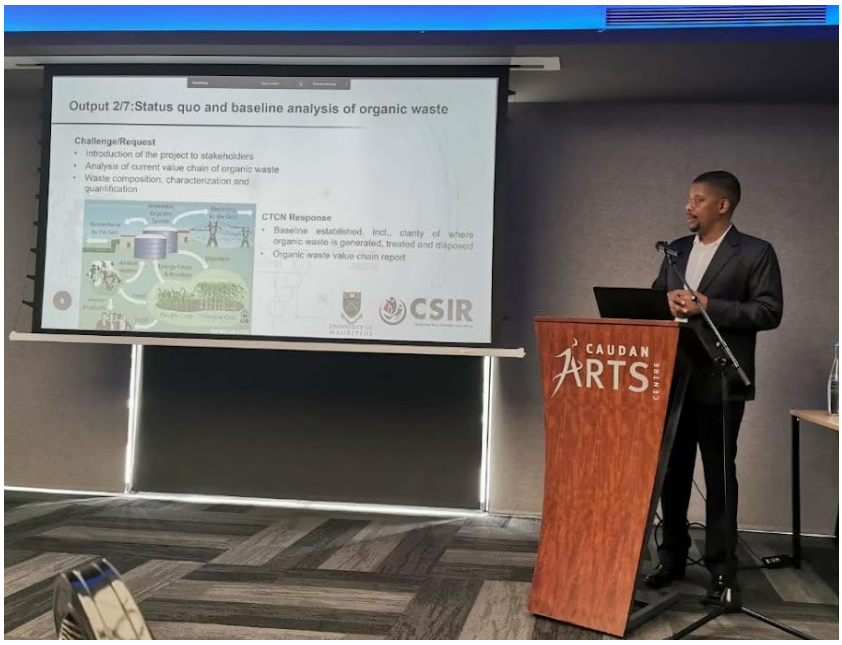


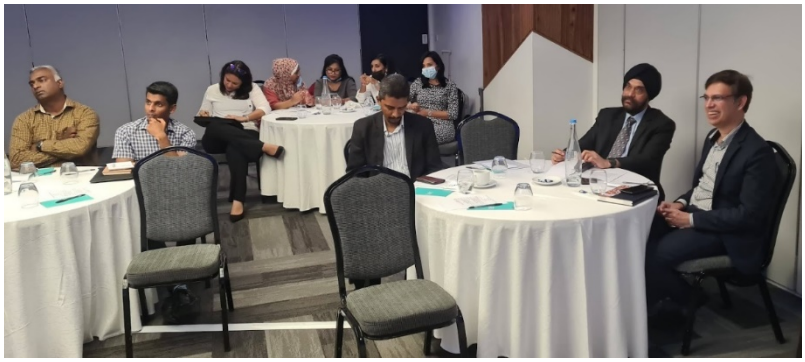


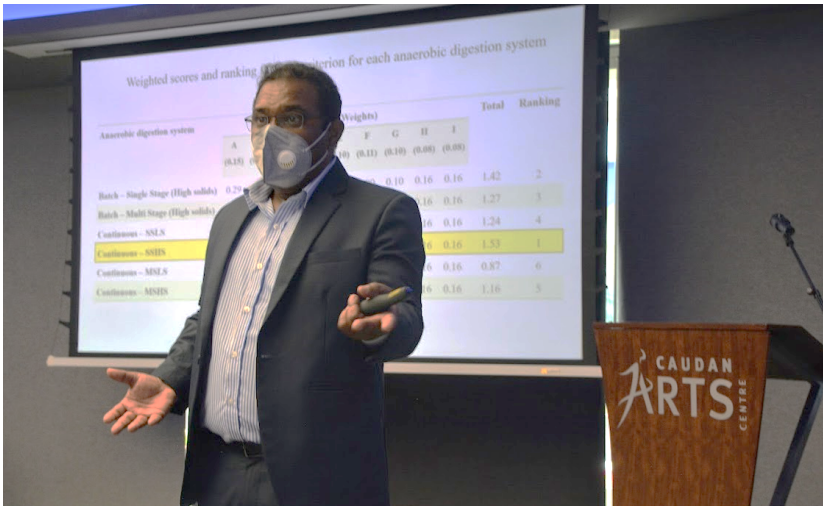




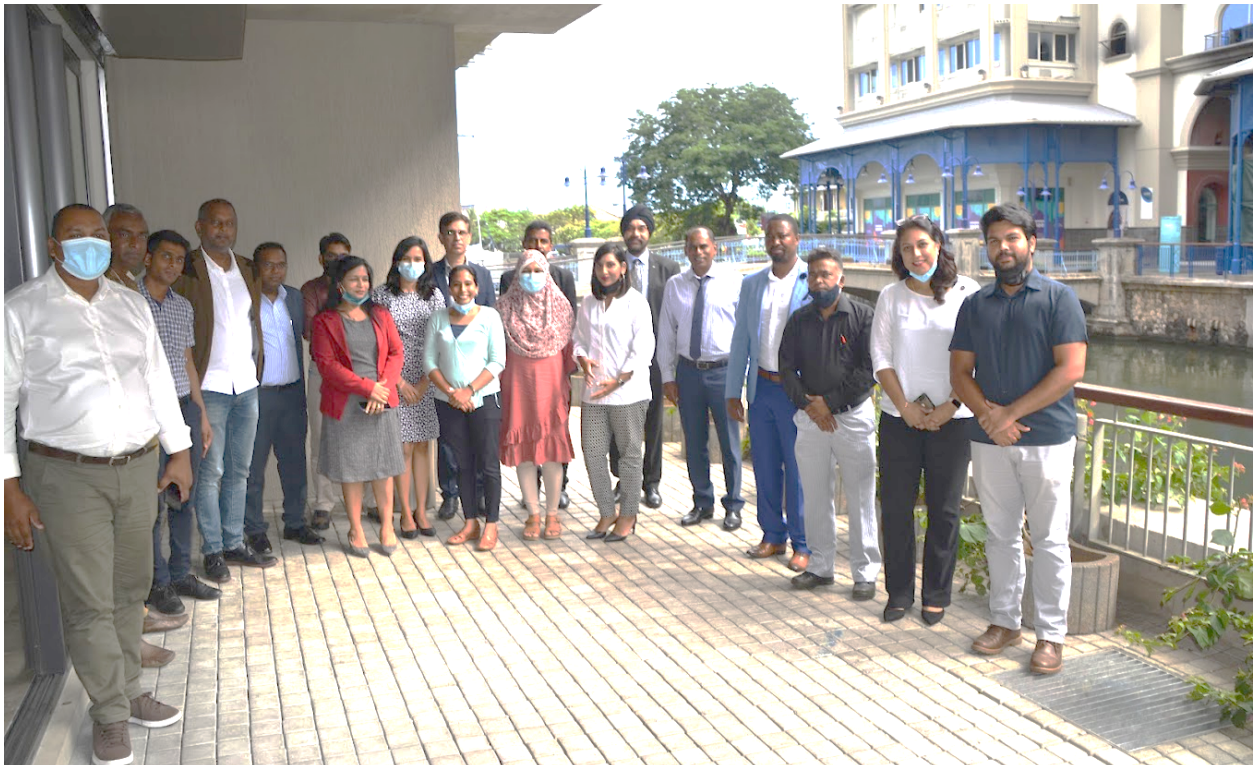



Output 2/7:Status quo and baseline analysis of organic waste
Challenge/Request
Introduction of the project to stakeholders
Analysis of current value chain of organic waste
Waste composition, characterization and quantification
CTCN Response
Baseline established, incl., clarity of where organic waste is generated, treated and disposed
Organic waste value chain report
CSIR
CAUDAN ARTS CENTRE




Weighted scores and ranking
Anaerobic digestion system
Total
Ranking
CAUDAN ARTS CENTRE

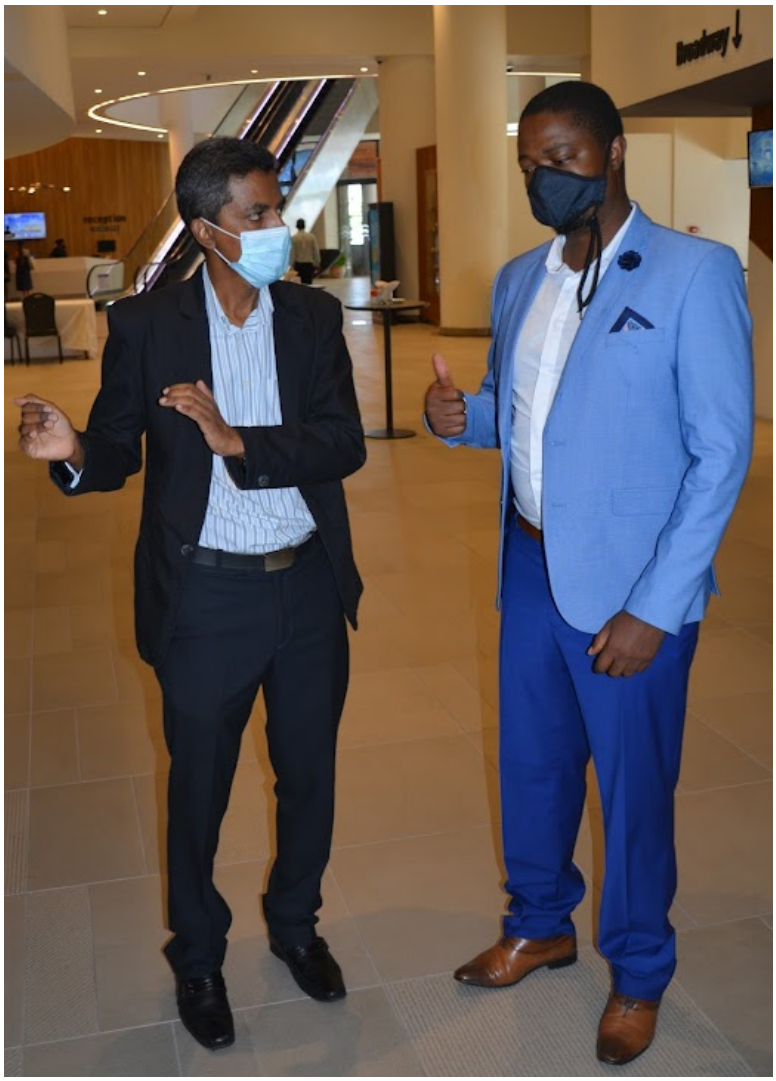

CSIR

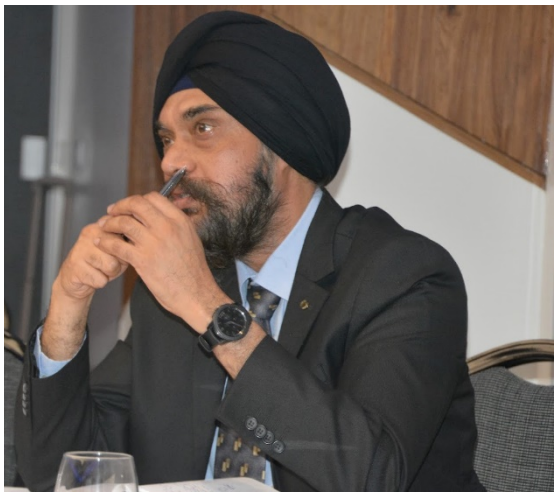


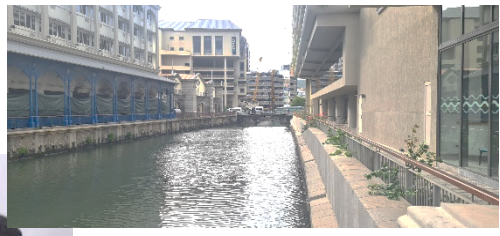
CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

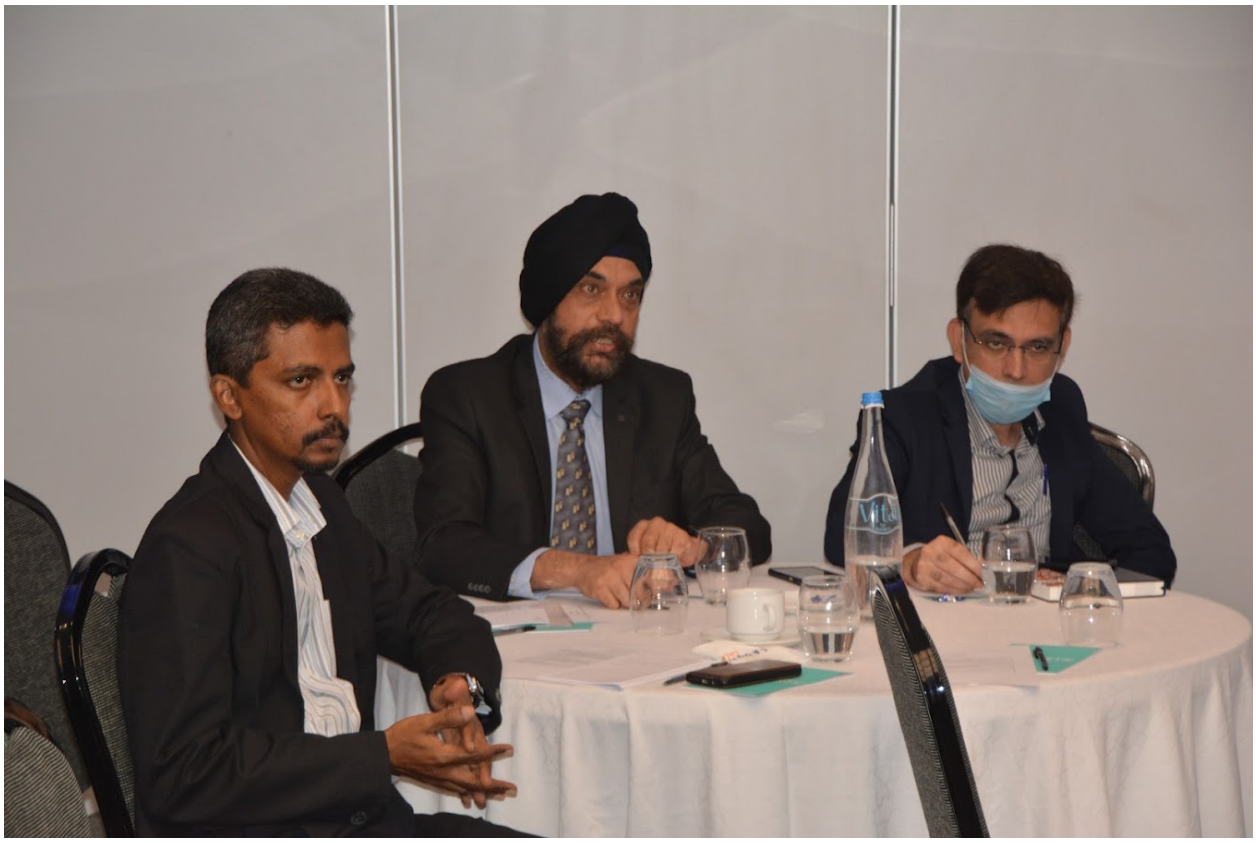
UN environment
United Nations Environment Programme

UNIDO









For communication purposes, please provide 2-4 Power Point slides, including illustrations or charts, describing barriers, opportunities, methodology, activities, outputs and achieved results. The illustrations must be copied into the TA Closure report but must also be delivered as power point files. Also, please provide at least five high-resolution pictures in jpg format, capturing technical assistance. The pictures should illustrate how the TA has impacted the lives of the beneficiaries in particular and the communities in general.

4. Impact Statement

The information in the table below will be used to communicate results and anticipated impacts of this technical assistance publicly. Please copy information from impact statement developed in the M&E Plan and update as relevant.

Challenge	Increasing solid waste generation is a major issue in Mauritius, with most of the total solid wastes generated being landfilled annually. Although the sole landfill in the island has been ensuring a continuous disposal capacity since 1997, this is not a sustainable approach as the landfill is reaching the end of its lifetime. Besides, Mauritius, being a Small Island Developing State, depends heavily on fossil fuels for meeting its energy requirements. Considering the highly fluctuating prices of fossil fuels on the world market, this does

	not represent a sustainable solution for the country.
CTCN Assistance	• Development of a schematic design of a biogas plant • Cost and revenue analysis and development of a business model for the biogas plant • Development of a preliminary proposal for a public-private partnership Capacity-building on anaerobic digestion
Anticipated impact	• Establishment of a public-private partnership for the setting-up and operation of a biogas plant • Setting-up and operation of the biogas plant • Diversion of a significant fraction of organic wastes from landfilling to the biogas plant • Reduction in greenhouse gas emissions from the solid waste sector.
Co-benefits: Achieved or anticipated co-benefits from the TA	Anticipated co-benefits linked with the construction and operation of a biogas plant in Mauritius are: 1. reduced environmental impacts resulting from degradation of organic wastes such as greenhouse gas emissions and leachate formation contaminating groundwater, 2. improved health with the reduced environmental impacts, 3. renewable energy exploitation and clean electricity production, 4. potential use of the digestate from the anaerobic digestion process as organic fertilizer in line with a circular economy approach creation of green jobs
Gender aspects of the TA	The role of women and youth will be analysed within the current organic waste supply chain in Mauritius from waste generation, collection, transportation to disposal. Opportunities for women and youth will be identified in connection with the future construction and operation of the biogas plant (Deliverables 2 and 5 of the Technical Assistance).
Anticipated contribution to NDC	The Technical Assistance directly supports Mauritius' Nationally Determined Contributions to: • A gradual shift towards the use of cleaner energy technologies, such as biogas

	• A sustainable and integrated waste management, including waste to energy through anaerobic digestion
The narrative story	Over 500,000 tonnes of solid wastes are landfilled annually in Mauritius, out of which more than 50% are organic wastes, while over 87% of the total primary energy requirements of the island are met through fossil fuels. As a solution to alleviate both issues, anaerobic digestion is proposed as the technology to process organic wastes and simultaneously, produce renewable energy in the form of biogas. Prior to implementation of anaerobic digestion on a large scale, an in-depth feasibility study needs to be carried out. This CTCN Technical Assistance thus addresses this gap through the development of a technical and economic feasibility study for anaerobic digestion of the organic fraction of solid waste from households, hotels and markets in Mauritius. At the end of this Technical Assistance, Mauritius will have a technical and economic feasibility study report as well as a preliminary proposal for a public-private partnership at hand that will allow the country to move towards the implementation phase of the project. The implementation of anaerobic digestion is in line with the mitigation measures listed in the Nationally Determined Contributions submitted by Mauritius.
Contribution to SDGs A complete list of SDGs and their targets is available here: https://sustainabledevelopment.un.org/partnership/register/	• *SDG 7 (Target 7.2) - By 2030, increase substantially the share of renewable energy in the global energy mix* Through the setting-up and operation of the anaerobic digestion plant, biogas will be produced and will be burnt to eventually generate electricity. This will reduce the reliance on fossil fuels for meeting the energy demand in Mauritius. As such, this contributes to target 7.2 having as aim to increase substantially the share of renewable energy in the energy mix for Mauritius. • *SDG 7 (Target 7.b) - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support*

	The implementation of a biogas plant expands and upgrades the energy infrastructure of Mauritius in line with target 7.b. • *SDG 12 (Target 12.5) - By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse* Through the setting-up and operation of the biogas plant, organic wastes will be converted into biogas (for electricity generation) and a digestate (with potential for reuse as soil amendment). This is in line with the concept of recycling as specified in Target 12.5. • *SDG 13 (Target 13.3) - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning* Anaerobic digestion of organic wastes is one of the mitigation measures that a country can take to abate greenhouse gas emissions from the solid waste sector. This Technical Assistance has a component on capacity-building which involves training on anaerobic digestion to relevant national stakeholders, including the Department of Environment and Solid Waste Management Division of the Ministry of Environment, Solid Waste Management & Climate Change and other relevant stakeholders. This is in line with Target 13.3. • *SDG 13 (Target 13.b) - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities* This Technical Assistance is one of the mechanisms through which Mauritius, as a small island developing State, is receiving technical support for mitigating greenhouse gas emissions from the solid waste sector. This is in line with Indicator 13.b.1.

Annex 1 Technical assistance data collection

Please add quantitative and qualitative values for the indicators selected in the M&E plan and monitored throughout the technical assistance in the tables below. Indicators which have been monitored in addition to the proposed indicators below may be added at the end of table A. Non-relevant indicators should be left blank.

A. Output and outcome indicators

Indicator Please note indicators below highlighted as **anticipated**	**Quantitative value** *Numerals only; disaggregates must sum to the total*	**Qualitative description** *List the various elements corresponding to the quantitative value as well as timelines and responsible institutions*
Total number of events organized by proponents and implementing partners	*1*	Capacity-building workshop on anaerobic digestion of organic wastes
Number of participants in events organized by proponents and implementing partners	*16*	
a) Number of men	*10*	8 Mauritian 2 Indian
b) Number of women	*6*	All Mauritian
Number of climate technology RD&D related events	*NIL*	Not Applicable
Number of participants in climate technology RD&D events	*Not Applicable*	Not Applicable
a) Number of men	*Not Applicable*	Not Applicable
b) Number of women	*Not Applicable*	Not Applicable
Number of training organized by proponents and implementing partners	*1*	Capacity-building workshop on anaerobic digestion of organic wastes
Number of participants in trainings organized by proponents and implementing partners	*16*	
a) Number of men	10	8 Mauritian and 2 Indian
b) Number of women	6	All Mauritian
Total number of institutions trained	*7*	
a) Governmental (national or subnational)	6	1. Solid Waste Management Division 2. Department of Environment 3. Wastewater Management Authority 4. Central Electricity Board 5. Mauritius Renewable Energy Agency 6. Food and Agricultural Research and Extension Institute
b) Private sector (bank, corporation, etc.)	**1**	Kukuza Project Development Company

c) Nongovernmental (NGO, University, etc.)	**None**	*Not Applicable*
Percentage of participants reporting satisfaction with CTCN training (from CTCN training feedback form)		*Satisfied= 4+ on 5-pt scale*
Percentage of participants reporting increased knowledge, capacity and/or understanding as a result of CTCN training (from CTCN training feedback form)		*Increased knowledge, capacity and/or understanding= 4+ on 5-pt scale*
a) Percentage of men		
b) Percentage of women		
Total number of deliverables produced during the assistance (excluding mission, progress and internal reports)	*22 Deliverables under 7 Outputs*	
a) Number of communication materials, including news releases, newsletters, articles, presentations, social media postings, etc.	7	1. *Implementation plan* 2. *Monitoring and Evaluation plan* 3. *Impact description document* 4. *Closure and data collection report* 5. *Kick-off meeting report* 6. *Meeting report including selected technology and site Closure meeting report*
b) Number of tools and technical documents strengthened, revised or developed	14	1. Organic waste value chain report 2. Baseline analysis of organic waste including composition, characterization and quantification 3. Report on biogas and energy production potential 4. Overview of side products ad their utility 5. Overview of identified technologies and processes 6. Overview of identified sites 7. Schematic design and inventory 8. Overview on integration requirements and opportunities into existing value and supply chain 9. Cost Analysis 10. Revenue Analysis 11. Cost-Benefit Analysis 12. Business Model 13. Implementation Plan 14. Draft PPP proposal
c) Number of other information materials strengthened, revised or created (For	**1**	*Capacity-building material and report*

example training and workshop reports, Power Points, exercise docs etc.)		
Total number of policies, strategies, plans, laws, agreements or regulations supported by the assistance		
a) Adaptation related	Not Applicable	
b) Mitigation related	Renewable energy from waste materials	NDC submitted by Mauritius
c) Both adaptation- and mitigation related	Not Applicable	
Anticipated number of policies, strategies, plans, laws, agreements or regulations proposed, adopted or implemented as a result of the TA		
a) Adaptation related	Not Applicable	
b) Mitigation related	Not Applicable	
c) Both adaptation- and mitigation related	Not Applicable	
Anticipated number of technologies transferred or deployed as a result of CTCN support	*1*	Biogas power
Anticipated number of collaborations facilitated or enabled as a result of technical assistance		
a) Number of South-South collaborations	None	
b) Number of RD&D collaborations	None	
c) Number of private sector collaborations	None	
Number of countries with strengthened National System of Innovation as a result of CTCN support	1	Mauritius
Insert any additional indicators here	Not Applicable	Not Applicable

B. Core impact indicators

Please fill in the tables for anticipated impacts of the CTCN assistance. Every technical assistance should contribute to at least one of the indicators below. For guidance on how to report on core indicators see the 'M&E Guidance Document for TA Implementers'.

Core indicator 1	**Anticipated metric tons of CO_2 equivalent (CO_2e) emissions reduced or avoided as a result of CTCN TA** *Please add your calculations in word or excel format as an Annex to this Closure Report, where applicable.*	
	Anticipated metric tons of CO_2e reduced or avoided as a result of the TA **on annual basis**	Anticipated metric tons of CO_2e reduced or avoided as a result of the TA **in total**
Quantitative value *(emissions reductions)*	*Total number (numerals only, no rounding or abbreviations)*	*Total number (numerals only, no rounding or abbreviations)*
Unit	tCO_2e	tCO_2e
GHG assessment boundary (project emissions)	Post-TA activities include the setting-up and operation of a biogas plant treating 30,000 tonnes per annum of organic wastes in Mauritius. The GHG assessment boundary (project emissions)	Post-TA activities include the setting-up and operation of a biogas plant treating 600,000 tonnes for a period of 20 years in Mauritius. The GHG assessment boundary (project

Identify expected post-TA activities, associated effects and assess boundary for quantification of GHG emission reductions	is focussed on the biogas plant (i.e. electricity generated from the waste processed and avoided CO2 if this electricity was instead produced from fossil fuels).	emissions) is focussed on the biogas plant (i.e. electricity generated from the waste processed and avoided CO2 if this electricity was instead produced from fossil fuels).
Baseline emissions Describe baseline scenario, baseline candidates, emission factors and emissions calculated	Methane emissions from biogas plant calculated as per IPCC guideline: CH4 emission factor: 0.8 g/kg wet waste treated. Emissions calculated: (0.8*30,000,000): 24,000,000 g CH4 (or 25 tons CH4) per year or 600 tons CO2e per year	Emissions calculated: 12,000 tons Co2e for a period of 20 years
Methodology Explain the method or process of verifying the indicator and how data was gathered	From the feasibility study, a total of 14.2 MWh of electricity is being produced on a yearly basis. With electricity generation from coal estimated at 2,460 kWh/ton coal, the 14.2 MWh of electricity produced would require 5,765 tons of coal/year. With coal generating 2.86 ton CO2 upon combustion, the 5,765 tons of coal would produce 16,487 tons of CO2 per year. As such, electricity production from anaerobic digestion of 30,000 tons/year of organic wastes would avoid the generation of 16,487 tons of CO2.	For a 20 year period, the 16,487 tons of CO2/year would equate to 330,000 tons of CO2 avoided.
Assumptions Describe assumptions made during calculation and quantification of GHG reductions	Assumptions made: 1. 1 ton of coal generates 2,460 kWh of electricity; and 2. 1 ton of coal generates 2.86 tons of CO2 upon combustion.	Assumptions made: 1. 1 ton of coal generates 2,460 kWh of electricity; and 2. 1 ton of coal generates 2.86 tons of CO2 upon combustion.

Core indicator 2	**Anticipated increased economic, health, well-being, infrastructure and built environment, and ecosystems resilience to climate change impacts as a result of technical assistance** *Please provide a **qualitative** description of the anticipated impacts on the categories below*
Infrastructure and built environment Anticipated increased infrastructure resilience (avoided/mitigated climate induced damages and strengthened physical assets)	Not Applicable
Ecosystems and biodiversity Anticipated increased ecosystem resilience (areas with increased resistance to climate-induced disturbances and with improved recovery rates)	Not Applicable

Economic Anticipated increased economic resilience (e.g. less reliance on vulnerable economic sectors or diversification of livelihood)	Increased resilience due to renewable electricity production and less dependent on the international volatile prices of fossil fuels
Health and wellbeing Anticipated increased health and wellbeing of target group (e.g. improved basic health, water and food security)	Increased resilience due to better management of solid organic wastes and less health-related issues

Core indicator 3	**Anticipated number of direct and indirect beneficiaries as a result of the TA**	
	Quantitative value	**Means of verification**
Total beneficiaries	*Total number*	
Number of adaptation beneficiaries	Not Applicable	*Not Applicable*
Number of mitigation beneficiaries	Direct beneficiaries: 16 persons Indirect beneficiaries: 32,000 persons (general public)	Capacity-building workshop carried out in Mauritius With 47,271 kWh/day of electrical energy produced from the biogas plant (based on feasibility study) and an electricity consumption of 1.48 kWh/capita/day, a total of 32,000 persons could benefit from the electricity generated by the biogas plant
Number of adaptation-and mitigation beneficiaries	Not Applicable	

Core indicator 4	**Anticipated amount of funding/investment leveraged (USD) as a result of TA (disaggregated by public, private, national, and international sources, as well as between anticipated/confirmed funding)**			
	Quantitative value confirmed *in USD*	**Quantitative value anticipated** *in USD*	**Qualitative description** *List the institutions, timelines, and description or title of the investment*	**Methods** *Describe methods used for quantification of funds leveraged*
Total funding	*Total number in USD (numerals only, no rounding or abbreviations)*	*Total number in USD (numerals only, no rounding or abbreviations)*		

Anticipated amount of public funding mobilised from national/domestic sources	Not Applicable (PPP project: fully private investment)	Not Applicable (PPP project: fully private investment)	Not Applicable (PPP project: fully private investment)	Not Applicable (PPP project: fully private investment)
Anticipated amount of public funding mobilised from international/ regional sources	Not Applicable (PPP project: fully private investment)	Not Applicable (PPP project: fully private investment)	Not Applicable (PPP project: fully private investment)	Not Applicable (PPP project: fully private investment)
Anticipated amount of private funding mobilised from national/domestic sources	Confirmed amount will be obtained only when bids have been received.	Investment costs: 12.5 Million USD Amount mobilised from national/ domestic sources will depend on any joint venture created.	Capital Investments (project development and plant construction)	Investment costs determined as part of feasibility study based on costs from literature review and from quotations received.
Anticipated amount of private funds mobilised from international/regional sources	Confirmed amount will be obtained only when bids have been received.	Same as above		Same as above

Annex 2 (for internal use – to be filled in by the CTCN)

CTCN evaluation

This section will be completed by the relevant CTCN Technology Manager.

- Evaluation of the timeliness of the TA implementation as measured against the timeline included in the response plan;
- Evaluation of TA quality as defined in the response plan;
- Overall performance of the Implementers;
- Overall engagement of the NDE and Proponent;
- Lessons learned on the CTCN process and steps taken by the CTCN to improve.