



# Vanuatu's Integrated Monitoring, Reporting and Verification (MRV) Tool

User Manual

Version 1.0

August-2021

IN CONTRIBUTION TO THE



ACCELERATING CLIMATE  
AND DEVELOPMENT ACTION

Supported by:



Federal Ministry  
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Federal Ministry  
for Economic Cooperation  
and Development



# **Vanuatu's Integrated Monitoring, Reporting and Verification (MRV) Tool**

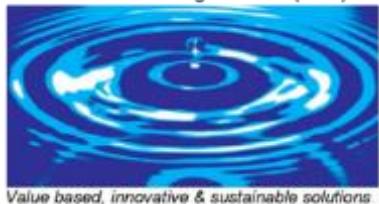
**(Version 1.0)**

## **User Manual**

**Version 1.0,  
August 2021**

Compiled By:

Subbarao Consulting Services (SCS) Ltd.



*Value based, innovative & sustainable solutions*

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Dear User,

Welcome to Integrated Monitoring, Reporting and Verification (iMRV)Tool. You are now part of a national Greenhouse Gas Inventory and Climate Actions (mitigation/adaptation) monitoring, reporting and verification system.

An integrated monitoring reporting and verification (iMRV) tool is key to achieving long term national and international climate change objectives and sustainable development. We strongly value your contribution and are committed to make your engagement with the iMRV Tool ecosystem a smooth experience.

For a newly registered user, a lot of effort goes to understand the requirements of the domestic and international climate actions MRV acts, polices, guidelines and ensure compliance. As a measure to facilitate users and make their climate actions MRV journey smooth, the newly registered users are being provided with this iMRV Tool user manual.

The User Manual is a brief document which aims to communicate with you in simple terms, without the technical jargons. The idea is to make new user and stakeholders understand the intent, benefits and processes of MRV in a lucid and effective manner.

We strongly recommend that you go through this document carefully to understand and appreciate the processes involved in MRV Tool and MRV compliance, the do's and don'ts while using MRV Tool and good practices that would make your MRV journey smooth and easy.

Please be informed that the user manual is by no means an exhaustive document. It is only an effort to compile the most relevant information with respect to MRV requirements/compliances and help at a single place.

For more detailed and elaborate information on MRV, please refer to the national and international MRV acts, policies, rules, notifications, circulars and advisories issued by the Government and UNFCCC.

We welcome your feedback and suggestions to improve this document so that users in the future may get benefited by the updated version of this document. We will update the user manual on your valuable feedback and suggestions.

All the Best

Subbarao Consulting Services, New Zealand

***Important Note:*** The user manual is only for Vanuatu's Integrated Monitoring, Reporting and Verification (MRV) tool and has been prepared for the Climate Change division under the Ministry of Climate Change Adaptation (MoCCA) and all relevant stakeholders (as designated by the MoCCA). The user manual has been prepared to provide guidance and explain the workflow of iMRV Tool; this a living document and information used in this document is subject to change without any prior notice. The information/data, companies, projects, names, and data used in this user manual is for illustration only, examples herein are fictitious unless otherwise noted. No part of this document can be reproduced or transmitted in any format, by any means; electronic or mechanical, for any purpose, without permission of Subbarao Consulting Services (SCS) Ltd.

## About the User Manual

This Integrated Monitoring, Reporting and Verification Tool (MRV- Tool) user manual familiarizes the user(s) with the various features and functionalities of the application in a systematic and step-wise manner.

### OBJECTIVES

The main objectives of this document are:

- To introduce user(s) to key functionality of the iMRV Tool
- To introduce user(s) to various modules of iMRV Tool
- To familiarize user(s) with the various conventions used in the iMRV Tool.
- To function as a reference manual and user guide to key functionalities and features of the iMRV Tool
- To help user(s) in performing various setups and steps by taking through the relevant screens methodically.

### NON-OBJECTIVES

This user manual does not aim to:

- Discuss domestic and international climate change related reporting requirements and concepts
- Discuss and explain GHG Inventory and IPCC-2006 Guidelines, Climate Finance, SDG concepts
- Act as a technical document

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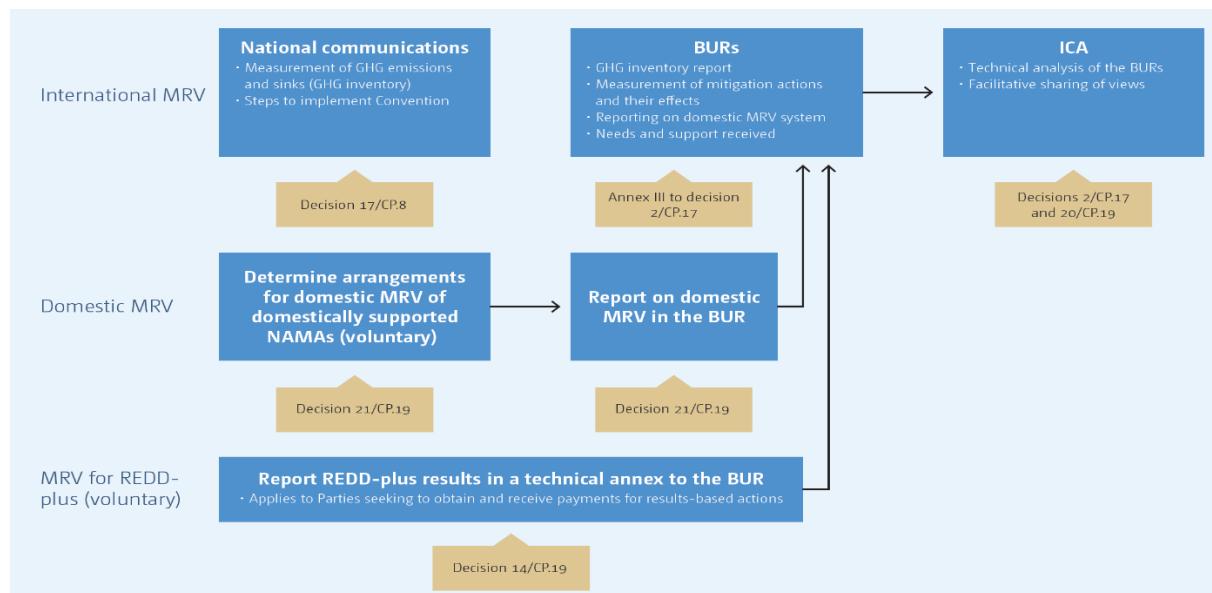
## 1. Background and Purpose

A robust [Monitoring \(Measuring\), Reporting and Verification \(MRV\)](#) system is important for national policy decisions and is a key requirement under [United Nations Framework Convention on Climate Change \(UNFCCC\)](#) and [the Paris Agreement \(PA\)](#). Vanuatu is expected to participate in existing MRV arrangements of the UNFCCC including preparation and submission of National GHG inventory reports, National Communications and Biennial Update Reports (BUR) as well international consultation and analysis processes.

**FIGURE 1.1: KEY MILESTONES IN THE DEVELOPMENT OF THE MRV FRAMEWORK FOR DEVELOPING COUNTRY PARTIES**

<b>1992/1994</b>	The Convention establishes reporting obligations for all Parties and timelines for the initial national communications from developing country Parties (Article 12, paragraph 5, and Article 4, paragraph 3)
<b>1996</b>	The guidelines for the preparation of national communications from developing country Parties: scope, structure and content (decision 10/CP.2)
<b>1997</b>	The first reporting under the Convention by developing country Parties through the initial round of national communications
<b>1999</b>	The Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE) is established to assist countries in their reporting obligations
<b>2002</b>	COP 8 adopted the revised guidelines for the preparation of national communications (decision 17/CP.8) and extended the term of the CGE for the period 2003-2007 with a broader mandate for technical assistance (decision 3/CP.8)
<b>2007</b>	COP 13 agreed to the principle of applying measurement, reporting and verification (MRV) to developing country Parties in the context of undertaking enhanced national/international action on mitigation of climate change (decision 1/CP.13)
<b>2009</b>	CGE is reconstituted for the period 2010-2012 to continue providing technical support and enhancing the capacity of developing country Parties to prepare their national communications
<b>2010</b>	COP 16 defined the frequency of the national communications every four years, and introduced additional elements of MRV (decision 1/CP.16): enhanced reporting in national communications, including inventories, on mitigation actions and their effects, and support received; biennial update reports (BURs) every two years; international consultation and analysis (ICA) of BURs; and domestic MRV of domestically supported mitigation actions
<b>2011</b>	COP 17 adopted the guidelines for the preparation of BURs and the guidelines and modalities for ICA: the first BUR to be submitted by December 2014, consistent with the capabilities and the level of support provided for reporting; least developed country Parties and small island developing States may submit this report at their discretion; the first BUR is to cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of submission; ICA will commence within six months of the submission of the first round of BURs; ICA will include a two-part technical analysis and facilitative sharing of views
<b>2013</b>	COP 19 adopted several decisions on the elements of the MRV framework: composition, modalities and procedures for the team of technical experts under ICA (decision 19/CP.19); general guidelines for domestic MRV (decision 21/CP.19); seven decisions of the Warsaw Framework for REDD-plus; and the term of the CGE continued for the period 2014-2018 with a broader mandate

**FIGURE 1.2: KEY ELEMENTS OF THE MRV FRAMEWORK**



Further, under the Paris Agreement (PA) commitments, Vanuatu will be subjected to participate in [the enhanced transparency framework \(ETF\)](#), which builds on the existing arrangements and shall require to communicate the National GHG Inventory, National Communications, Biennial transparency reports (BTR), Progress on NDC Implementation, Adaptation Communications and Reporting on Support (Provided/Received). Article 13 of the PA provides the core structure of the ETF, which includes reporting, the technical expert review (TER) and a facilitative, multilateral consideration of progress. The ETF will be implemented based on the Modalities, Procedures and Guidelines for the transparency framework for action and Support (MPGs) that apply to all Parties, with flexibility to those developing countries that need it in the light of their capacities.

FIGURE 1.3: ENHANCED TRANSPARENCY FRAMEWORK (ETF) FOR ACTION AND SUPPORT ESTABLISHED BY ARTICLE 13 OF THE PA

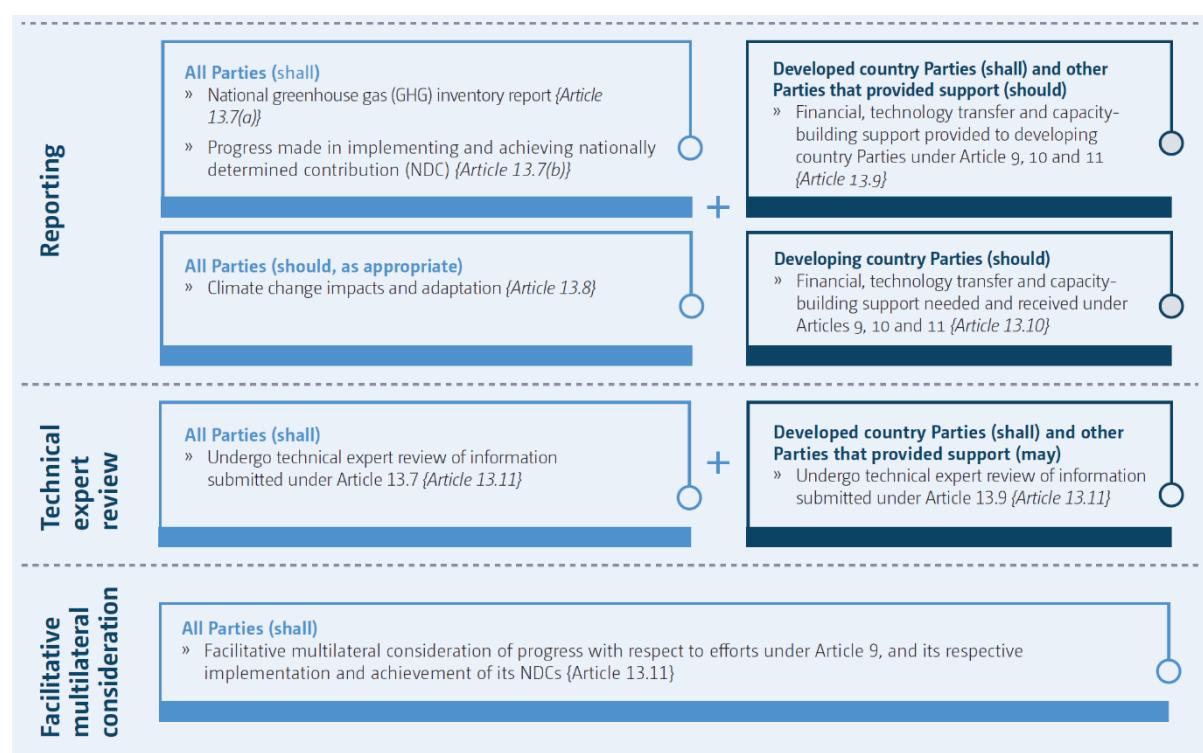


FIGURE 1.4: INFORMATION TO BE REPORTED IN THE BIENNIAL TRANSPARENCY REPORT (BTR)



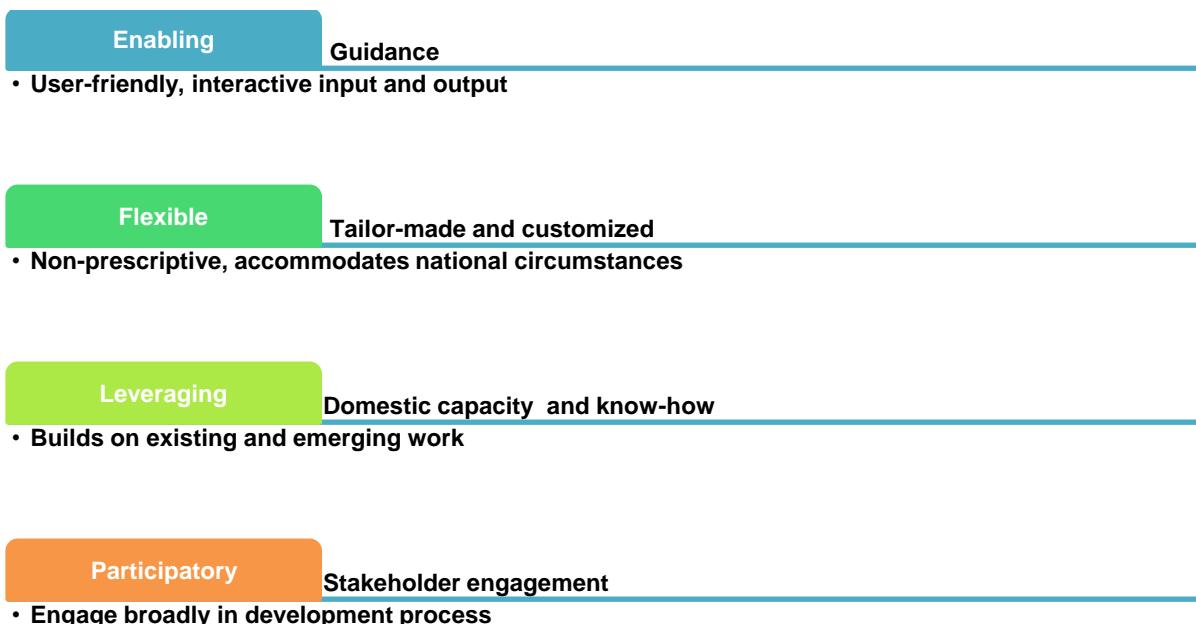
The Integrated Monitoring, Reporting and Verification (iMRV) Tool aims to assist the Climate Change Division under the Ministry of Climate Change Adaptation (MoCCA) and other line ministries/departments to develop a concise and strategic domestic/national MRV system. It is envisaged that the iMRV tool would assist in enhancing monitoring, tracking, reporting and verifying of climate actions including national GHG emissions, climate change mitigation action, adaptation actions, climate finance and [sustainable development goals \(SDG\)](#) impact of climate change projects, program and policies.

This is expected to assist in leveraging international, regional and domestic public and private climate finance flows. The integrated MRV Tool will be robust but built upon available resources e.g., data, human resources, capacity etc. and existing systems of monitoring and reporting (data collection and analysis) with minimal additional burden to the reporting agency and relevant stakeholders.

The iMRV Tool has been developed was finalized during the extensive multiple stakeholder consultation process, however this is a living tool and further improved over the period of time. Hence some of the features/requirements are kept for future development and implementation. The present version of integrated MRV Tool covers following key elements:

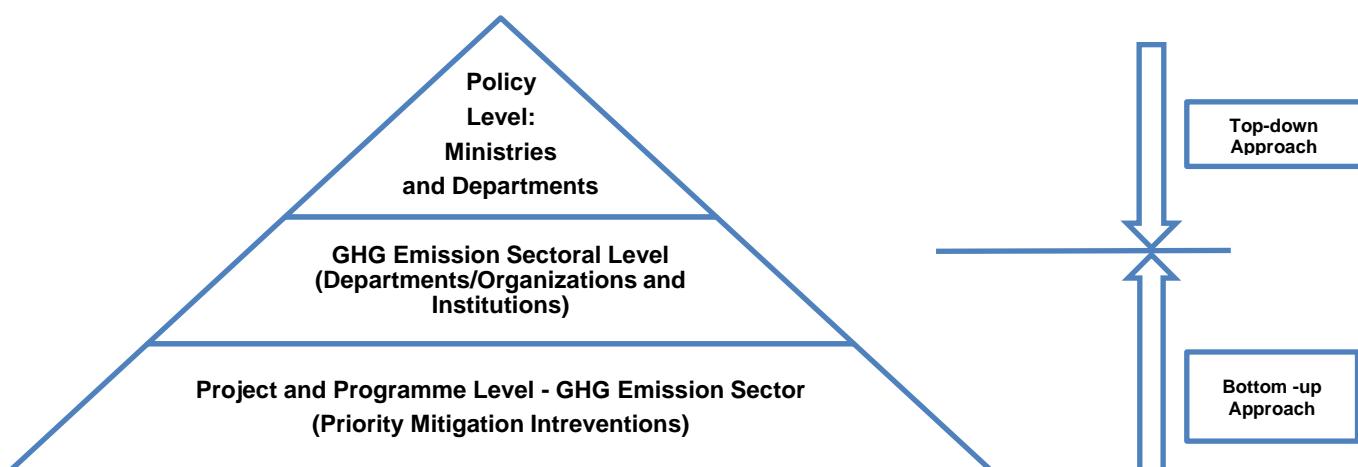
- National GHG Inventory (limited to key sector and sub-sectors)
- Monitoring and Tracking: Climate Change Mitigation Actions/Projects and GHG emission reductions
- Monitoring and Tracking: Climate Change Adaption Actions/Projects and Impacts.
- Monitoring and Tracking: Climate Finance Flow towards Climate Actions.
- Monitoring and Tracking: SDG impact of climate actions.

FIGURE 1.5: INTEGRATED MRV TOOL DESIGN PRINCIPLE



The iMRV Tool design approach was to transparently demonstrate progress made towards the targets defined in the national policies and frameworks such as Climate Change Action Plan (CCAP), Nationally Determined Contributions (NDC) etc. Besides measuring ex-post emissions baseline and mitigation actions, the national MRV system also aimed to track the progress of implementation in terms of other impacts (e.g., policies, co-benefits, achieving SDGs), plus results of means of implementation (e.g., tracking of climate finance flows, technology transfer, capacity building).

FIGURE 1.6: TOP-DOWN, BOTTOM-UP APPROACH FOR MRV FRAMEWORK DESIGN



Vanuatu's integrated MRV Tool is an Information and communications technology (ICT) based Digital MRV system specifically considering the specific requirements of Vanuatu and finalized post extensive desktop review of documents, stakeholder consultation and discussion with Climate Change Division under the Ministry of Climate Change Adaptation (MoCCA). However, the iMRV tool shall be improvised over period of time and shall incorporate future decisions.

**TABLE 1.1: ELEMENTS OF INTEGRATED MRV TOOL**

Integrated MRV Tool				
Module 1: National GHG Inventory	Module 2: Mitigation Actions	Module 3: Adaptation Actions	Module 4: Climate Finance Flow	Module 5: Sustainable Development Goals (SDGs)
<ul style="list-style-type: none"> <li>-GHG emission sectors</li> <li>- Monitoring and data collection</li> <li>- GHG emission calculation</li> <li>- Analysis and reporting</li> <li>- Results and communication</li> </ul>	<ul style="list-style-type: none"> <li>- NDC implementation roadmap - Priority mitigation actions</li> <li>- Tracking mitigation actions</li> <li>- Monitoring and reporting</li> <li>- Results and communication</li> </ul>	<ul style="list-style-type: none"> <li>- NDC implementation roadmap - Priority Adaptation actions</li> <li>- Tracking NDC adaptation actions</li> <li>- Monitoring and reporting</li> <li>- Results and communication</li> </ul>	<ul style="list-style-type: none"> <li>- Climate finance for NDC implementation actions</li> <li>- Finance &amp; resources deployment schedule</li> <li>- Monitoring and reporting</li> <li>- Results and communication</li> </ul>	<ul style="list-style-type: none"> <li>- SDGs mapping and Monitoring for NDC actions based on UNDP CAIT</li> <li>- Data for SDGs impact monitoring</li> <li>- Review and analysis</li> <li>- SDGs Impact Reporting</li> </ul>

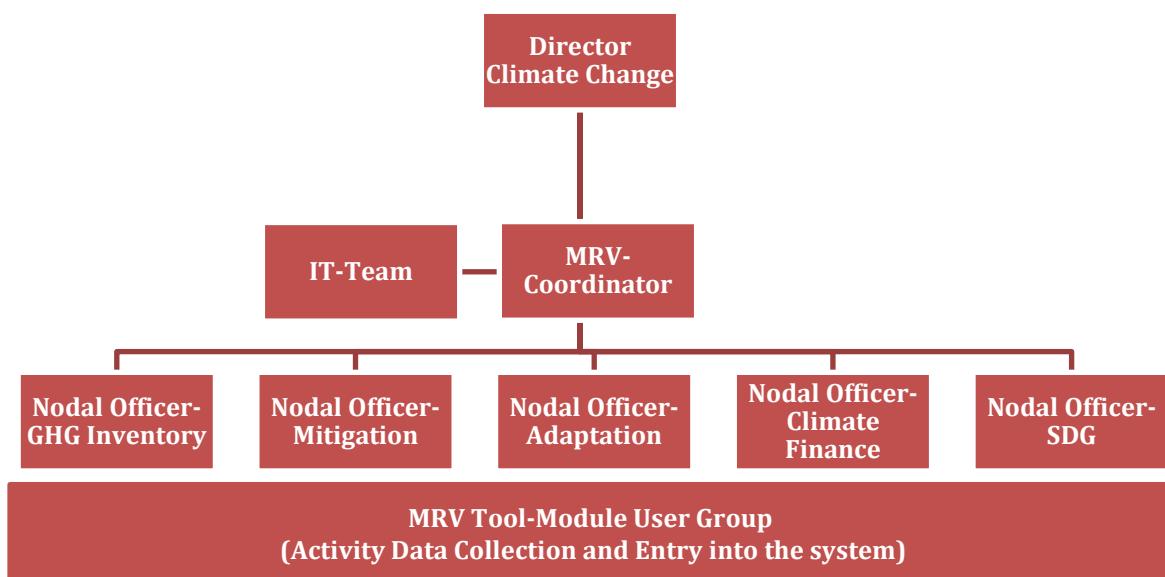
## 1.1 iMRV Tool Operational Structure

Vanuatu's integrated MRV tool is a web-based digital integrated MRV Tool for climate actions (deployed on cloud server – AWS, please contact IT administrator for more information) designed specifically considering the domestic and international reporting requirements on climate actions. The web-based online digital iMRV tool provides robustness and increases the accessibility of the MRV tool to the different user groups.

The roles and responsibility of key MRV personal briefly discussed here:

- The users of MRV tool shall enter the data in the MRV Module i.e., GHG Inventory, Create/ Edit Project, Mitigation Actions, Adaptation Action, Climate Finance and SDG Module.
- The designated Nodal Officer shall approve/reject each entry in to the MRV system (all modules)
- Administrator shall have access and control over all functionality of MRV Tool

**FIGURE 1.7: OVERARCHING OPERATIONAL STRUCTURE FOR IMRV SYSTEM**



**MRV Coordinator:** Shall have overall responsibility of iMRV Tool and MRV Reports.

MRV Coordinator shall review the MRV System and MRV reports on periodic basis (quarterly, half yearly) or at least once in a year; shall also responsible for backstopping and capacity building.



**MRV Administrator:** Shall have overall responsibility of iMRV Tool implementation and functions.

MRV Administrator will be a Master User with all privileges and rights; shall also Approve, edit and delete user registration and access, approve/edit emission factors, database etc. on recommendation of MRV Coordinator or Nodal Officer.



**Nodal Officers:** Shall have the right to Validate and Verify the entered activity data.

Each Module shall have at least one Nodal Officer; designated by the MRV Coordinator. Nodal officer shall validate and verify the activity data entered in the iMRV tool i.e. approve or reject.



**MRV Module and Sector User Group:** Will have the right to enter/edit data in respective sector(s).

Module or Sector User will be provided these rights by the MRV Administrator on recommendation of their Nodal Officer or MRV Coordinator.

## 2. User Management Module

### Getting started with the MRV Tool

The following sections describe the steps necessary steps to access and initialize the Integrated MRV Tool and the relevant databases. Following these steps, the iMRV Tool is ready for distribution and sharing among the users (inventory compilers, NDC MRV participants and other relevant stakeholders).

#### 2.1 How to Access the iMRV Tool

The latest Version of Integrated MRV Tool uploaded on the Amazon Web Services (AWS) Cloud Server. The digital iMRV Tool can be accessed on following link (please contact IT administrator if you are not able to access this page):

<http://vanuatu-env.eba-nu3d2ntd.us-east-2.elasticbeanstalk.com/Login.jsp>

FIGURE 2.1: WEBPAGE OF INTEGRATED MRV TOOL (VERSION 1.0)



## 2.2 MRV Tool User Group

As per the user management framework of Integrated MRV Tool, following user groups are defined:

User Group	User Privilege
<b>MRV Administrator</b>	 Have access to the entire MRV tool and functionality, create/delete new user credentials, edit/delete database.
<b>Nodal Officers</b>	 Nodal Officer can access only My Approvals and approves/rejects the data entered by the users in modules of MRV Tool.
<b>Users - MRV Module and Sector User Group</b>	 Will have the right to enter/edit data in respective Modules, sector(s)/sub-sectors/projects.

### 2.2.1 MRV Administrator (IT Administrator)

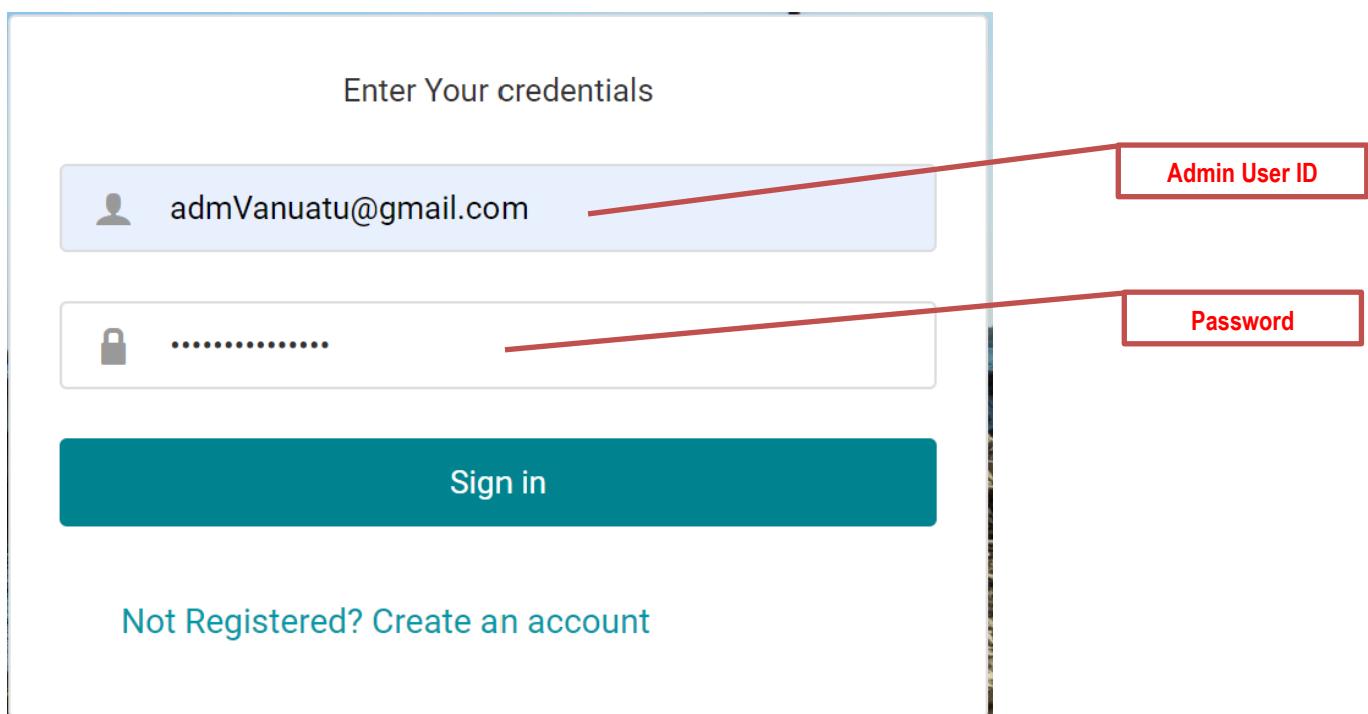
The MRV-IT Administrator will have overall responsibility of the operation of MRV Tool also responsible for defining new or additional users and has full control over the applications and corresponding databases. The MRV-IT Administrator shall also:



- Ensure the functioning of the IT structure of MRV System
- Create/edit/delete user accounts on recommendation of MRV-Coordinator
- Assign the user rights and privilege to each Nodal officer and User group.
- Maintain the databases, back-up and system security

#### 2.2.1.1 MRV Administrator Log-in

The Climate Change Division shall appoint/designate responsibility of MRV-IT Administrator.

**FIGURE 2.2: INTEGRATED MRV TOOL –ADMINISTRATOR LOG-IN**

### 2.2.1.2      **MRV Administrator – Master User List**

MRV-Administrator on Login can access all the features of iMRV Tool, including:

- Master User List
- New User Approval/Rejection
- Assign access rights to the new user
- Delete user account
- Access to all Approvals – Default approver
- Emission factor database -controls (edit/addition/deletion)
- Population Database controls (edit/addition/deletion)
- IPPU Emission Factor -Controls (edit/addition/deletion)
- Access to overall functionality of MRV Tool
- All other Administrator console features

**FIGURE 2.3: MRV ADMINISTRATOR – ADMIN DASHBOARD (MASTER LIST OF EXISTING USERS)**

**VANUATU'S CLIMATE ACTION IMPACT ASSESSMENT MRV TOOL**

**USER - PERMISSIONS**

User Name	Email	Permissions	Role	Actions
Harsh Dixit	harsh@neoclimate.org	GHG: Energy,IPPU,AFOLU,Waste NDC Action: Create Project,Adaptation Tracking,Mitigation Tracking,Finance Tracking,SDG Tracking Reports: GHG Report,Adaptation Report,Mitigation Report,Finance Report,SDG Report,MRV Report	User	Delete
Harsh Dixit	harsh@neoclimate.org	GHG: Energy,IPPU,AFOLU,Waste NDC Action: Create Project,Adaptation Tracking,Mitigation Tracking,Finance Tracking,SDG Tracking Reports: GHG Report,Adaptation Report,Mitigation Report,Finance Report,SDG Report,MRV Report	Nodal Officer	Delete
MRV approver	ccapprover@cc.com	GHG: Energy,IPPU,AFOLU,Waste NDC Action: Create Project,Adaptation Tracking,Mitigation Tracking,Finance Tracking,SDG Tracking Reports: GHG Report,Adaptation Report,Mitigation Report,Finance Report,SDG Report,MRV Report	Nodal Officer	Approve Reject
MRV User	couser@cc.com	GHG: Energy,IPPU,AFOLU,Waste NDC Action: Create Project,Adaptation Tracking,Mitigation Tracking,Finance Tracking,SDG Tracking Reports: GHG Report,Adaptation Report,Mitigation Report,Finance Report,SDG Report,MRV Report	User	Approve Reject

### 2.2.1.2 MRV Administrator – User Approval and Assign Responsibilities

The MRV-IT Administrator will have overall control on user accounts and can:

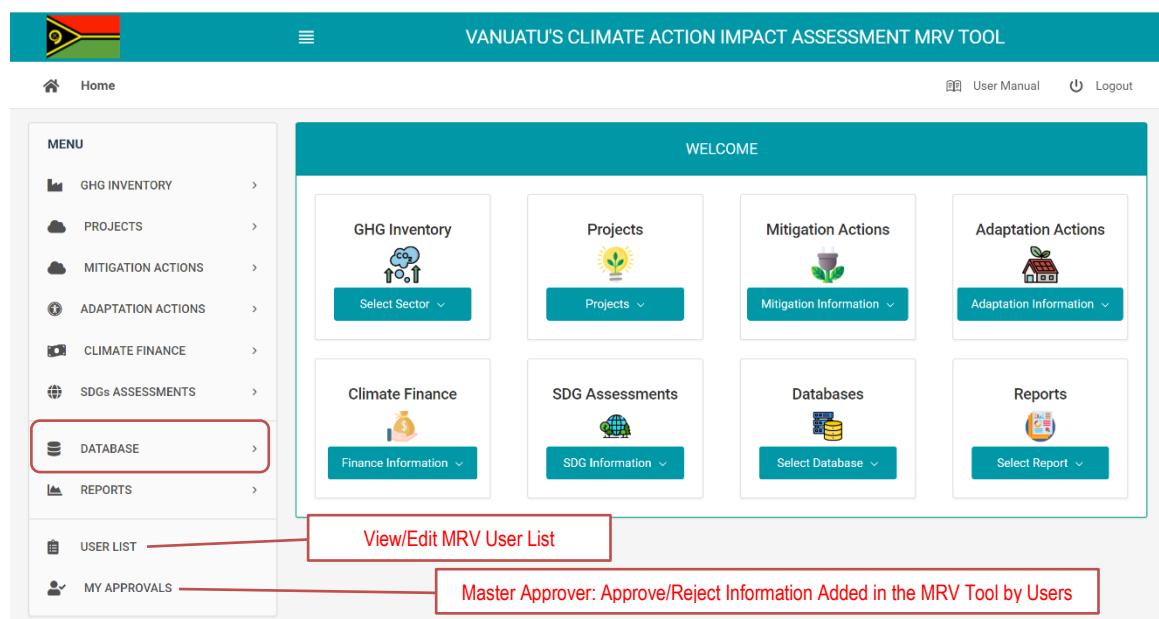
- MRV Tool User Management:
  - Approve/Reject new user account request
  - Delete user account

**FIGURE 2.4: MRV ADMINISTRATOR – USER APPROVAL/REJECTION**

**VANUATU'S CLIMATE ACTION IMPACT ASSESSMENT MRV TOOL**

**USER - PERMISSIONS**

User Name	Email	Permissions	Role	Actions
Harsh Dixit	harsh@neoclimate.org	GHG: Energy,IPPU,AFOLU,Waste NDC Action: Create Project,Adaptation Tracking,Mitigation Tracking,Finance Tracking,SDG Tracking Reports: GHG Report,Adaptation Report,Mitigation Report,Finance Report,SDG Report,MRV Report	User	Delete
Harsh Dixit	harsh@neoclimate.org	GHG: Energy,IPPU,AFOLU,Waste NDC Action: Create Project,Adaptation Tracking,Mitigation Tracking,Finance Tracking,SDG Tracking Reports: GHG Report,Adaptation Report,Mitigation Report,Finance Report,SDG Report,MRV Report	Nodal Officer	Delete
MRV approver	ccapprover@cc.com	GHG: Energy,IPPU,AFOLU,Waste NDC Action: Create Project,Adaptation Tracking,Mitigation Tracking,Finance Tracking,SDG Tracking Reports: GHG Report,Adaptation Report,Mitigation Report,Finance Report,SDG Report,MRV Report	Nodal Officer	Approve Reject
MRV User	couser@cc.com	GHG: Energy,IPPU,AFOLU,Waste NDC Action: Create Project,Adaptation Tracking,Mitigation Tracking,Finance Tracking,SDG Tracking Reports: GHG Report,Adaptation Report,Mitigation Report,Finance Report,SDG Report,MRV Report	User	Approve Reject

**FIGURE 2.5: MRV ADMINISTRATOR – DASHBOARD**

- Master Approver:
  - Approve/Reject new data/information added in the MRV Tool
- Database Management:
  - Add/edit databased e.g., population, emission factor, GWP-global worming potentials, Livestock emission factor, Livestock populations etc.

#### **Master User for all modules under Vanuatu's Integrated MRV Tool Viz.**

Vanuatu's Integrated MRV Tool Modules			
Module		Dashboard Symbol	Menu Symbol
<b>Module 1</b>	<b>GHG Inventory</b>		
<b>Module 2</b>	<b>Mitigation Actions</b>		
<b>Module 3</b>	<b>Adaptation Actions</b>		
<b>Module 4</b>	<b>Climate Finance</b>		
<b>Module 6</b>	<b>SDGs Assessment</b>		

## 2.2.2 Nodal Officer



The MRV Tool have five main modules viz: Module-1: National GHG Inventory; Module-2: Mitigation Actions; Module-3: Adaptation Actions; Module-4: Climate Finance; and Module-5: SDGs Assessment; though MRV Administrator have overall control on all these modules; however as per the MRV system of Vanuatu, each module shall be headed by a Nodal Office. The main function of the Nodal officers is:

- Approval rights (or they may designate the approval rights to competent user) for the activity data entered and projects created by the user.
- Validation and Verification of Data entered in each module/action
- Ensuring functioning of respective module and
- Coordination with MRV Administrator for smooth operation of respective module
- Coordinate among the different Nodal officers.
- Participate in review, validation and verification (internal/external) of data/information
- Any other responsibility designated by MRV coordinator or MRV administrator

### 2.2.2.1 Nodal Officer Log-in

Nodal officers can access the Integrated MRV Tool via following and using their respective user ID and Password:

<http://vanuatu-env.eba-nu3d2ntd.us-east-2.elasticbeanstalk.com/Login.jsp>

In case of any difficulty/error in login/password, please contact MRV administrator.

FIGURE 2.6: NODAL OFFICER LOG-IN

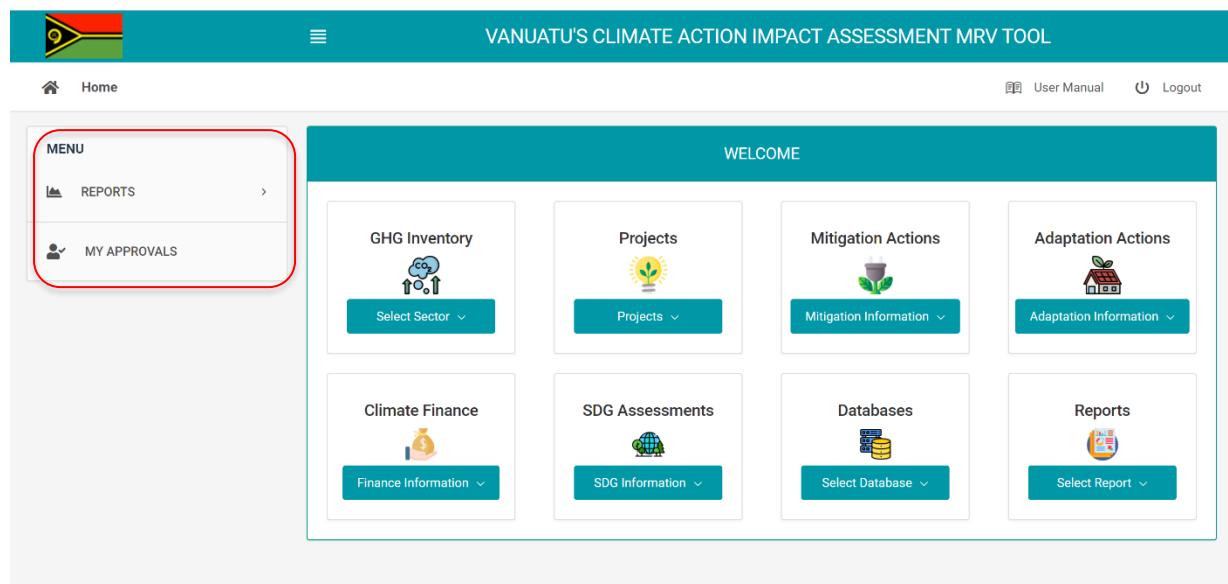
Enter Your credentials

Username Nodal User ID

Password Password

Sign in

Not Registered? Create an account

**FIGURE 2.7: INTEGRATED MRV TOOL – NODAL OFFICER DASHBOARD**

### 2.2.3 Users (User Group)



The Integrated MRV Tool have five main modules viz: Module-1: National GHG Inventory; Module-2: Mitigation Actions; Module-3: Adaptation Actions; Module-4: Climate Finance; and Module-5: SDGs; each module shall be used by the user groups (assigned by the Nodal Officer).

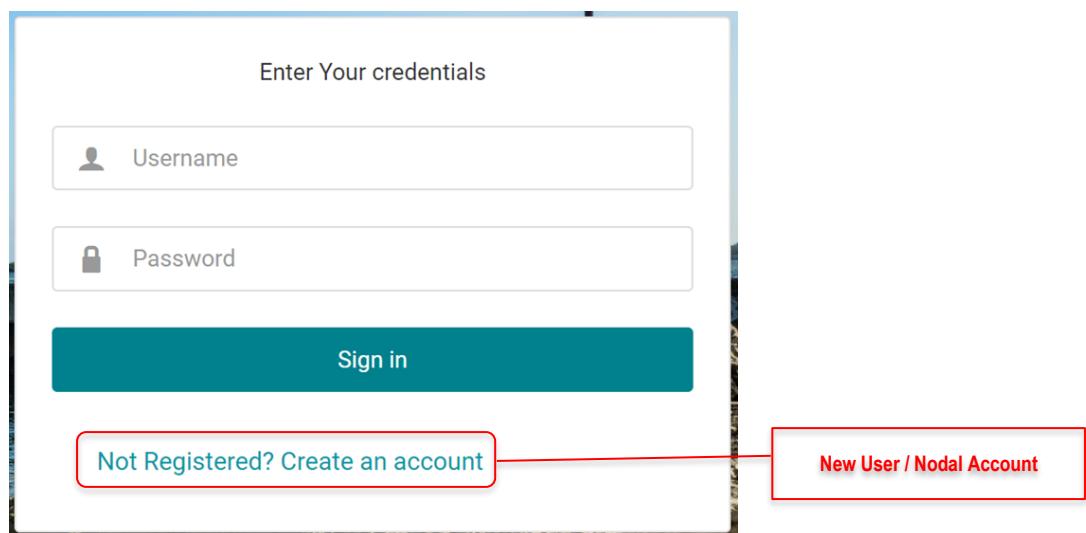
There can multiple users for each module e.g., for GHG inventory there may be multiple user responsible for each sector and subsectors – Energy Sector, Transport, IPPU, Forestry, Waste etc. or single user may be eligible for using multiple modules e.g., GHG Inventory and Mitigation etc.

The user shall coordinate with different activity data providers via electronic media to collect the activity data (regular basis or periodically as required) and shall update the data in the MRV system. The user shall also verify the data preliminary and submit for approval to the nodal officers.

### 2.2.4 New Account (User/Nodal)

Following steps to be followed to create new account:

**Step-1: Select “Not Registered? Create an account” on iMRV Tool Link**

**Step-2: Fill the registration form with basic information:**

- Email:
- Name:
- Department:
- Contact:
- Password:

**Step-3: Select Role i.e., User or Nodal Officer****Step-4: Select Access Required:**

- ***GHG Inventory Sector***
  - Energy Sector
  - IPPU Sector
  - Waste Sector
  - AFOLU Sector
- ***Project Tracking – NDC Actions Tracking***
  - Create Project
  - Mitigation Projects
  - Adaptation Projects
  - Climate Finance Projects
  - SDG Projects
- ***Reports***
  - GHG Inventory Report
  - Mitigation Summary
  - Finance Summary
  - SDG Summary
  - Adaptation Summary
  - Project MRV Report

**FIGURE 2.8: MRV TOOL –NEW USER REGISTRATION FORM**

**Create account**  
All fields are required

**User Role**

**Access Required**

GHG INVENTORY	NDC ACTIONS	REPORTS
<input checked="" type="checkbox"/> Energy	<input checked="" type="checkbox"/> Create NDC Action	<input checked="" type="checkbox"/> Adaptation Summary
<input checked="" type="checkbox"/> IPPU	<input checked="" type="checkbox"/> Adaptation Actions	<input checked="" type="checkbox"/> Mitigation Summary
<input checked="" type="checkbox"/> AFOLU	<input checked="" type="checkbox"/> Mitigation Actions	<input checked="" type="checkbox"/> Finance Summary
<input checked="" type="checkbox"/> Waste	<input checked="" type="checkbox"/> Climate Finance	<input checked="" type="checkbox"/> SDG Summary
<input checked="" type="checkbox"/> GHG Inventory Report	<input checked="" type="checkbox"/> SDG Assessment	<input checked="" type="checkbox"/> Project MRV Report

**Create account** +

**Fill the registration form with basic information**

**Select Role i.e., User or Nodal Officer**

**Select Access Required**

**Submit Registration Form by clicking on "Create Account" button**

**Step-4: Select Role i.e., User or Nodal Officer**

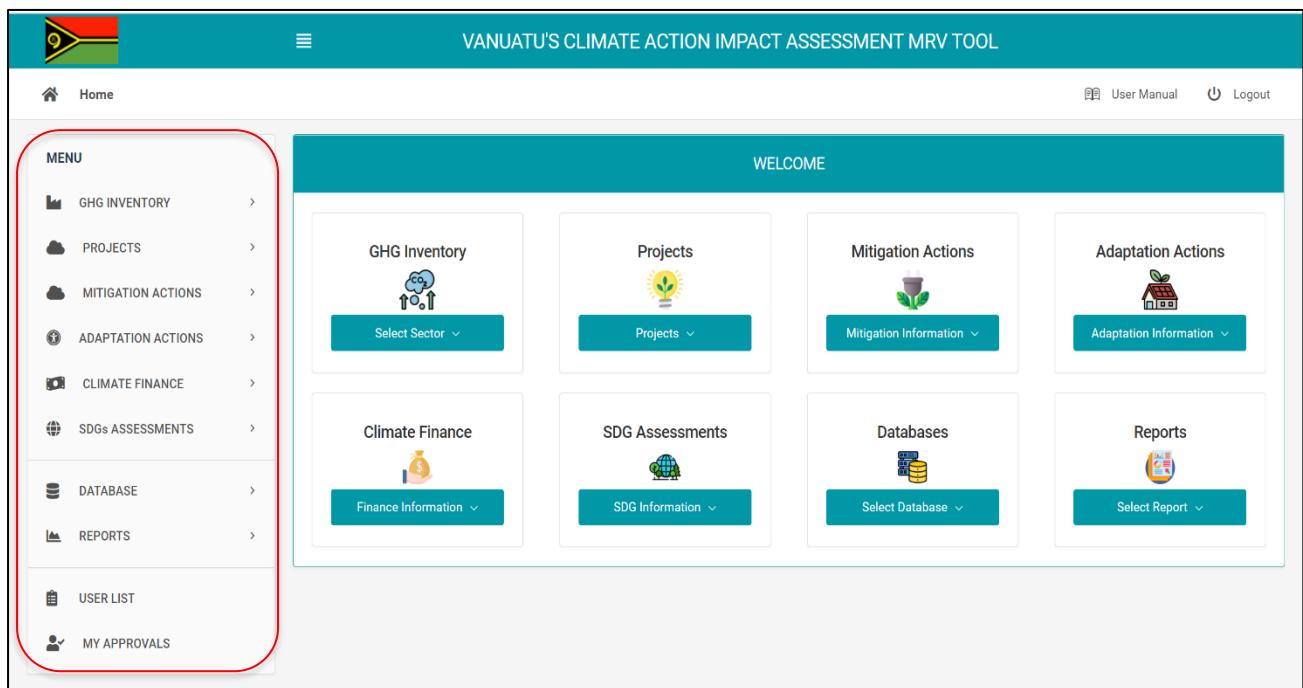
**Step-5: Submit Registration From by clicking on “Create Account” button.**

**On submission of registration from, the request will be submitted to Administrator for Approval. And new user will receive an email for process.**

**Once new user approved by the administrator, new user can access the MRV Tool with Log-in credentials.**

## 2.2.5 MRV Tool – Dashboard

On logging-in the Dashboard page will appear to User; Administrator will land directly to user list and interface and nodal officer have access to My Approvals Only.

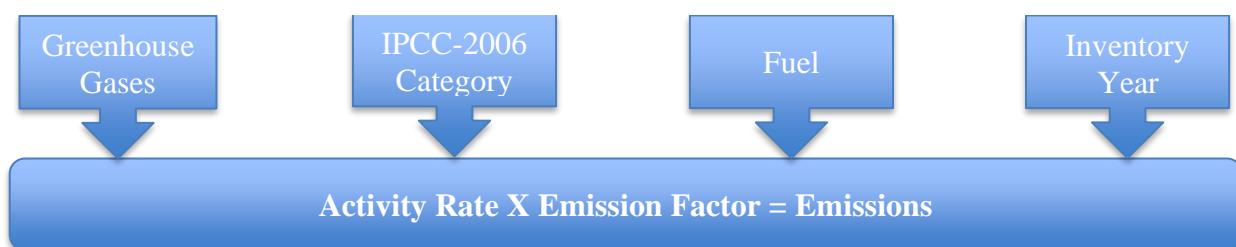
**FIGURE 2.9: MRV TOOL - DASHBOARD**

### 3. GHG Inventory Module

The purpose of GHG Inventory Module of MRV Tool is to implement Tier1 methodologies in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories for the preparation of national GHG inventories according to 2006 IPCC Guidelines.

Further to simplify the GHG Inventory for a country the calculation sheets are customized and sector/sub-sector relevant to a country included in this version of GHG Inventory Module. The basic approach of the software is to enable filling out the 2006 IPCC Guidelines category worksheets with the activity data. The basic inventory data model looks like following Figure.

**FIGURE 3.1: BASIC DATA RELATIONS**



To maintain the consistency among the different GHG Inventory compilers, Green House Gases, Emission Factors and CO<sub>2</sub>equivalent are fixed in this version of the Module. **Only the users with appropriate access rights can use the GHG Inventory Module.**

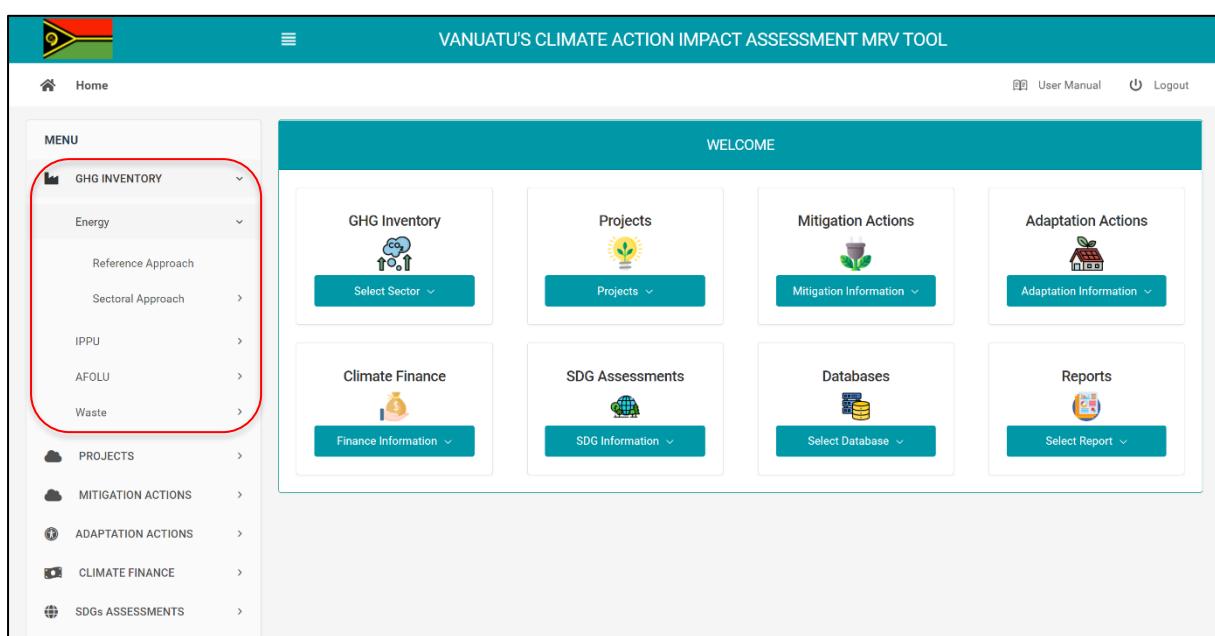
**Fixed Emission Factors for Fuels:** As per Table 1.2 and Table 2.2 of IPCC-2006, guidelines. Only, the MRV Administrator can edit/delete Fuel category, calorific value and emission factor.

**Fixed GHG Gases:** The main three GHGs i.e., CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O covered under this module.

**Fixed CO<sub>2</sub> Equivalent types:** Fixed CO<sub>2</sub> Equivalent values as per AR5, that cannot be changed or deleted.

**Sector Covered:** The GHG Inventory module customized to accommodate specific requirement of a country, the sector and sub-sectors not applicable has been removed for simplicity of calculations and report.

**FIGURE 3.2: GHG INVENTORY MODULE-SECTOR COVERED**



### 3.1 Energy Sector – Inventory

The energy sector emissions include total emission of all greenhouse gases from stationary and mobile energy activities (fuel combustion as well as fugitive fuel emissions). The Energy Sector emissions can be calculated using both Sectoral Approach and Reference Approach.

**Sectoral Approach:** The CO<sub>2</sub> emissions by IPCC Sectoral (Bottom-Up) Approach are calculated based on Energy consumption data and Emission factors. For the Tier 1 Sectoral Approach, total CO<sub>2</sub> is summed across all fuels (excluding biomass) and all sectors. The 'bottom-up' approach is generally the most accurate, where the energy consumption data are reasonably complete and readily available.

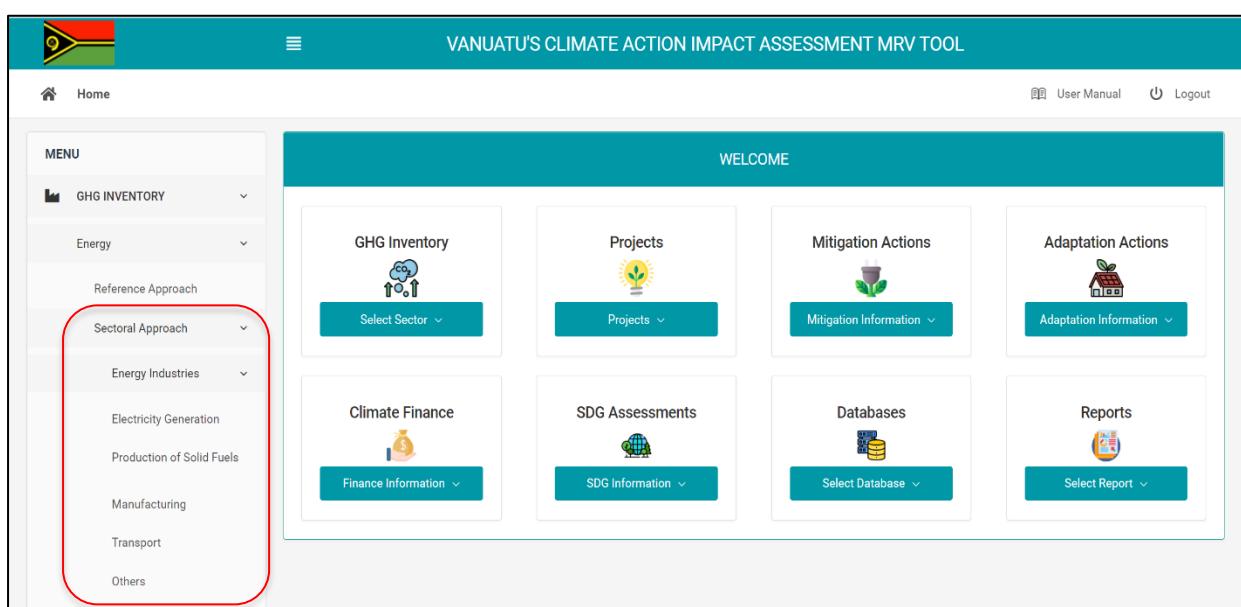
**Reference Approach:** The Reference Approach is a top-down approach, using a country's energy supply data to calculate the emissions of CO<sub>2</sub> from combustion of mainly fossil fuels. Reference approach does not include detailed information on how the individual fuels are used in each sector.

The Reference Approach estimates CO<sub>2</sub> emissions from fuel combustion in several steps:

- Estimation of fossil fuel flow into the country (apparent consumption).
- Conversion to carbon units.
- Subtraction of the amount of carbon contained in long-lived materials manufactured from fuel carbon.
- Multiplication by an oxidation factor to discount the small amount of carbon that is not oxidized.
- Conversion to CO<sub>2</sub> and summation across all fuels

The Reference Approach provides only aggregate estimates of emissions by fuel type distinguishing between primary and secondary fuels, whereas the Sectoral Approach allocates these emissions by source category. Estimates of emissions based on the Reference Approach will not be the same as estimates based on the Sectoral Approach. It is good practice to apply both a sectoral approach and the reference approach to estimate a country's CO<sub>2</sub> emissions from fuel combustion and to compare the results of these two independent estimates.

FIGURE 3.3: ENERGY SECTORAL APPROACH



### 3.1.1 Sectoral Approach

As per the IPCC Methodology, for the Tier 1 Sectoral Approach, total CO<sub>2</sub> is summed across all fuels (excluding biomass) and all sectors.

**FIGURE 3.4: SECTORAL APPROACH ENERGY INDUSTRIES**

Inventory Year	1994	Sector	1-Energy
Category	1.A-Fuel Combustion Activities	Sub Sector	1.A.1-Energy Industries
Sub Category	1.A.1.a.i-Electricity Generation	Calculation Approach	Tier 1

**Inventory Year:** Select the GHG inventory year from drop-down list.

**Category:** The IPPC methodology includes following energy sector category:

- 1.A - Fuel Combustion Activities: (Included in the Inventory Module)
- 1.B - Fugitive emissions from fuels: (Not included)
- 1.C - Carbon dioxide Transport and Storage (Not included)

**Sub-Sector:** The Energy Sector's Sub-Sectors under Fuel combustion activities are:

- 1.A.1 - Energy Industries
- 1.A.2 - Manufacturing Industries and Construction
- 1.A.3 – Transport
- 1.A.4 - Other Sectors
- 1.A.5 - Non-Specified (Not Included)

**Sub-Category:** The Sub-categories under the above sub-sectors as per IPCC.

**Calculation Approach:** Tier-1 (Default)

#### 3.1.1.1 Sectoral Approach – Activity Data

Activity data for energy sector are the amount and type of fuel combusted. It is good practice to use fuel combustion statistics rather than delivery statistics where they are available. Quantities of solid and liquid fuels delivered to enterprises will, in general, differ from quantities combusted by the amounts put into or taken from stocks held by the enterprise.

**FIGURE 3.5: ENERGY ACTIVITY DATA INSERTION**

Add Energy Data

Fuel Type --Select--  Select fuel type	Fuel --Select--  Select fuel	Unit tonnes	Amount Enter fuel consumed	Reference Enter data source	<b>Add</b>
---	---------------------------------------	----------------	-------------------------------	--------------------------------	------------

Remarks

**Save/Submit**

**Enter Comments/observations if any related to activity data.**

**Submit the activity data by clicking save/submit button**

**Fuel Type:** Select Fuel Type from the drop-down list. Fuel Types are: Liquid Fuels, Solid Fuels, Gas, Other Fossil fuels, Peat, Biomass.

**Fuel:** Select the fuel from the drop-down list. (*Ref: Table 1.1 of 2006 IPCC guidelines, Vol.2: Energy, Chapter 1: Introduction, p. 1.12-1.16*)

E.g. -

- If 'Liquid Fuels' is selected in Fuel Type then Fuels in drop-down list are: Crude Oil, Orimulsion, Motor Gasoline ...etc.
- If 'Solid Fuels' is selected in Fuel Type then Fuels in drop-down list are Anthracite, Coking Coal, Lignite...etc.
- If 'Gas' is selected in Fuel Type, then fuels are: Natural Gas.

**Unit:** Tonnes (Default)

**Amount:** Actual fuel consumed.

**Reference:** Data source for specific entry of fuel consumption.

**Click on the 'Add' button to insert fuel consumption data.**

**Remarks:** Comments/observations if there related to activity data.

**You need to submit the activity data using save/submit button.**

**FIGURE 3.6: ENERGY ACTIVITY DATA DELETION**

Energy Data					
Fuel Type	Fuel	Unit	Amount	Reference	Action
Liquid Fuels	Gas / Diesel Oil	tonnes	2887.0	MEMD	<input checked="" type="checkbox"/>
Liquid Fuels	Motor Gasoline	tonnes	810.0	MEMD	<input type="checkbox"/>

**Delete Row** After selecting the checkbox, click the button to remove the fuel activity data

Select the checkbox for any fuel activity data that needs to be deleted

**Action:** Select the checkbox for any fuel activity data that needs to be deleted

**Delete Row:** Click the button to remove the fuel activity data.

**You need to submit the action using save/submit button as explained above to remove the fuel activity data entry after clicking on delete row button.**

**User may consider the IPCC 2006 guidelines for more information and definitions of the key input parameters.** (<https://www.ipcc-nqgip.iges.or.jp/public/2006gl/>)

### 3.1.2 Reference Approach

As per the IPCC Methodology, in reference Approach, using a country's energy supply data to calculate the emissions by fuel type distinguishing between primary and secondary fuels. The input screen includes following:

**FIGURE 3.7: ENERGY REFERENCE APPROACH**

**GHG INVENTORY - ENERGY (REFERENCE APPROACH)**

Inventory Year	-Select-	Sector	1-Energy
Calculation Approach	Tier 1		

**Inventory Year:** Select the GHG inventory year from drop-down list.

**Calculation Approach:** Tier-1 (Default)

#### 3.1.2.1 Reference Approach – Activity Data

The Reference Approach starts from statistics for production of fuels and their external (international) trade as well as changes in their stocks. It also needs a limited number of values for the consumption of fuels used for non-energy purposes where carbon may be emitted through activities not covered or only partly covered under fuel combustion.

**FIGURE 3.8: REFERENCE APPROACH ACTIVITY DATA**

Activity Data											
Fuel Type	Fuel	Unit	Production	Imports	Exports	International Bunkers	Stock Change	Excluded Consumption	Reference		
Liquid Fuels	Liquefied Petroleum Gases (LPG)	tonnes	0.0	1642.0	0.0	0.0	0.0	250.0	sample data	<input type="checkbox"/>	
Liquid Fuels	Gas / Diesel Oil	tonnes	0.0	36132.0	298.0	393.0	36.0	37.0	sample data	<input type="checkbox"/>	
Liquid Fuels	Jet Kerosene	tonnes	0.0	9240.0	97.0	6429.0	17.0	0.0	sample data	<input type="checkbox"/>	
Liquid Fuels	Motor Gasoline	tonnes	0.0	18865.0	0.0	0.0	92.0	0.0	sample data	<input type="checkbox"/>	
Liquid Fuels	Crude Oil	tonnes	8099.0	832.0	0.0	0.0	13.0	0.0	sample data	<input type="checkbox"/>	
Liquid Fuels	Aviation Gasoline	tonnes	0.0	436.0	0.0	41.0	9.0	0.0	sample data	<input type="checkbox"/>	

[Delete Row](#) [Add Row](#)

**Click on the “Add Row” button in above screen to get following activity data sheet form:**

**FIGURE 3.9: REFERENCE APPROACH ACTIVITY DATA FORM**

### Add Energy Data

Fuel Type	Fuel
<input type="text" value="Liquid Fuels"/>	<input type="text" value="Gas / Diesel Oil"/>
Unit	Production
<input type="text" value="tonnes"/>	<input type="text" value="0"/>
Imports	Exports
<input type="text" value="10000"/>	<input type="text" value="2000"/>
International Bunkers	Stock Change
<input type="text" value="1000"/>	<input type="text" value="300"/>
Excluded Consumption	Reference
<input type="text" value="700"/>	<input type="text" value="sample data"/>
<a href="#" style="border: 1px solid #00AEEF; padding: 2px 10px; color: inherit; text-decoration: none;">Add</a>	

**Production:** Enter the amount of fuel produced

**Imports:** Enter the amount of fuel imported

**Exports:** Enter the amount of fuel exported

**International Bunkers:** Enter the amount of fuel used in international bunkers

**Stock change:** Enter the net increase and decrease in stocks of fuel

**Excluded Consumption:** Enter the amount of fuel which does not lead to combustion activities

**Click on the 'Add' button to insert fuel consumption data.**

**You need to submit the activity data using save/submit button.**

**Select the checkbox of a particular row activity data, click on the 'Delete Row' button and submit the form to delete the selected entry.**

**User may consider the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nqgip.iges.or.jp/public/2006gl/>)**

### 3.1.3 Database – Energy

The database menu can be accessed through the Home Page or Dashboard. On the left-hand side of the Dashboard, you would see the 'Database' which you shall use to navigate the system and access different functionality. In this sub-section of database menu emission factor of fuels are maintained.

**FIGURE 3.10: FUEL EMISSION FACTOR DATABASE SCREEEN**

EMISSION FACTOR DATABASE - FUEL								
Fuel Type	Fuel	NCV (TJ/Gg)	CO <sub>2</sub> Emission Factor (kgCO <sub>2</sub> /TJ)	CH <sub>4</sub> Emission Factor (kgCH <sub>4</sub> /TJ)	N <sub>2</sub> O Emission Factor (kgN <sub>2</sub> O/TJ)	Reference	Select	
Biomass	Biodiesels	27.0	70800.0	3.0	0.6		<input type="checkbox"/>	
Biomass	Biogasoline	27.0	70800.0	3.0	0.6		<input type="checkbox"/>	
Biomass	Charcoal	29.5	112000.0	200.0	4.0		<input type="checkbox"/>	
Biomass	Landfill Gas	50.4	54600.0	1.0	0.1		<input type="checkbox"/>	
Biomass	Municipal wastes (biomass fraction)	11.6	100000.0	30.0	4.0		<input type="checkbox"/>	
Biomass	Other Biogas	50.4	54600.0	1.0	0.1		<input type="checkbox"/>	
Biomass	Other Liquid Biofuels	27.4	79600.0	3.0	0.6		<input type="checkbox"/>	

**Filter:** Enter name of any fuel/fuel-type to search.

**Show:** Select number from the drop-down list to display as many results as possible in one page.

**Copy:** Click to copy on clipboard the results displayed on the page.

**Excel/CSV/PDF:** Click on the format name to be exported.

**FIGURE 3.11: EMISSION FACTOR DATABASE - ADD FUEL SCREEN**

**Fuel Type:** Select fuel type from the drop-down list.

**Fuel:** Enter name of fuel to be inserted into database.

**NCV:** Enter value of NCV for the fuel to be inserted into database.

**EF CO<sub>2</sub>:** Enter value of CO<sub>2</sub> emission factor for the fuel to be inserted into database.

**EF CH<sub>4</sub>:** Enter value of CH<sub>4</sub> emission factor for the fuel to be inserted into database.

**EF N<sub>2</sub>O:** Enter value of N<sub>2</sub>O emission factor for the fuel to be inserted into database.

**Add:** Click on the 'Add' button to insert fuel emission factor data.

**You need to submit the fuel emission factor data using save/submit button.**

## 3.2 IPPU Sector – Inventory

The Industrial Processes and Product Use (IPPU) sector covers greenhouse gas emissions occurring from the use of greenhouse gases in products, and from non-energy uses of fossil fuel carbon.

### 3.2.1 Non-Energy Products from Fuels and Solvent Use

The inventory module calculates emissions by applying analytical approach, which is to apply emission factors to activity data on the amount of lubricant or solvent consumption, from the first use of fossil fuels as a product for primary purposes other than energy or feedstock/reducing agent. The input screen includes following:

**FIGURE 3.17: LUBRICANT USE INPUT SCREEN**

**Inventory Year:** Select the GHG inventory year from drop-down list.

**FIGURE 3.18: ADD LUBRICANT ACTIVITY DATA FORM**

Add Lubricant

Lubricant Name	Amount Consumed (TJ)	Carbon Content (tonne C/TJ)	Fraction Oxidised (fraction)	Reference
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Add**

Remarks

**Save/Submit**

**Lubricant Name:** Enter the name of lubricant type consumed.

**Amount Consumed (TJ):** Enter the quantity for lubricant consumed.

**Carbon Content (tonne C/TJ):** Enter the carbon content of lubricant type. ([Consult default value in table 1.3 of 2006 IPCC guidelines, vol. 2: Energy, chapter 1: INTRODUCTION, p. 1.21](#))

**Fraction Oxidized (fraction):** Enter the oxidation fraction of lubricant type. ([Consult default value in table 5.2 of 2006 IPCC guidelines, vol. 3: IPPU, chapter 5: non-energy products from fuels and solvent use, p. 5.9](#))

**Click on the 'Add' button to insert lubricant use data.**

**You need to submit the lubricant use data using save/submit button.**

User may consider the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nrgip.iges.or.jp/public/2006gl/>)

### 3.2.2 Product Uses as Substitutes for Ozone Depleting Substances

The inventory module calculates HFC emissions from stationary and mobile air-conditioning and refrigeration equipment. The input screen includes following:

**FIGURE 3.19: ADD SUBSTITUTES FOR ODS GAS CONSUMPTION FORM**

Add Data

Gas Consumed	Unit	Amount	Reference
<input type="text"/> -Select-	<input type="text"/> tonnes	<input type="text"/>	<input type="text"/>

**Add**

Remarks

**Save/Submit**

**Gas Consumed:** Select the type of gas consumed from drop-down list.

**Amount:** Enter the quantity for gas consumed.

**Click on the ‘Add’ button to insert gas consumption data.**

**You need to submit the gas consumption data using save/submit button.**

**FIGURE 3.20: MOBILE AIR CONDITIONING DATA FORM**

Gas Consumed	Unit	Amount	Reference	Select
<b>Delete Row</b>				

Add Data

Gas Consumed --Select--	Unit tonnes	Amount	Reference	<b>Add</b>
----------------------------	----------------	--------	-----------	------------

Remarks

**Save/Submit**

**For submission of gas consumption data related to mobile air conditioning, please click on ‘Mobile Air Conditioning’ tab and add the data accordingly.**

User may look into the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nqgip.iges.or.jp/public/2006gl/>)

### 3.2.3 Database - IPPU

In this sub-section of database menu GWP for gases are maintained.

**FIGURE 3.22: GWP DATABASE SCREEEN**

Gas Name	GWP	Reference	Select
Carbon Dioxide	1.0		<input type="checkbox"/>
HFC-125	3170.0		<input type="checkbox"/>
HFC-134	1120.0		<input type="checkbox"/>
HFC-134a	1300.0		<input type="checkbox"/>
HFC-143	328.0		<input type="checkbox"/>
HFC-143a	4800.0		<input type="checkbox"/>
HFC-152	16.0		<input type="checkbox"/>
HFC-152a	138.0		<input type="checkbox"/>

**FIGURE 3.23: GWP DATABASE ADD NEW GAS DATA FORM**

Add New Gas	Gas <input type="text"/>	GWP <input type="text"/>	Reference <input type="text"/>	<b>Add</b>
<b>Save/Submit</b>				

**Gas:** Enter name of gas to be inserted into database.

**GWP:** Enter value of global warming potential for the gas to be inserted into database.

**Click on the ‘Add’ button to insert gas GWP data.**

**You need to submit the gas GWP data factor data using save/submit button.**

### 3.3 AFOLU Sector – Inventory

The AFOLU sector covers emissions and removals of CO<sub>2</sub> and non-CO<sub>2</sub> greenhouse gases from land-use, livestock related emissions and from biomass burning. The input screen includes following:

**FIGURE 3.24: AFOLU SECTOR INVENTORY YEAR INPUT SCREEN**

Inventory Year	<input type="text" value="–Select–"/>	Sector	<input type="text" value="3-Agriculture, Forestry, and Other Land U..."/>
Category	<input type="text" value="3.A-Livestock"/>	Sub Sector	<input type="text" value="3.A.1-Enteric Fermentation"/>
Calculation Approach	<input type="text" value="Tier 1"/>		

**Inventory Year:** Select the GHG inventory year from drop-down list.

**Category:** As per the IPPC methodology inventory module includes following AFOLU sector category:

- 3.A - Livestock
- 3.B - Land
- 3.C - Aggregate sources and non-CO<sub>2</sub> emissions sources on land

**Sub-Sector:** The AFOLU Sector's Sub-Sectors included in inventory module are:

- 3.A.1 – Enteric Fermentation
- 3.A.2 – Manure Management
- 3.B.1 – Forest Land
- 3.B.2 – Cropland
- 3.B.3 – Grassland
- 3.B.4 – Wetlands
- 3.B.5 – Settlements
- 3.B.6 – Other Land
- 3.C.1 – Emissions from Biomass Burning
- 3.C.6 – Indirect N<sub>2</sub>O Emissions from Manure Management

**Calculation Approach:** Tier-1 (Default)

### 3.3.1 Livestock

Emissions from enteric fermentation and manure management are calculated by the backend engine from the livestock population data maintained in the database menu. User only needs to select the **inventory year** from the drop-down list and emissions will be displayed.

**FIGURE 3.25: AFOLU ENTERIC FERMENTATION ACTIVITY DATA SCREEN**

Enteric Fermentation

Category	Heads	GHG Emissions (tCO <sub>2</sub> e)
Dairy Cows	161473	307444.6
Other Cattle	8573	11282.1
Goats	27940	3911.6
Horses	7597	3828.9
Swine	92006	2576.2

Remarks

**Save/Submit**

**FIGURE 3.26: AFOLU MANURE MANAGEMENT ACTIVITY DATA SCREEN**

Manure Management

Category	Heads	GHG Emissions (tCO <sub>2</sub> e)
Dairy Cows	161473	45557.7
Other Cattle	8573	2196.6
Goats	27940	313.9
Horses	7597	431.3
Swine	92006	2903.4

Remarks

**Save/Submit**

### 3.3.2 Land

This inventory module is a data entry form in which land area under respective land category and emissions are to be entered. The input screen includes following:

**FIGURE 3.27: LAND EMISSIONS INVENTORY YEAR INPUT SCREEN**

Inventory Year	-Select-	Sector	3-Agriculture, Forestry, and Other Land U...
Category	3.B-Land	Sub Sector	3.B.1-Forest Land
Calculation Approach	Tier 1		

**Inventory Year:** Select the GHG inventory year from drop-down list.

**FIGURE 3.28: LAND-USE AREA AND EMISSIONS DATA INSERTION FORM**

Forest Data			
Forest Category	Area (Ha)	GHG Emissions (tCO <sub>2</sub> )	Reference
Forest land Remaining Forest land	750323.0	-124000.0	NFA
Cropland converted to Forest Land			
Grassland converted to Forest Land			
Wetlands converted to Forest Land			
Settlements converted to Forest Land	46875.0	-4283.0	NFA
Other Land converted to Forest Land			

\*Please refer to the calculation sheet attached in the User Manual for estimating GHG emissions

Remarks

**Save/Submit**

**Area (Ha):** Enter the land area alongside appropriate land-use category.

**GHG Emissions (tCO<sub>2</sub>):** Enter the amount of GHG emissions alongside appropriate land-use category.

**You need to submit the land use area and emissions data using save/submit button.**

**User may look into the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nppgiges.or.jp/public/2006gl/>)**

### 3.3.3 Aggregate sources and non-CO<sub>2</sub> emissions sources on land

This category includes emissions from burning of biomass in different land-use and indirect emissions resulting from volatile nitrogen losses during manure management. The input screen for various sub-sector is as follows:

**FIGURE 3.29: BIOMASS BURNING ACTIVITY DATA FORM**

**Add Biomass Burning Data**

Initial Land Use	Land Use during Reporting Year
Forest Land	Forest Land
Subcategory	Area burnt (Ha)
Area of grazing within Forest land	494114
Mass of fuel available for combustion (tonne/Ha)	Combustion Factor
13.5	0.36
EF CO <sub>2</sub> (kg/tonne dm burnt)	EF N <sub>2</sub> O (kg/tonne dm burnt)
1580	0.2
EF CH <sub>4</sub> (kg/tonne dm burnt)	Reference
6.8	Sample data
<input type="button" value="Add"/>	

**Initial Land Use:** Select the land-use from the drop-down list.

**Land Use during Reporting year:** Select the current land-use from the drop-down list.

**Area burnt (ha):** Enter the value of land area burnt.

**Subcategory:** Enter the subcategory name if any.

**Mass of fuel available for combustion (tonne/Ha):** Enter the amount of fuel available for burning.

**Combustion factor:** Enter the appropriate value of combustion factor for fuel burned.

**EF CO<sub>2</sub> (kg/tonne dm burnt):** Enter the value of emission factor for CO<sub>2</sub> emitted per unit of dry matter combusted.

**EF N<sub>2</sub>O (kg/tonne dm burnt):** Enter the value of emission factor for N<sub>2</sub>O emitted per unit of dry matter combusted.

**EF CH<sub>4</sub> (kg/tonne dm burnt):** Enter the value of emission factor for CH<sub>4</sub> emitted per unit of dry matter combusted.

**You need to submit the biomass burning data using save/submit button.**

**User may consider the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nqgip.iges.or.jp/public/2006gl/>)**

Indirect emissions from manure management are calculated by the backend engine from the livestock population data maintained in the database menu. User only needs to select the **inventory year** from the drop-down list and emissions will be displayed.

**FIGURE 3.30: INDIRECT N<sub>2</sub>O EMISSIONS SCREEN**

The screenshot shows a user interface for calculating indirect N<sub>2</sub>O emissions. At the top, there are four dropdown menus: 'Inventory Year' set to 2020, 'Sector' set to 3-Agriculture, Forestry, and Other Land U..., 'Category' set to 3.C-Aggregate sources and non-CO<sub>2</sub> emi..., and 'Sub Sector' set to 3.C.6-Indirect N<sub>2</sub>O emissions from manu...'. Below these is a 'Calculation Approach' dropdown set to Tier 1. The main area displays a table titled 'Manure Management - Indirect N<sub>2</sub>O Emissions' with the following data:

Category	Heads	GHG Emissions (tCO <sub>2</sub> e)
Dairy Cows	161473	12310.9
Other Cattle	8573	587.0
Goats	27940	54.3
Horses	7597	24.7
Swine	92006	98.2

### 3.3.4 Database - AFOLU

In this sub-section of database menu livestock population and emission factor are maintained.

**FIGURE 3.32: DATABASE LIVESTOCK POPULATION SCREEN**

**VANUATU'S CLIMATE ACTION IMPACT ASSESSMENT MRV TOOL**

Home User Manual Logout

**MENU**

- GHG INVENTORY
- PROJECTS
- MITIGATION ACTIONS
- ADAPTATION ACTIONS
- CLIMATE FINANCE
- SDGs ASSESSMENTS
- DATABASE**
  - Energy
  - IPPU
  - Livestock Population**
  - Emission Factor - Livestock
- Waste
- REPORTS
- USER LIST
- MY APPROVALS

**GHG INVENTORY - LIVESTOCK POPULATION**

Inventory Year: 2010

Select inventory year from drop-down list.

Category	Heads	Reference	Select
Dairy Cows	155000	sample data	<input type="checkbox"/>
Goats	23000	sample data	<input type="checkbox"/>
Horses	5700	sample data	<input type="checkbox"/>
Swine	93100	sample data	<input type="checkbox"/>

**Add Livestock Data**

Category	Heads	Reference	Add
-Select-			

**Remarks**

**Save/Submit**

**FIGURE 3.33: LIVESTOCK POPULATION DATA INSERTION**

**Add Livestock Data**

Category	Heads	Reference	Add
-Select-			

Remarks

**Save/Submit**

**Category:** Select livestock category from the drop-down list.

**Heads:** Enter value for number of head of livestock category.

**Click on the 'Add' button to insert livestock population data.**

**You need to submit the livestock population data using save/submit button.**

## Emission Factor – Livestock

FIGURE 3.34: LIVESTOCK EMISSION FACTOR DATABASE SCREEN

LIVESTOCK EMISSION FACTOR DATABASE												
Category	EF <sub>Enteric</sub> Fermentation (kgCH <sub>4</sub> /head/ year)	EF <sub>Manure</sub> Management (kgCH <sub>4</sub> /head/ year)	N Excretion Rate (kgN/1000kg animal/day)	Typical Animal Mass (kg)	Nitrogen Excretion Managed in MMS (%)	EF Direct N <sub>2</sub> O-N Emissions from MMS	Managed Manure N lost in MMS (%)	Fraction of managed livestock manure nitrogen that volatilises	EF N <sub>2</sub> O emissions from atmospheric deposition of nitrogen on soils and water surfaces	Reference		
Buffalo	55.0	1.0	0.32	380.0	10.0	0.01	100.0	0.3	0.01	0.01	□	
Camels	46.0	1.92	0.38	217.0	10.0	0.01	100.0	0.3	0.01	0.01	□	
Dairy Cows	68.0	1.0	0.44	500.0	76.0	0.01	24.0	0.3	0.01	0.01	□	
Goats	5.0	0.17	1.42	30.0	10.0	0.01	100.0	0.3	0.01	0.01	□	
Horses	18.0	1.64	0.3	238.0	10.0	0.01	100.0	0.3	0.01	0.01	□	
Mules and Assess	10.0	0.9	0.3	130.0	10.0	0.01	100.0	0.3	0.01	0.01	□	
Other Cattle	47.0	1.0	0.5	330.0	91.0	0.01	9.0	0.3	0.01	0.01	□	
Poultry	0.0	0.02	1.1	0.9	10.0	0.01	100.0	0.3	0.01	0.01	□	
Sheep	5.0	0.15	1.13	28.0	10.0	0.01	100.0	0.3	0.01	0.01	□	
Swine	1.0	1.0	0.52	45.0	10.0	0.01	100.0	0.3	0.01	0.01	□	

Showing 1 to 10 of 10 entries

1 / 10

Save/Submit

Click on the 'Add Row' button to get livestock emission factor form

**FIGURE 3.35: ADD NEW LIVESTOCK CATEGORY FORM**

**Add New Livestock Category**

Livestock	EF Enteric Fermentation (kgCH <sub>4</sub> / head/ year)
EF Manure Management (kgCH <sub>4</sub> / head/ year)	N Excretion Rate (kgN/ 1000kg animal/ day)
Typical Animal Mass (kg)	Nitrogen Excretion Managed in MMS (fraction)
EF Direct N <sub>2</sub> O-N Emissions from MMS	Managed Manure N lost in MMS (%)
Fraction of managed livestock manure nitrogen that volatilises	Emission factor for N <sub>2</sub> O emissions from atmospheric deposition of nitrogen on soils and water surfaces
Reference	<b>Add</b>

**Livestock:** Enter livestock category name for which emission factor is to be inserted

**EF Enteric Fermentation (kgCH<sub>4</sub>/ head/ year):** Enter value of emission factor for the livestock category during enteric fermentation.

**EF Manure Management (kgCH<sub>4</sub>/ head/ year):** Enter value of emission factor for the livestock category during manure management.

**N Excretion Rate (kgN/ 1000kg animal/ day):** Enter value for default N excretion rate of livestock category.

**Typical Animal Mass (kg):** Enter value of typical animal mass for livestock category.

**Nitrogen Excretion Managed in MMS (fraction):** Enter value for fraction of total annual nitrogen excretion for each livestock category that is managed in manure management system.

**EF Direct N<sub>2</sub>O-N Emissions from MMS:** Enter value of emission factor for direct N<sub>2</sub>O emissions from manure management system.

**Managed Manure N lost in MMS (%):** Enter value for amount of managed manure nitrogen for livestock category that is lost in the manure management system.

**Fraction of managed livestock manure nitrogen that volatilizes:** Enter value for fraction of managed manure nitrogen for livestock category that volatilizes.

**Emission factor for N<sub>2</sub>O emissions from atmospheric deposition of nitrogen on soils and water surfaces:** Enter value of emission factor for N<sub>2</sub>O emissions from atmospheric deposition of nitrogen on soils and water surfaces.

**You need to submit the livestock emission factor data using save/submit button.**

### 3.4 Waste Sector – Inventory

The Waste sector covers emissions from incineration, open burning, wastewater treatment and for changes in carbon stored in solid waste disposal sites. The input screen includes following:

**FIGURE 3.36: WASTE SECTOR INVENTORY YEAR INPUT SCREEN**

Inventory Year	-Select-	Sector	4-Waste
Category	4.A-Solid Waste Disposal	Sub Sector	4.A-Solid Waste Disposal
Calculation Approach	Tier 1		

**Inventory Year:** Select the GHG inventory year from drop-down list.

**Category:** As per the IPPC methodology, inventory module includes following waste sector category:

- 4.A – Solid Waste Disposal
- 4.B – Biological Treatment of Solid Waste
- 4.C – Incineration and Open Burning of Waste
- 4.D – Wastewater Treatment and Discharge

**Sub-Sector:** The Waste Sector's Sub-Sectors under the above categories as per IPCC.

**Calculation Approach:** Tier-1 (Default)

#### 3.4.1 Solid Waste Disposal

This category includes emissions from solid waste deposited at disposal sites. The input screen includes following:

**FIGURE 3.37: SOLID WASTE ACTIVITY DATA FORM**

Solid Waste Data

Urban Population	Waste Per Capita (kg/capita/year)	Fraction of waste going to SWDS	CH <sub>4</sub> Generation per ton of waste (kg/tonne)	Reference
72764	300.0	0.76	25.0	sample data

Remarks

**Save/Submit**

**Waste Per Capita (kg/capita/year):** Enter value for mass of waste generated.

**Fraction of waste going to SWDS:** Enter value for fraction of waste deposited at SWDS.

**CH<sub>4</sub> Generation per ton of waste (kg/tonne):** Enter value for CH<sub>4</sub> generation potential of waste deposited at SWDS.

**You need to submit the Solid waste data using save/submit button.**

User may look into the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nqip.iges.or.jp/public/2006gl/>)

### 3.4.2 Biological Treatment of Solid Waste

This category includes emissions from biological treatment (composting, anaerobic digestion in biogas facilities). The input screen includes following:

**FIGURE 3.38: BIOLOGICAL TREATMENT OF SOLID WASTE ACTIVITY DATA FORM**

Waste Data - Biological Treatment

Treatment Type	Amount of waste treated (tonnes)	Emission Factor (kgCO <sub>2</sub> /ton of waste)	Reference	Action
Composting	32877.0	17.55	sample data	<input type="checkbox"/>

**Delete Row**

Add Data

Treatment Type	Amount of waste treated	Emission Factor	Reference	<b>Add</b>
	tonnes	(kgCO <sub>2</sub> /ton of waste)		

Remarks

**Save/Submit**

Use 'Add Data' section for Activity data input

**Treatment Type:** Enter name for the type of biological treatment employed.

**Amount of waste treated:** Enter quantity of waste treated by particular biological treatment method.

**Emission factor:** Enter value of emission factor for particular type of biological treatment.

**Add:** Click on the 'Add' button to insert biological treatment of waste data.

**You need to submit the biologically treated waste data using save/submit button.**

User may look into the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nccc.iges.or.jp/public/2006gl/>)

### 3.4.3 Incineration and Open Burning of Waste

This category includes emissions from incineration and open burning of all types of combustible waste. The input screen includes following:

**FIGURE 3.39: INCINERATION AND OPEN BURNING ACTIVITY DATA FORM**

Waste Data - Incineration							
Waste Incinerated (wet weight) (tonnes)	Dry Matter Fraction-DM	Carbon Fraction in dry matter-CF	Fossil Carbon Fraction in Total carbon- FCF	Oxidation Factor-OF	Reference		
29354.0	0.079	0.078875	0.0011	1.0	sample data		

Waste Data - Open Burning							
Urban Population	Waste Per Capita (kg/year)	Fraction of Population Burning Waste	Dry Matter Fraction-DM	Carbon Fraction in Dry Matter-CF	Fossil carbon Fraction in Total Carbon- FCF	Oxidation Factor- OF	Reference
70304	600.0	0.35	0.066	0.066	0.000924	0.58	sample data

Remarks							
<input type="text"/>							

**Save/Submit**

#### Waste Data - Incineration

**Waste Incinerated:** Enter quantity of waste incinerated.

**Dry Matter Fraction-DM:** Enter value for fraction of dry matter content in the waste incinerated.

**Carbon Fraction in dry matter-CF:** Enter value for fraction of carbon in the dry matter content of waste incinerated.

**Fossil Carbon Fraction in Total carbon-FCF:** Enter value for fraction of fossil carbon in the total carbon of waste incinerated.

**Oxidation Factor-OF:** Enter value for oxidation factor.

#### Waste Data - Open Burning

**Waste per Capita:** Enter the quantity of waste generated.

**Fraction of Population Burning Waste:** Enter value for fraction of population burning waste.

**Dry Matter Fraction-DM:** Enter value for fraction of dry matter content in the waste open burned.

**Carbon Fraction in dry matter-CF:** Enter value for fraction of carbon in the dry matter content of waste open burned.

**Fossil Carbon Fraction in Total carbon-FCF:** Enter value for fraction of fossil carbon in the total carbon of waste incinerated.

**Oxidation Factor-OF:** Enter value for oxidation factor.

You need to submit the incinerated and open burned waste data using save/submit button.

User may look into the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nqgip.iges.or.jp/public/2006gl/>)

### 3.4.4 Wastewater Treatment and Discharge

This category includes emissions from treatment or disposition of wastewater discharged through sources. The input screen includes following:

FIGURE 3.40: WASTEWATER TREATMENT AND DISCHARGE ACTIVITY DATA FORM

Wastewater Treatment and Discharge - CH <sub>4</sub> Emissions				
Population	Degradable Organic Component (kgBOD/capita/year)	Correction Factor for Industrial BOD Discharged in Sewers	Methane Producing Capacity (kgCH <sub>4</sub> /kgBOD)	Reference
268269	13.505	1.25	0.6	sample data

Wastewater Treatment and Discharge - N <sub>2</sub> O Emissions				
Population	Per capita Protein Consumption (kg/person/year)	Nitrogen Fraction in Protein	Emission factor (kgN <sub>2</sub> O- N/kgN)	Reference
268269	20.805	0.16	0.005	sample data

Remarks

**Degradable Organic Component:** Enter value for per capita BOD in given inventory year.

**Correction Factor for Industrial BOD Discharged in Sewers:** Enter value of correction factor for additional industrial BOD discharged into sewers.

**Methane Producing Capacity (kgCH<sub>4</sub>/kgBOD):** Enter value for methane producing capacity. For domestic wastewater, a COD-based value can be converted into a BOD based value by multiplying with a factor of 2.4.

**Per capita Protein Consumption (kg/person/year):** Enter value for annual per capita protein consumption.

**Nitrogen Fraction in Protein:** Enter value for fraction of nitrogen in protein.

**Emission factor (kgN<sub>2</sub>O-N/kgN):** Enter value of emission factor for N<sub>2</sub>O emissions from discharged to wastewater.

**You need to submit the wastewater treatment data using save/submit button.**

**User may look into the IPCC 2006 guidelines for more information and definitions of the key input parameters. (<https://www.ipcc-nqgip.iges.or.jp/public/2006gl/>)**

### 3.4.5 Database - Waste

In this sub-section of database menu urban and rural population are maintained.

**FIGURE 3.41: DATABASE WASTE - POPULATION SCREEN**

Year	Rural Population	Urban Population	Total Population	Reference	Action
2010	197000	70300	267300	census	<input type="checkbox"/>

**FIGURE 3.42: DATABASE WASTE ADD POPULATION DATA SCREEN**

**Inventory Year:** Select inventory year from drop-down list.

**Rural Population:** Enter value for rural population in given inventory year.

**Urban Population:** Enter value for urban population in given inventory year.

**Click on 'Add' button after inserting data in above mentioned field, to reflect data in population data table.**

**You need to submit the population data using save/submit button.**

## 4. Projects Module

The first activity to developing the mitigation/adaptation/climate finance/SDG impact database is to create an action or project in the MRV database. This module activity captures basic information about the respective action or project. The sub-modules required for mitigation/adaptation/climate finance/SDGs Assessment action or project to be created using the information entered in this module.

**FIGURE 4.1: PROJECTS NAVIGATION AND SEARCH PROJECT PAGE**

**FIGURE 4.2: CREATE PROJECT - DATA INSERTION FORM**

**Cause:** Select appropriate cause from the drop-down list.

**Division:** Select applicable division from the drop-down list.

**Sector:** Select the sector from the drop-down list.

**Sub-Sector:** Select the sub-sector from the drop-down list.

**Area:** Select area from the drop-down list.

**Project Title:** Enter the Project Title (this should be short and simple to identify the project).

**Implementing Agency:** Enter the Name of implementation agency (keep the name short and consistent for all other projects).

**Executing Agency:** Enter executing party involve in the project implementation/financing etc.

**Lifetime (years):** Enter operational lifetime of the project.

**Expected Commissioning Date:** Enter expected date of effectiveness for the project.

**Project End Date:** Enter end date for the project.

**Financial Closure Date:** Enter financial closure date for the project.

**Part of NAP/NAPA/NAMA:** Select appropriate option from the drop-down list.

**Included in NDC:** Select 'Yes' or 'No' from the drop-down list.

**Project Location:** Select location of the project from the drop-down list.

**Geo Coordinates:** Enter the geographical coordinates (latitude and longitude) of project activity site.

**Project Cost (USD):** Enter value for the project cost.

**Source of Funding:** Select the source of funding for the project from the drop-down list.

**Remarks:** Enter comments/observations if there related to project.

**You need to submit the project data in the database using 'Submit' button and a unique project Id is created at the backend.**

## 5. Mitigation Actions Module

The Mitigation Action Tracking Module focus on both project implementation and operation phase. The bottom-up approach is applied to develop a comprehensive and integrated system considering the unique requirement of a country. However, this is being developed as a living

framework and shall be updated on periodic basis or as and when required. It is important to integrate the existing national processes for project monitoring with the new tool to avoid duplication and maximize the use of resources. The module will allow for efficient integration and strengthening between what exists and what is expected be developed. Importantly, appropriate monitoring indicators and parameters (e.g., raw data needs) will be identified and monitored at either the mitigation action level, or at the sub-sector level.

## 5.1 Mitigation Actions - Project Information

To initiate the Mitigation action monitoring, user needs to include the baseline project information in the database against which Mitigation action project can be tracked/monitored.

**FIGURE 5.1: MITIGATION ACTION - PROJECT INFORMATION FORM**

MITIGATION ACTION - PROJECT INFORMATION	
Project*	VA-012-02-9/test project 2
Mitigation Sector	Energy Generation
Included in NDC	Yes
Implementing Agency	MoCC
Contact Details	BP 26 Port Villa Vanuatu
Project Cost (USD)	10000.0
Project End Date	01-12-2025
Commissioning Date	01-01-2001
Expected GHG Savings (tCO <sub>2</sub> e/ year)*	1000.0
Project Contributions*	Economic, Social, Environmental
Project Beneficiaries*	Residential customers
Expected Project Outputs*	RE generation
Registered With Market Based Mechanism*	No
Issuance of Carbon Benefits	
Part of NAP/NAPA/NAMA	NAMA
* Mandatory Field	

**Project:** Select the projects already created (using projects module) from the drop-down list.

**Expected GHG Savings (tCO<sub>2</sub>e/ year):** Enter value for expected annual GHG emission reductions in the project.

**Target GHGs:** Select appropriate GHGs reduced by implementation of the project activity from the drop-down list.

**Project Contributions:** Select appropriate project contributions from the drop-down list.

**Project Status:** Select appropriate value for project status from the drop-down list.

**Project Beneficiaries:** Enter name of beneficiaries related to project activity.

**Gender Inclusiveness Assessment:** Select appropriate option from the drop-down list.

**Expected Project Outputs:** Enter name of expected project outputs related to project activity.

**Project Impacts:** Enter name of project impacts related to project activity.

**Calculation Sheet:** Click on 'Choose file' option to upload the emission reduction sheet.

**Registered With Market Based Mechanism:** Enter name of market-based mechanism for which the project activity is registered.

**Provide Weblink:** Enter URL of market-based mechanism for which the project activity is registered

**Issuance of Carbon Benefits:** Enter in brief if any type of carbon benefits is issued.

**Verification Status (rounds):** Enter value for verification rounds conducted in relation to issuance of carbon benefits.

**FIGURE 5.2: MITIGATION ACTION - PERFORMANCE INDICATOR FORM**

The screenshot shows a web-based form titled 'PERFORMANCE INDICATORS'. It features a table with columns for 'Indicator', 'Unit', 'Value', 'Reference', and 'Select'. Two rows of data are present: 'Number of household impacted' (unit: numbers, value: 25000, reference: feasibility report) and 'Number of CFL replaced' (unit: numbers, value: 100000, reference: Monitoring reports). A red button labeled 'delete row' is located below the table. Below the table is a section titled 'Add Performance Indicator' with fields for 'Performance Indicator', 'Unit', 'Value', and 'Reference', and a red 'Add' button. A red box highlights this 'Add' section. To the right of the form, a red callout box contains the text: 'Use this section to add new performance indicators data'.

Indicator	Unit	Value	Reference	Select
Number of household impacted	numbers	25000	feasibility report	<input type="checkbox"/>
Number of CFL replaced	numbers	100000	Monitoring reports	<input type="checkbox"/>

**delete row**

Add Performance Indicator

Performance Indicator      Unit      Value      Reference      Add

Remarks

Submit

Use this section to add new performance indicators data

**Performance Indicator:** Enter name of performance indicator to monitored for project activity.

**Unit:** Enter name of unit in which the performance indicator to be measured and monitored for project activity.

**Value:** Enter expected value for the performance indicator to be measured and monitored for project activity.

**Add:** Click on the 'Add' button to insert performance indicator data.

**You need to submit the project information data using submit button.**

## 5.2 Mitigation Actions - Monitoring Information

To track the Mitigation action user, need to enter the monitoring data on annual basis.

### FIGURE 5.3: MITIGATION ACTION - MONITORING INFORMATION FORM

MITIGATION ACTION - MONITORING INFORMATION			
Project*	VA-012-02-9 test project 2		
Monitoring Year*	2003		
Mitigation Sector	Energy Generation	Mitigation Sub-Sector	Renewable Energy
Included in NDC	Yes	Project Location	City
Implementing Agency	MoCC	Executing Agency	Local Government
Contact Details	BP 26 Port Vila Vanuatu	Contact Details	Namba 2 Area Port Vila Vanuatu
Project Cost (USD)	10000.0	Source of Funding	Gov, Grant or Loan
Project End Date	01-12-2025	Financial Closure Date	01-04-2000
Commissioning Date	01-01-2001	Part of NAP/NAPA/NAMA	NAMA
Lifetime (years)	25.0	Target GHGs	CO2
Project Contributions	Economic,Social,Environmental	Project Status	Operational
Project Beneficiaries	Residential customers	Gender Inclusiveness Assessment	Yes
Expected Project Outputs	RE generation	Project Impacts	positive
Actual GHG Savings (tCO <sub>2</sub> e/ year)*	800.0	Provide Weblink*	
Registered With Market Based Mechanism	No		
Issuance of Carbon Benefits		Verification Status (rounds)	
<small>* Mandatory Field</small>			

**Project:** Select the project from the drop-down list.

**Monitoring Year:** Select the inventory year from the drop-down list.

**Actual GHG Savings (tCO<sub>2</sub>e/ year):** Enter value for actual annual GHG emission reductions in the particular project.

**Calculation Sheet:** Click on 'Choose file' option to upload the emission reduction sheet.

**Verification Reports:** Click on 'Choose file' option to upload the project verification sheet.

### FIGURE 5.4: MITIGATION ACTION - PERFORMANCE INDICATOR MONITORING FORM

PERFORMANCE INDICATORS			
Indicator	Unit	Value	Data Source
Number of CFL replaced	numbers	60000	Monitoring reports
Number of household impacted	numbers	10000	fisibility report
<small>Remarks</small> <input type="text"/>			
<input type="button" value="Submit"/>			

**Value (Performance Indicator):** Enter actual value for the performance indicator measured and monitored for project activity.

**You need to submit the project monitoring data using submit button.**

## 6. Adaptation Actions Module

The Climate Change adaptation action monitoring and tracking module is designed as per the UNDP CAIT Tool. The Adaptation action tracking tool will follow similar bottom approach and methodology as for GHG inventory and Mitigation Action Tracking. Adaptation module shall have both the qualitative and quantitative information.

### 6.1 Adaptation Actions - Project Information

**FIGURE 6.1: ADAPTATION ACTION - PROJECT INFORMATION FORM**

ADAPTATION ACTION - PROJECT INFORMATION			
Project Id*	VA-011-13-8 test project 1		
Adaptation Sector	Marine and Coastal Resources	Adaptation Sub-Sector	Coastal zone
Included in NDC	Yes	Part of NAP/NAPA/NAMA	NAP and NAPA
Implementing Agency	Implementing Agency	Executing Agency	Executing Agency
Project End Date	01-01-2002	Financial Closure Date	01-01-2000
Commissioning Date	01-01-2001	Lifetime (years)	2.0
NDP Objective Coverage*	Enhance the productivity and social wellbeing of the population		
NDP Coverage*	Water, Climate Change and ENR Management		
<small>* Mandatory Field</small>			

**Project Id:** Select the projects already created and stored in the database from the drop-down list.

**NDP Objective Coverage:** Select NDP objective from drop-down list. Objectives are:

- Enhance value addition in key growth opportunities
- Strengthen the private sector to create jobs
- Consolidate and increase the stock and quality of productive infrastructure
- Enhance the productivity and social wellbeing of the population
- Strengthen the role of the state in guiding and facilitating development

**NDP Coverage:** Select NDP coverage from drop-down list. (e.g., Agro-Industrialization; Mineral-based Industrialization...Etc...)

**By clicking on the priority area name (agriculture, forestry, water, energy, health and risk management) qualitative and quantitative questionnaire form will be displayed for respective priority area.**

### Qualitative Impact

**FIGURE 6.2: QUALITATIVE IMPACT FORM**

**Click on 'Qualitative Impact' to expand the section for questionnaire**

Agriculture	Forestry	Water	Energy	Health	Risk Management
<b>AGRICULTURE</b>					
<div style="border: 1px solid red; padding: 2px;">+ Qualitative Impact</div>					
Does the action enhance crop productivity?  Does the action enhance productivity in the livestock sector?  Does the action enhance productivity enhance productivity in the fisheries sector?  Does the action diversify livelihoods to adjust to a changing climate? <div style="border: 1px solid red; padding: 2px;">+ Quantitative Impact</div>					
<div style="border: 1px solid red; padding: 10px;"> <input type="button" value="Yes"/> <input type="button" value="No"/> <input type="button" value="No"/> <input type="button" value="Yes"/> </div>					
Remarks  <input type="text"/>					
<input type="button" value="Submit"/>					

User can select 'Yes/No/Not Applicable' as preferred from the drop-down list against each question

**Quantitative Impact****FIGURE 6.3: QUANTITATIVE IMPACT FORM**

**Click on 'Quantitative Impact' to expand the section for questionnaire.**

Agriculture	Forestry	Water	Energy	Health	Risk Management
<b>AGRICULTURE</b>					
<div style="border: 1px solid red; padding: 2px;">+ Qualitative Impact</div> <div style="border: 1px solid red; padding: 2px;">- Quantitative Impact</div>					
Number of farmers with crop insurance Baseline Data <input type="text" value="1000.0"/> Data Source <input type="text" value="SAMPLE AGENCY"/>  Number of farmers accessing agriculture input subsidies Baseline Data <input type="text" value="300"/> Data Source <input type="text" value="SAMPLE AGENCY"/>  Number of institutions harvesting water Baseline Data <input type="text" value="400"/> Data Source <input type="text" value="SAMPLE AGENCY"/>					

**Baseline Data:** Enter value for baseline data for the respective quantitative assessment.

**Data Source:** Enter reference for baseline data of respective quantitative assessment.

**You need to submit the project information data using submit button.**

## 6.2 Adaptation Actions – Monitoring Information

**FIGURE 6.4: ADAPTATION ACTION - MONITORING INFORMATION FORM**

**Project Id:** Select the projects already created and stored in the database from the drop-down list.

**Monitoring Year:** Select year for which monitoring data is to be submitted from the drop-down list.

**Data:** Enter value for actual data for the respective quantitative assessment.

**Data Source:** Enter references for data of respective quantitative assessment.

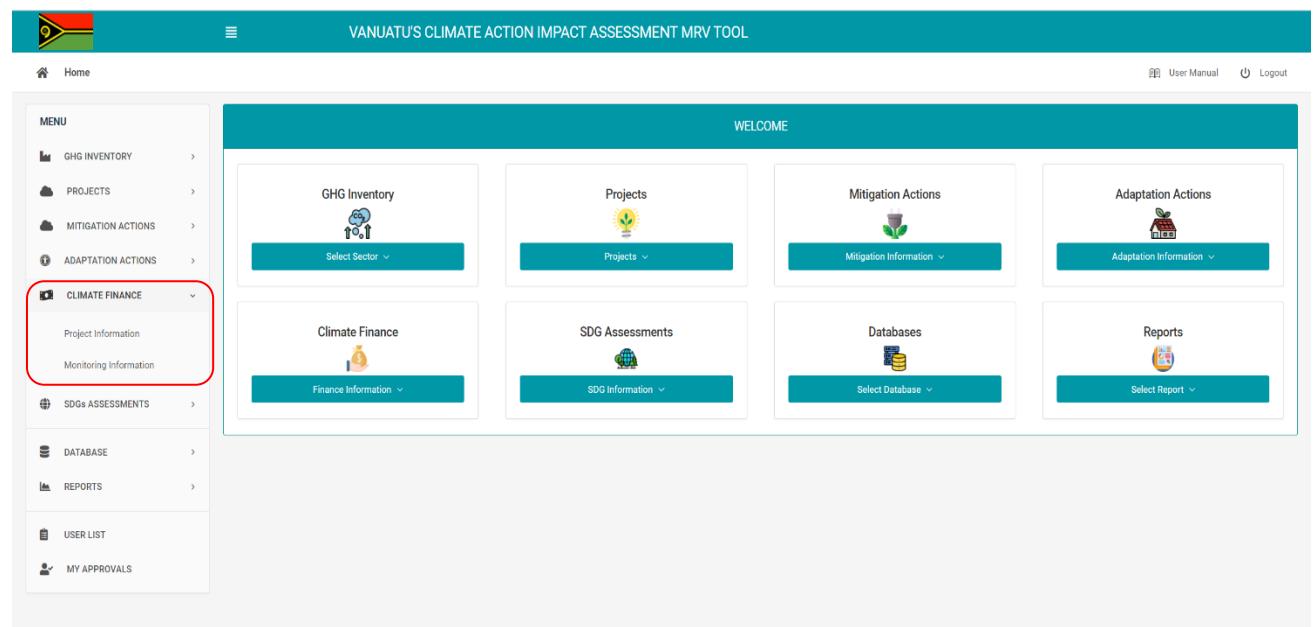
**By clicking on the priority area name (agriculture, forestry, water, energy, health and risk management) quantitative assessment form will be displayed for respective priority area.**

**You need to submit the project monitoring data using submit button.**

## 7. Climate Finance Module

The Climate Finance Flow Module has been designed to cater both domestic and international Climate Finance Tracking requirements. Climate Finance Flow Tracking Sub-Module can be accessed through the Home Page or Dashboard. On the left-hand side of the Dashboard, you would see the Climate Finance Sub-Module tab which you shall use to navigate the system and access different functionality.

**FIGURE 7.1: CLIMATE FINANCE MODULE MENU NAVIGATION**



### 7.1 Climate Finance - Project Information

This sub-module is used to enter the planned financial data related with any project. This sub-module has four components:

### 7.1.1 Project Details

**FIGURE 7.2: CLIMATE FINANCE - PROJECT DETAILS FORM**

CLIMATE FINANCE - PROJECT INFORMATION

Project\* VA-011-13-8|test project 1

Project Details	Financial Flow	Detailed Budget	Disbursement Year
Financial Year* 2001-02	Applied Exchange Rate (VT/USD)* 110	Financing Mode* On Budget	Budget Code* MOE001
Project End Date 01-01-2002	Financial Closure Date 01-01-2000	Commissioning Date 01-01-2001	

\* Mandatory Field

**Project:** Select the projects already created and stored in the database from the drop-down list.

**Financial Year:** Enter value for the financial year. (e.g., 2021-22)

**Applied Exchange Rate (VT/USD):** Enter value for the applicable exchange rate.

**Financing Mode:** Select the financing mode from the drop-down list.

**Budget Code:** Enter the value as per the climate finance budgetary reporting.

**Approval Date:** It gets auto populated after selection of a project.

**Financial Closure Date:** It gets auto populated after selection of a project.

**Effectiveness Date:** It gets auto populated after selection of a project.

## 7.1.2 Financial Flow

**FIGURE 7.3: CLIMATE FINANCE - FINANCIAL FLOW FORM**

CLIMATE FINANCE - PROJECT INFORMATION

Project\* VA-011-13-8|test project 1

Project Details      Financial Flow      Detailed Budget      Disbursement Year

Project Size (million USD)\* Large(>1.0)  
National Budget (USD)\* 20000  
Sub National Budget (USD)\* 200000  
Green Bonds (USD)\* 3000  
Others (USD) 7577000

Use this section to add new funding type details for the project

SOURCES OF FINANCE

Funding Type	National/International	Amount (USD)	Financing Channel	Funding Agency	Select
Delete Row					
Add Row	Funding Type: Loan-Concessional National/International: National Amount (USD): 10000 Channel: National Fund Funding Agency: sample				Add

**Project Size (million USD):** Select the mode based on the project cost from the drop-down list.

**Project Cost (USD):** It gets auto populated after selection of a project.

**National Budget (USD):** Enter value for national budget if applicable.

**Sub National Budget (USD):** Enter value for sub-national budget if applicable.

**Green Bonds (USD):** Enter value for debt investment (if any) made for the project.

**Others (USD):** Enter value for other investment (if any) made for the project.

### Sources of Finance

**Funding Type:** Select type of funding for the project from drop-down list.

**National/International:** Select funding for the project is national/international from drop-down list.

**Amount (USD):** Enter value for amount funded for the project.

**Channel:** Select channel for funding of the project from drop-down list.

**Funding Agency:** Enter name of funding agency for the project.

**Add:** Click on 'Add' button to insert finance source data.

### 7.1.3 Detailed Budget

**FIGURE 7.4: CLIMATE FINANCE - DETAILED BUDGET FORM**

CLIMATE FINANCE - PROJECT INFORMATION

Project\* VA-011-13-8|test project 1

Project Details      Financial Flow      **Detailed Budget**      Disbursement Year

PROJECT COST BREAKDOWN

Disbursement Category	Amount (USD)	Reference	Select
Civil Work	700000	sample data	<input type="checkbox"/>
Equipment & Machinery	25000	sample data	<input type="checkbox"/>

**Delete Row**

**ADD CATEGORY**

Disbursement Category	Amount (USD)	Reference	Add
Equipment & Machinery	25000	sample data	<b>Add</b>

**Use this section to add new disbursement details**

**Disbursement Category:** Select relevant disbursement category from drop-down list.

**Amount (USD):** Enter value for amount funded for disbursement category.

**Add:** Click on 'Add' button to insert detailed budget data.

### 7.1.4 Disbursement Year

**FIGURE 7.5: CLIMATE FINANCE - DISBURSEMENT SCHEDULE FORM**

CLIMATE FINANCE - PROJECT INFORMATION

Project\* VA-011-13-8|test project 1

Project Details      Financial Flow      Detailed Budget      Disbursement Year

DISBURSEMENT SCHEDULE

Disbursement Year	Amount (USD)	Reference	Select
2001	10000	sample data	<input type="checkbox"/>
2002	200000	sample data	<input type="checkbox"/>

**Delete Row**

**ADD YEAR**

Year	Amount (USD)	Reference	Add
2002	200000	sample data	<b>Add</b>

Remarks

**Submit**

**Use this section to add new disbursement schedule details**

**Year:** Select disbursement year from drop-down list.

**Amount (USD):** Enter value for amount disbursed.

**Click on 'Add' button to insert disbursement schedule data.**

**You need to submit the project information data using submit button.**

## 7.2 Climate Finance - Monitoring Information

FIGURE 7.6: CLIMATE FINANCE MONITORING INFORMATION FORM

The screenshot shows the 'CLIMATE FINANCE - MONITORING INFORMATION' form. At the top, there are input fields for 'Project\*' (VA-011-13-B|test project 1), 'Monitoring Year\*' (2001), 'Financial Year' (2001-02), 'Applied Exchange Rate' (110.0), 'Financing Mode' (On Budget), 'Budget Code' (TestMOE001), 'Project End Date' (01-01-2002), 'Financial Closure Date' (01-01-2000), and 'Commissioning Date' (01-01-2001). Below these are sections for 'DISBURSEMENT DETAILS' and 'Remarks'. In the 'Disbursement Details' section, there is a table with columns for 'Disbursement Category', 'Amount (USD)' (Q1, Q2, Q3, Q4), 'Reference', and 'Select'. One row is shown: 'Civil Work' with amounts 25000, 25000, 25000, 25000, reference 'sample data', and a checkbox. A red box highlights the 'ADD ROW' button and the 'Equipment & Machinery' dropdown. A red callout box points to the 'ADD' button with the text 'Use this section to add new disbursement details'.

**Project:** Select the projects already created and stored in the database from the drop-down list.

**Monitoring Year:** Select monitoring year from drop-down list.

**Disbursement Category:** Select relevant disbursement category from drop-down list.

**Click on 'Add' button to insert disbursement category in 'disbursement details' form.**

**Amount (USD):** Enter value for disbursed amount under appropriate quarter of monitoring year.

**You need to submit the project monitoring data using submit button.**

## 8. SDG Assessment Module

SDG assessment module has been developed and integrated with this tool to help a broad range of stakeholders in managing the design, development, implementation, financing, measurement, reporting and verification of the various type of actions. This will enable the stakeholders to identify significant impacts, define indicators, quantify impacts, and set targets and track the progress of the actions towards the NDCs.

For consistency with internationally accepted definitions, the terminologies used in this tool were aligned with the definitions of the Initiative for Climate Action and Transparency (ICAT): <http://www.climateactiontransparency.org/about/>. This tool is based on UNDP CAIT tool <https://climateimpact.undp.org/> and uses a bottom-up tool that can be applied to track 'significant, direct impacts' of actions. For more information or clarification on SDGs, please refer the UNDP website: <https://www.undp.org/content/undp/en/home/sustainable-development-goals.html>

The tool focuses on consolidating the direct impacts resulting from a proposed action. The tool provides the flexibility to the user to define what impact can be considered significant and direct – and is an outcome (short-term or long term, intended or unintended) of the proposed action. The 5 principles below provide the users with a basis for decision making.

Principle	Description
<b>Relevance</b>	Ensure the assessment appropriately reflects the sustainable development impacts of the policy or action and serves the decision-making needs of users and stakeholders, both internal and external to the reporting entity. Applying the principle of relevance depends on the objectives of the assessment, broader policy objectives, national circumstances, and stakeholder priorities.
<b>Completeness</b>	Include all significant impacts in the assessment boundary. Disclose and justify any specific exclusions.
<b>Consistency</b>	Use consistent accounting approaches, data collection methods, and calculation methods to allow for meaningful performance tracking over time. Transparently document any changes to the data, assessment boundary, methods, or any other relevant factors in the time series.
<b>Transparency</b>	Provide clear and complete information for internal and external reviewers to assess the credibility and reliability of the results. Disclose all relevant methods, data sources, calculations, assumptions, and uncertainties. The information should be sufficient to enable a party external to the assessment process to derive the same results if provided with the same source data.
<b>Accuracy</b>	Ensure that the estimated impacts are systematically neither over nor under actual values as far as can be judged and that uncertainties are reduced as far as practicable. Achieve decisions with reasonable confidence as to the integrity of the reported information. Accuracy should be pursued as far as possible, but once uncertainty can no longer be practically reduced, conservative estimates should be used.

Moreover, the tool provides an assessment criterion to decide whether the impact is significant enough to warrant additional information. The significance is based on the following criteria:

- Define the likelihood that an impact will occur; and
- The expected magnitude of each impact.

For likelihood, the tool uses a 5-point scale as below:

Likelihood	Description
<b>Very likely</b>	Reason to believe the effect will happen (or did happen) because of the action. (For example, a probability in the range of 90-100%).
<b>Likely</b>	Reason to believe the effect will probably happen (or probably happened) because of the action. (For example, a probability in the range of 66-90%).
<b>Possible</b>	Reason to believe the effect may or may not happen (or may or may not have happened) because of the action. About as likely as not. (For example, a probability in the range of 33-66%).
<b>Unlikely</b>	Reason to believe the effect will probably not happen (or probably did not happen) because of the action. (For example, a probability in the range of 10-33%).
<b>Very unlikely</b>	Reason to believe the effect will not happen (or did not happen) because of the action. (For example, a probability in the range of 0-10%).

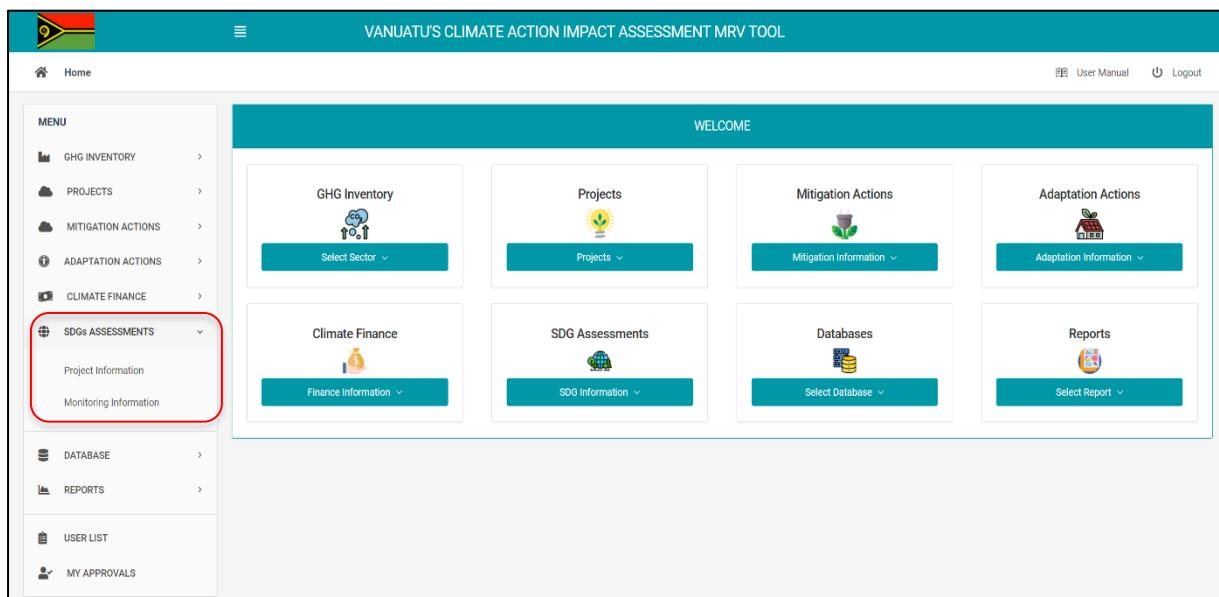
For magnitude, the tool uses a 3-point scale as below:

Magnitude	Description
<b>Major</b>	The change in the impact category is likely to be significant in size (either positive or negative).
<b>Moderate</b>	The change in the impact category could be significant in size (either positive or negative).
<b>Minor</b>	The change in the impact category is expected to be insignificant in size (either positive or negative).

Based on the above consideration, the tool then determines whether the impact is significant and will then require the user to provide additional information in the form of a quantitative data (e.g., quantitative targets a basis to track the progress of the implementation of the action through an MRV system).

The Sustainable Development Goals (SDGs) module can be accessed through the Home Page or Dashboard. On the left-hand side of the Dashboard, you would see the SDG Assessment of the system which you shall use to navigate the system and access different functionality.

**FIGURE 8.1: SDG ASSESSMENT MODULE NAVIGATION FROM HOME SCREEN**



## 8.1 SDG Assessment - Project Information

This sub-module allows user to provide basic project information and baseline/expected SDG benefits for the already created projects.

**FIGURE 8.2: SDG ASSESSMENT - PROJECT INFORMATION FORM**

**Project Id:** Select the projects already created and stored in the database from the drop-down list.

**Describe environmental and social screening approach, identified risks and management approach (if conducted):** If Social and environmental risk screening conducted then user should describe screening approach, identified risks, and management approach. (Please refer following weblink for more information on UNDP's Social and Environmental Standards)

<https://www.undp.org/content/undp/en/home/librarypage/operations1/undp-social-and-environmental-standards.html>

**FIGURE 8.3: STAKEHOLDER FEEDBACK INPUT FORM**

STAKEHOLDER INPUTS											
<b>— Stakeholder Feedback</b> <ul style="list-style-type: none"> <li><b>— Government</b> <table border="1"> <tr> <td>Strengths</td> <td>Motivation through incentives</td> <td>Opportunities</td> <td>Experience from other projects</td> </tr> <tr> <td>Weakness</td> <td>Target affecting quality</td> <td>Threats</td> <td>Challenge of sustaining the interest and priority</td> </tr> </table> </li> </ul>				Strengths	Motivation through incentives	Opportunities	Experience from other projects	Weakness	Target affecting quality	Threats	Challenge of sustaining the interest and priority
Strengths	Motivation through incentives	Opportunities	Experience from other projects								
Weakness	Target affecting quality	Threats	Challenge of sustaining the interest and priority								
<ul style="list-style-type: none"> <li>+ Private Sector</li> <li>+ NGOs</li> <li>+ Civil Society</li> <li>+ Direct Beneficiaries</li> <li>+ Others</li> </ul>											

**Stakeholder Feedback:** Click on 'Stakeholder Feedback' to expand the section for various stakeholders. Following stakeholder are included:

- Government
- Private Sector
- NGOs
- Civil Society
- Direct Beneficiaries
- Others

**By clicking on the stakeholder's name feedback form with four sections viz. Strengths, Opportunities, Weakness and Threats will be displayed for respective stakeholder. User can enter feedback summary in these sections for respective stakeholder.**

## SDG Benefits

User should click on the SDG benefit name tab, so that qualitative and quantitative questionnaire form will be displayed for respective SDG benefit.

**FIGURE 8.4: SDG ASSESSMENT - QUALITATIVE IMPACT FORM**

The screenshot shows a user interface for assessing SDG benefits. At the top, there are tabs for different SDG impacts: Stakeholder Consultation, Poverty Reduction, Reducing Inequality, Gender Parity, and Other SDG Impacts. The 'Poverty Reduction' tab is selected. Below the tabs, a green header bar says 'POVERTY REDUCTION'. Under this, there are two sections: 'Qualitative Impact' and 'Quantitative Impact'. The 'Qualitative Impact' section contains four questions, each with 'Likelihood' and 'Impact' dropdown menus. The 'Quantitative Impact' section contains four data entry fields with 'Data' and 'Data Source' fields.

Likelihood	Impact
Likely	Moderate Impact
Very Likely	Major Impact
Possible	Moderate Impact
Likely	Major Impact

Data	Data Source
1000	Sample data source
200	Sample data source
20000	Sample data source
0	None

**Qualitative Impact:** Click on 'Qualitative Impact' to expand the section for questionnaire.

**Likelihood:** Select type of likelihood from the drop-down list for the respective question.

**Impact:** Select magnitude of impact from the drop-down list for the respective question.

**FIGURE 8.5: SDG ASSESSMENT - QUANTITATIVE IMPACT FORM**

The screenshot shows a user interface for assessing SDG benefits. It is similar to Figure 8.4 but focuses on quantitative impact. The 'Poverty Reduction' tab is selected. Below the tabs, a green header bar says 'POVERTY REDUCTION'. Under this, there are two sections: 'Qualitative Impact' and 'Quantitative Impact'. The 'Quantitative Impact' section contains four data entry fields with 'Data' and 'Data Source' fields.

Data	Data Source
1000	Sample data source
200	Sample data source
20000	Sample data source
0	None

- Quantitative Impact:** Click on ‘Quantitative Impact’ to expand the section for assessment.
- Data:** Enter value for actual data for the respective quantitative assessment.
- Data Source:** Enter references for data of respective quantitative assessment.
- You need to submit the project information data using submit button.**

## 8.2 SDG Assessment - Monitoring Information

Once project information submitted, the database file created for each project and monitoring information are being mapped against the project baseline information. Monitoring for the SDG shall be carried out on an annual basis or as situated to the MRV Team. Annual monitoring of the mapped SDG benefits from the climate actions (qualitative and quantitative information) over period will be entered by the user in this sub-module. The input screen includes following:

**FIGURE 8.6: SDG ASSESSMENT MONITORING INFORMATION FORM**

**Project Id:** Select the projects already created and stored in the database from the drop-down list.

**Monitoring Year:** Select year for which monitoring data is to be submitted from the drop-down list.

**Data:** Enter value for actual data for the respective quantitative assessment.

**Data Source:** Enter references for data of respective quantitative assessment.

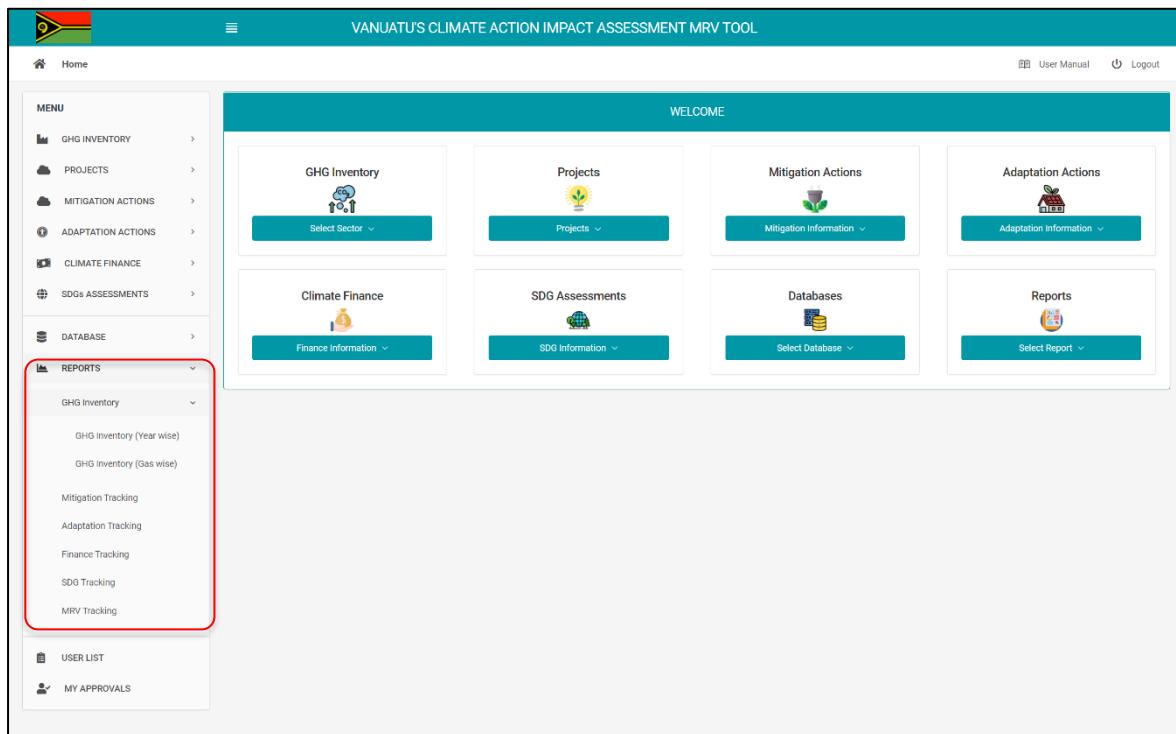
**User should click on the SDG benefit name tab, so that quantitative assessment form will be displayed for respective SDG benefit.**

**You need to submit the project monitoring data using submit button.**

## 9. Reports

The integrated MRV Tool has in-built reporting template for sectors and institutions. The reporting templates are designed considering the domestic and international reporting requirements as per ETF.

**FIGURE 9.1: REPORTS NAVIGATION ON MENU SECTION**



### 9.1 Reports – GHG Inventory

This Report Module of MRV Tool provides the result and Output for the national GHG Inventory.

**FIGURE 9.2: GHG INVENTORY REPORT - USER INPUT SCREEN**

GHG INVENTORY REPORT			
Select Inventory Years	Select Inventory Unit		
2018	2023	tCO2e	Get Report

**Select Inventory Years:** Select from and to year for which report must be generated from the drop-down list.

**Select Inventory Unit:** Select inventory unit from the drop-down list.

**User should click on ‘Get Report’ to see the GHG inventory report for selected inventory year.**

## 9.2 Reports – Mitigation Tracking

This Report Module of MRV Tool provides the result and Output for the Mitigation actions.

**FIGURE 9.3: MITIGATION ACTION TRACKING REPORT - USER INPUT SCREEN**

**User should select year from the drop-down list and click on ‘Get Report’ to see the Mitigation tracking report for selected year.**

## 9.3 Reports – Adaptation Tracking

This Report Module of MRV Tool provides the tracking report for the Adaptation actions.

**FIGURE 9.4: ADAPTATION TRACKING REPORT - USER INPUT SCREEN**

**User should select category from the drop-down list and click on ‘Get Report’ to see the Adaptation tracking report for selected category.**

## 9.4 Reports – Finance Tracking

This Report Module of MRV Tool provides the finance tracking report for the Mitigation/Adaptation actions.

**FIGURE 9.5: CLIMATE FINANCE TRACKING REPORT - USER INPUT SCREEN**

The screenshot shows a user interface for a 'Climate Finance Tracking Report'. At the top, the title 'CLIMATE FINANCE TRACKING REPORT' is displayed in a teal header bar. Below the title is a white input area. On the left, there is a label 'Select Year' followed by a dropdown menu containing the year '2018'. To the right of the dropdown is a green rectangular button labeled 'Get Report'.

**User should select year from the drop-down list and click on ‘Get Report’ to see the Finance tracking report for selected year.**

## 9.5 Reports – SDG Tracking

This Report Module of MRV Tool provides the Sustainable Development Goals tracking report for the Mitigation/Adaptation actions.

**FIGURE 9.6: SDG TRACKING REPORT - USER INPUT SCREEN**

The screenshot shows a user interface for an 'SDG Tracking Report'. The title 'SDG Tracking Report' is at the top in a teal header bar. Below the title is a white input area. On the left, there is a label 'Select Category' followed by a dropdown menu containing the text 'Poverty Reduction, Water and Sanitation, Health and Well Being'. To the right of the dropdown is a green rectangular button labeled 'Get Report'. Below the dropdown is a search bar with a magnifying glass icon and a clear 'X' button. To the right of the search bar is a 'Show:' dropdown set to '10' and buttons for 'Copy', 'Excel', 'CSV', and 'PDF'. In the center, there is a list of categories with checkboxes. The categories listed are 'Select all', 'Poverty Reduction' (which is checked), 'Food Security and Hunger' (unchecked), 'Water and Sanitation' (checked), 'Health and Well Being' (checked), and 'Infrastructure, Innovation, Industry' (unchecked). Below this list is a message 'Showing 0 to 0 of 0 entries'. At the bottom of the screen, there is a footer with the text 'Report Generated on [Tue Jul 27 14:10:24 UTC 2021]'. At the very bottom, there is a section titled 'SDG Action Summary'.

**User should select category from the drop-down list and click on ‘Get Report’ to see the SDG tracking report for selected category.**

## 9.6 Reports – MRV Tracking

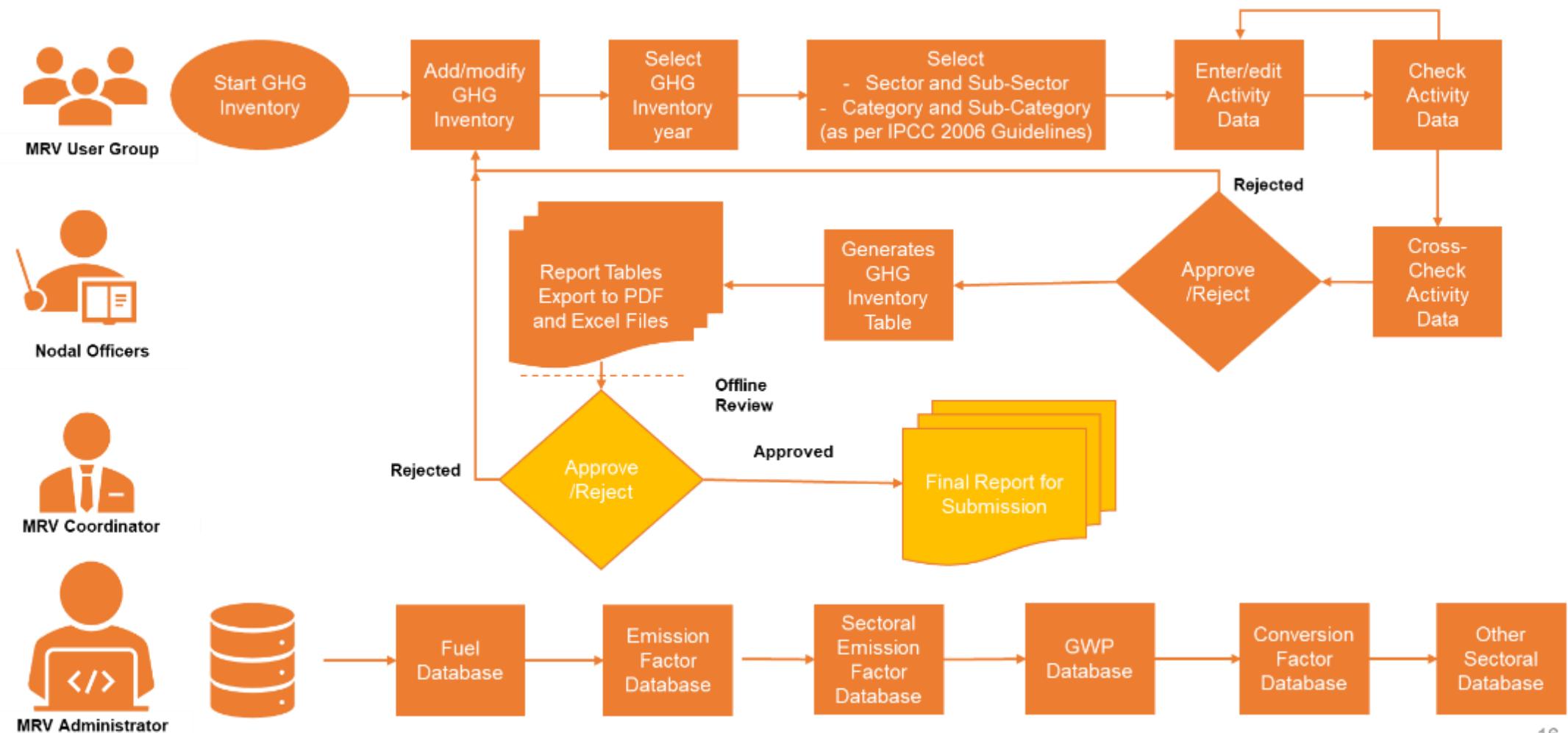
FIGURE 9.7: MRV REPORT - USER INPUT SCREEN

The screenshot shows a user interface for generating an MRV report. At the top, a teal bar contains the text 'MRV REPORT'. Below this, there is a white input area. On the left side of the input area, the word 'Project' is followed by a dropdown menu containing the text 'VA-011-13-8|test project 1'. To the right of the dropdown is a teal rectangular button with the white text 'Get Report'.

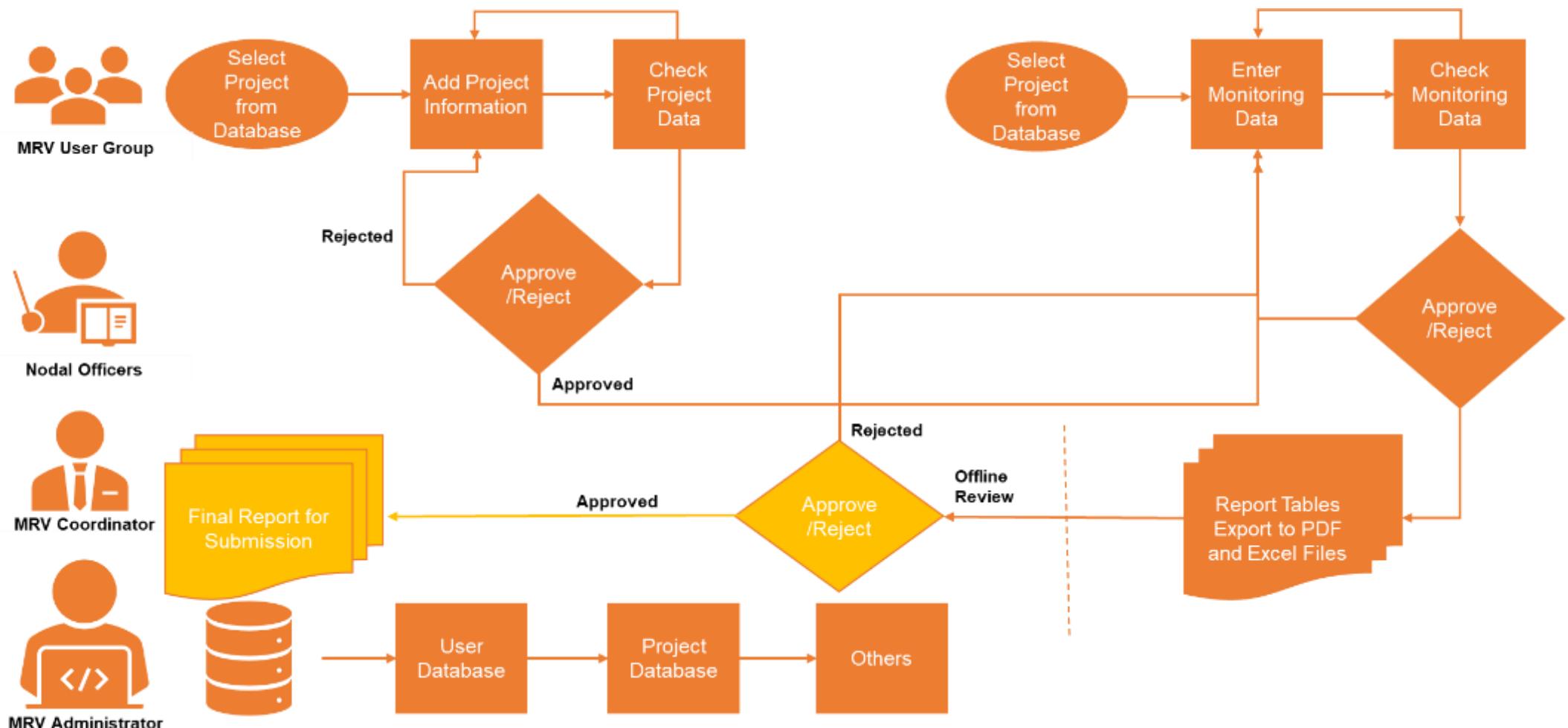
User should select project from the drop-down list and click on ‘Get Report’ to see the MRV tracking report of selected project for different modules.

**In all the above report sections, by clicking on ‘Excel’ / ‘CSV’ / ‘PDF’ user can download report in suitable format.**

## MRV Tool – GHG Inventory Workflow (Illustrative)



## MRV Tool – Other Modules Workflow (Illustrative)



## Contact Us

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