



From
the People of Japan



INSTITUTIONALIZATION OF CLIMATE RESILIENT AGRICULTURE

NDC MEASUREMENT, VERIFICATION AND REPORTING SYSTEM

2024





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Prepared by TRTA Consultant under
TA-10009 PHI: Accelerating Climate Resilience in
Agriculture, Natural Resources, and the Environment -
01 TA Consulting Firm (55268-002)



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ACRONYMS

ADB	Asia Development Bank
AMIA	Adaptation and Mitigation Initiative in Agriculture
AWD	Alternate Wetting and Drying
CCA/DRR	Climate Change Adaptation / Disaster Risk Reduction
CIAT	International Centre for Tropical Agriculture
CIS	Climate Information Services
COP	Conference of the Parties
CRAO-DA	Climate Resilient Agriculture Office – Department of Agriculture
CRVA	Climate-Risk Vulnerability Assessment
DA	Department of Agriculture
DSR	Direct-Seeded Rice
GHG	Green House Gas
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change.
LGU's	Local Government Units
MRV	Monitoring, Reporting and Verification
NDC's	Nationally Determined Contributions
PA	Paris Agreement
PAPs	Prioritized Action Plans
PPP	Public Private Partnership
PSA	Philippine Statistics Authority
TNA	Training Needs Assessment
UNFCCC	United Nations Framework Convention on Climate Change
WFP	Whole Farm Planning

EXECUTIVE SUMMARY

The report on the institutionalization of Climate Resilient Agriculture through the Nationally Determined Contributions (NDC) Measurement, Verification, and Reporting System offers an in-depth examination of efforts to integrate climate resilience within the agricultural sector of the Philippines. As part of the global commitment under the Paris Agreement, the Philippines has pledged to significantly reduce greenhouse gas (GHG) emissions and implement robust climate action across various sectors, with a strong focus on agriculture.

Agriculture has been identified as a substantial contributor to the country's GHG emissions, primarily through rice cultivation and livestock rearing. To address these, the report outlines various management and technological strategies aimed at reducing emissions and enhancing sustainability.

This framework is a cornerstone of the country's strategy to address climate change impacts through agriculture. It provides a structured approach to track progress, assess the effectiveness of implemented practices, and ensure accountability in the efforts to reduce greenhouse gas emissions and enhance resilience to climate variations.

Central to the MRV framework is its comprehensive categorization of emission sources within the agriculture sector, alongside prescribed methodologies for monitoring and verification. The framework delineates specific technologies and practices that aim to reduce emissions, such as the implementation of more sustainable cultivation techniques and livestock management practices that lessen methane production. It also suggests improvements in soil management to decrease nitrous oxide emissions.

To effectively measure the progress towards achieving the NDCs, the MRV framework outlines detailed requirements for data collection, including the types of data needed, data sources, and frequency of reporting. This systematic data collection is supported by both governmental and independent agencies tasked with verifying reported data to uphold integrity and accuracy.

Moreover, the MRV framework emphasizes the importance of transparency, requiring regular updates and public sharing of progress towards emissions reduction and resilience goals. This transparency not only fosters greater accountability but also facilitates informed decision-making by stakeholders across all levels.

The report also highlights several challenges that impede progress, including limited financial resources, technological gaps, and insufficient institutional support. However, it identifies significant opportunities for international collaboration and financial aid that could propel the country towards its NDC goals.

In conclusion, the report emphasizes the need for an integrated approach that combines policy enhancement, improved resource management, and robust institutional support frameworks. These measures are essential for the Philippines to meet its international climate commitments and to foster sustainable agricultural practices that are resilient to the challenges posed by climate change. The strategic recommendations provided aim to bolster the country's MRV system, enhance stakeholder engagement, and secure the necessary support to ensure the effective implementation of climate-resilient strategies in agriculture.

1 INTRODUCTION

The Philippines was among the 192 countries who legally bound itself on an international treaty of climate change (CC) referred to as Paris Agreement at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. Subsequent to that, the Philippines Senate unanimously ratified the “Paris Agreement on Climate Change” on March 15, 2017.

The Paris Agreement (PA) is a landmark international treaty and its primary goal is to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with efforts to limit the temperature increase to 1.5 degrees Celsius. This is in recognition of the severe impacts that even a 2-degree increase could have on the planet, including more frequent and intense heat waves, rising sea levels, increasing incidence of uncharacteristic weather events, and other climate-related challenges.

Key elements of the PA include the following five considerations.

Nationally Determined Contributions (NDCs)

Central to the PA is the concept of Nationally Determined Contributions, or NDCs. Each participating country submits its NDC, which outlines its commitment to addressing CC. NDCs specify the country's goals, targets, and planned actions to reduce Green House Gas (GHG) emissions and enhance resilience to the impacts of CC. Ideally, NDC need to be recognised as being arrived at from a “cross-sectoral” perspective, one which involves all government departments, private enterprise and the civil society. It should guide the country’s long-term development plan towards a climate-resilient and low carbon future, particularly the developing nations. NDCs are established independently by the parties (countries or regional groups of countries) and signatories are expected to regularly update and strengthen their NDCs over time to reflect changing circumstances or increased ambitions. As a result, NDCs can be reviewed and reset every five years and any change is registered by the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat.

Table 1: Major GHG and NDC Metrics

NDC metrics	Data available & sources;	Data not available and possible sources
Tonnes of CO2 equivalent emissions	Estimated data extrapolated from production data available from PSA Currently no data assembled in DA	Hard data from representative agro-geographic regions & specific value chains not available. Commence a pilot series of baseline data
Production and use of nitrogen fertilizers generate CO2, N2O and CH4	No available data identified.	As part of national policy, it needs to be negotiated with local N production companies that they monitor

		production process to develop baseline.
Global Warming Potential (GWP) is the emissions metric used most often to aggregate contributions from different greenhouse gases ¹	GWP is the relative potency as an agent of CC compared to CO ₂ over a specified 20, 100 & 500 year time intervals & is tabled by the IPCC.	Recognised as the benchmark against which GHG accounting is conducted.

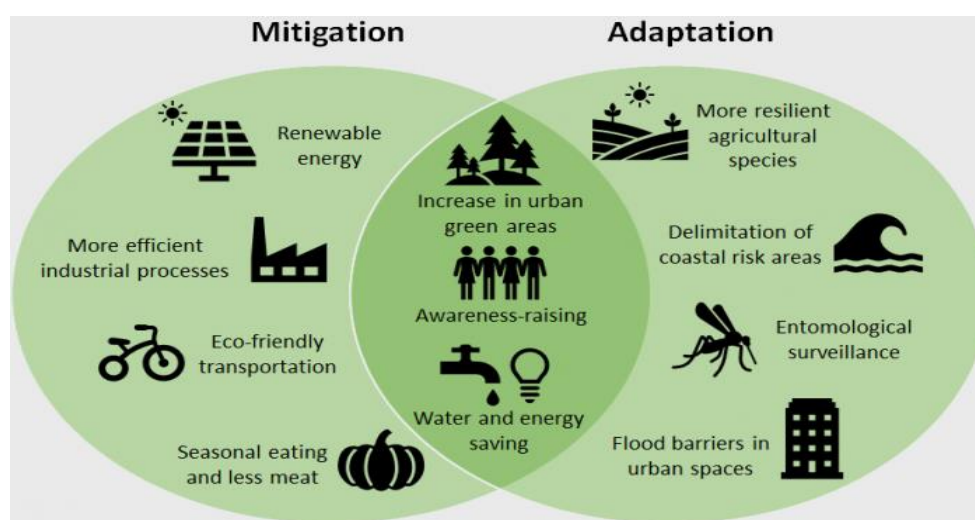
Mitigation and Adaptation

Basically, mitigation targets the reduction of GHG emissions. Signatory countries commit to reducing these emissions through various measures, such as transitioning to renewable energy sources, improving energy efficiency, and implementing sustainable land use practices. On-farm mitigation measures contribute to global efforts to reduce GHG emissions, helping to mitigate climate change impacts beyond the farm level. They can also lead to cost savings, improved efficiency, and enhanced environmental sustainability. The specific targets and strategies vary by country, reflecting their unique circumstances and capabilities.

In addition to mitigation efforts, the PA recognizes the importance of adaptation to the impacts of CC. On-farm adaptation measures help farmers cope with the impacts of climate change, reducing losses in crop yields and livestock productivity. They enhance the resilience of agricultural systems to extreme weather events and changing environmental conditions. Countries, particularly those most vulnerable to CC, outline their plans for building resilience to climate impacts, protecting communities, and adapting to changing conditions.

The distinction between adaptation on the one hand, and mitigation on the other is illustrated in Figure 1 and needs to be made in terms of NDC.

Figure 1: Adaptation Versus Mitigation: Illustrating the Difference



¹ Calculated by the Intergovernmental Panel on Climate Change (IPCC)

In summary, CC adaptation and mitigation are both critical to combatting CC – but in different ways. The terms should not be seen as synonymous as they define different actions to combat CC.

Finance

The agreement emphasizes the provision of financial support by developed countries to help developing nations in their efforts to mitigate and adapt to CC. Financial assistance is crucial for technology transfer, capacity building, and supporting vulnerable communities.

Transparency and Accountability

The PA establishes a framework for transparency and accountability. Countries are required to regularly report on their progress in implementing their NDCs and achieving their climate-related goals. This transparency enhances trust among nations and helps hold them accountable for their commitments.

The PA represents a global commitment to cooperative action on CC, recognizing the shared responsibility of all nations to address this critical issue. The NDCs serve as a foundation for collective efforts to limit global temperature rise and build a more sustainable future.

2 AGRICULTURE-RELATED GHG EMISSIONS IN THE PHILIPPINES

Agriculture is a significant contributor to GHG emissions globally, and this includes emissions from activities such as enteric fermentation in livestock, rice cultivation, and the use of synthetic fertilizers. Agriculture is a crucial sector of the Philippine (PHL) economy, but it also contributes to GHG emissions albeit small in relative comparison (See Table 1).

2.1 Estimated GHG contributions of agriculture.

Though recognised as a minor GHG contributor to CC globally, the PHL GHG emissions rank in the top 25 percent among low and middle-income countries, with significant increases projected in the coming decades². It was shared to the TA team that the Philippines can contribute to global mitigation efforts through an energy transition (ibid) process which would optimise renewables. The DA could be more aware of this and see it as an important part of its response to the PA.

The Philippines emits an average of 1.98 metric tons of carbon dioxide equivalent per capita in 2020, or way below the global average of four (4) metric tons of GHG) emissions per capita.³ Globally, a significant source of GHG emission comes from the manufacture of synthetic nitrogen (N) fertilizers consumed in crop production processes. Application of synthetic N fertilizers is recognised as the most important factor contributing to direct nitrous oxide (N₂O) emissions from agricultural soils.

The Business-As-Usual (BAU) scenario of the Philippine NDC is projected from the results of the 2010 GHG as shown in Table 1. GHG covered are carbon dioxide (CO₂), methane (CH₄), N₂O, perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). The 2010 Philippine GHG Inventory was completed in 2019 and was developed by government experts in 2014 (ibid).

Table 1: 2010 National GHG Inventory Results

Sector	CO2 (in Mt CO2e)	CH4 (in Mt CO2e)	N2O (in Mt CO2e)	HFCs (in Mt CO2e)	Total (in Mt CO2e)
Agriculture	0.696	33.853	8.604	-	43.152
Waste	0.015	14.527	1.017	-	15.559
IPPU	7.564	0.009	0.019	0.771	8.363
Transport	23.718	0.125	0.331	-	24.174
FOLU	-37.016	0.007	0.002	-	-37.007
Energy	50.698	1.888	0.519	-	53.105
Total with FOLU					107.345
Total without FOLU					144.352

Source: Climate Change Commission

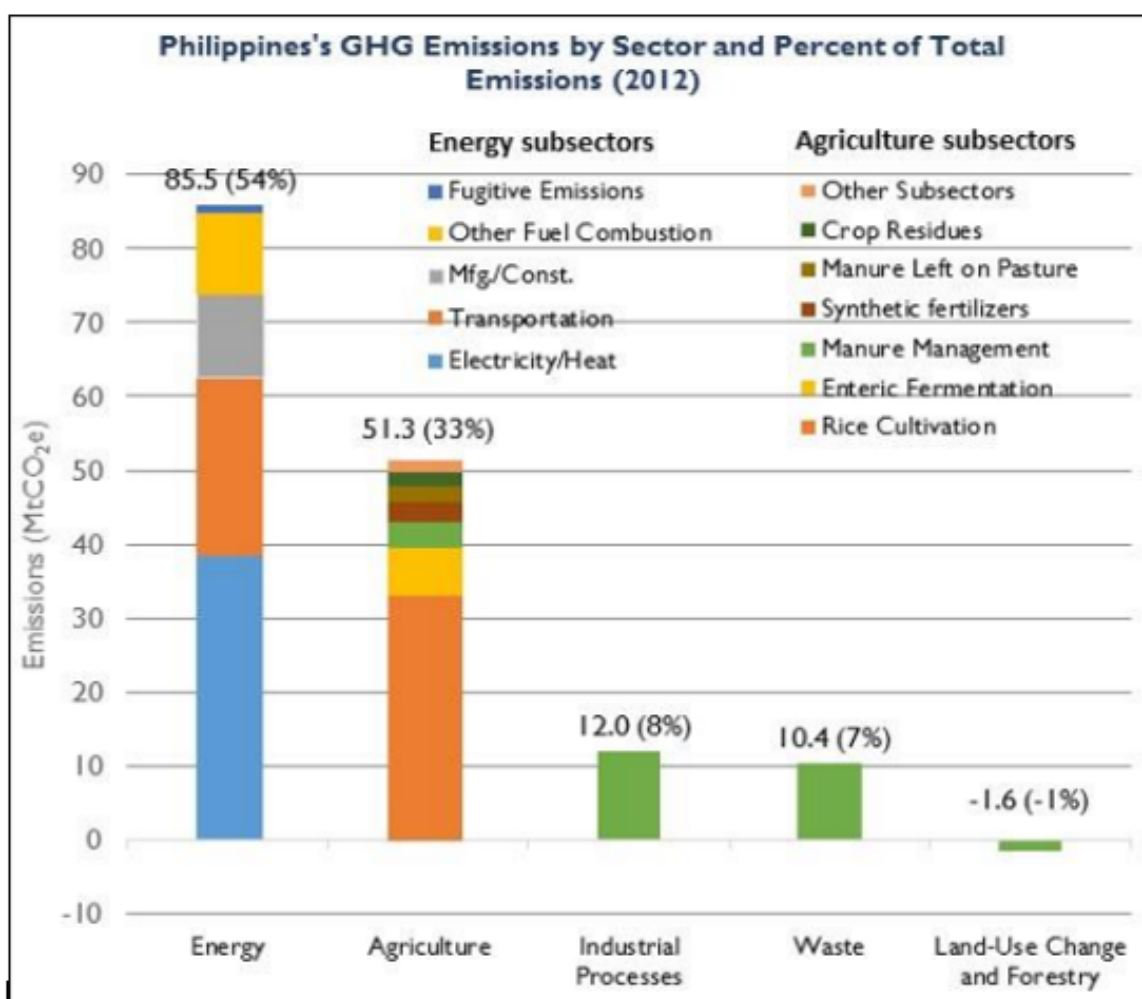
²World Bank <https://www.worldbank.org/en/country/philippines/publication/getting-a-grip-on-climate-change-in-the-philippines#:~:text=Though%20a%20minor%20contributor%20to,projected%20in%20the%20coming%20decades.>

³ Philippine Climate Change Commission (2010) Philippines' Greenhouse Gas Inventory.

The statistics indicate that agriculture is next to energy sector in terms of the highest GHG emission level based on inventory results in 2010. Transport sector is next in the rank, while Forestry and Land Use (FOLU) is negative contributor being considered as a good mechanism for carbon sequestration.

Consistently, Figure 2 below illustrates the 2016 national inventory of GHG and highlights the relatively low national emissions rate⁴ attributed to agriculture compared to the energy sector with the inclusion of transport in the latter based on the 2016 inventory.

Figure 2: Graphing GHG emissions by sector by percentages (2012)



Source: WRI CIAT 2.0 (2016) FAOSTAT, 016

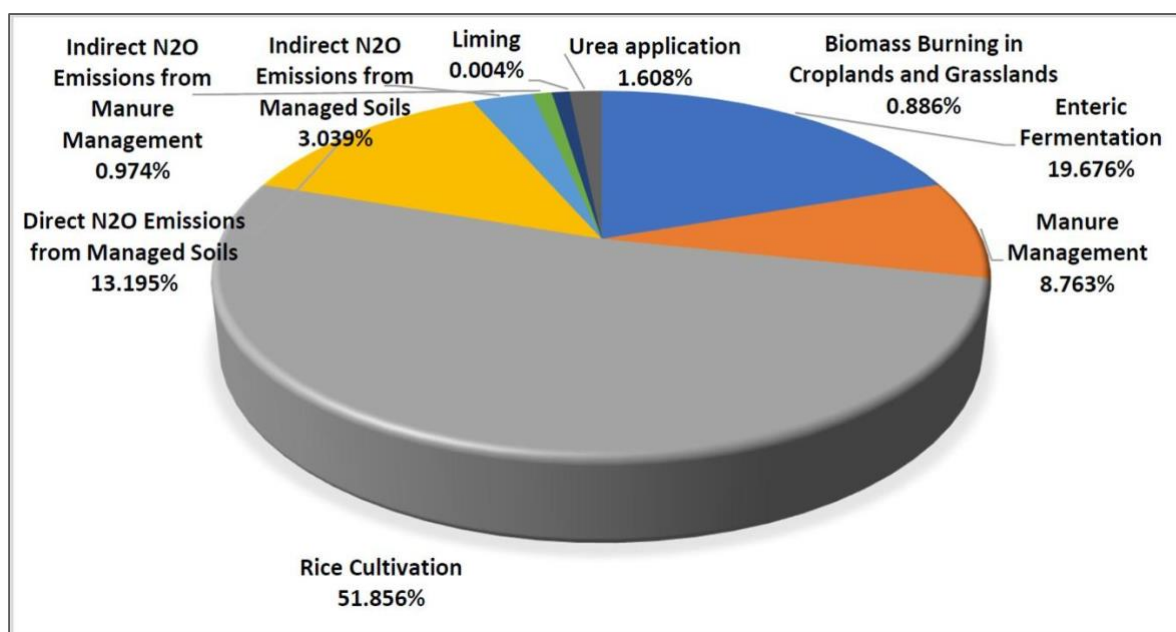
⁴ Respondents within DA repeatedly offered this position with firm conviction. While this is positive it can potentially detract from institutional conviction that some farming practices could change to assist adaptation to the likely coming scenarios.

2.2 Sectoral Contribution

The Philippines has committed to an aggregate GHG reduction to approximately 990 million metric tons of carbon dioxide (mmt CO₂) towards low-carbon growth pathway. This equivalent entails a total investment cost of an estimated US \$72 Billion. Of this total targeted reduction figure, 21% or 211 mmt CO₂ is directed at curbing GHG emission in the agriculture sector requiring approximately US\$ 1 Billion. The highest emission reduction target goes to the energy sector at 587 mmt CO₂ (59%) with investment cost of US\$ 36.5 Billion. The other sectors' targets and their corresponding investment costs are follows: *Waste*: 66 mmt CO₂ (7%)-US\$ 1.6; *Transport*: 67 mmt CO₂ (7%)-US\$ 32.8 Billion, and *Industry*: 59 mmt CO₂ (6%)-US\$ 194 Million. Figure 3 shows each sector's component contribution to the overall GHG reduction target.

It should be noted that in terms of investment allocation, apparently there seems to be a glaring discrepancy for agriculture sector with reference to the other sectors, except for the *industry* considering its target as against its cost of making it happen. Predominant the financing requirements are identified in the energy sector (about \$36.5 billion or ₱2.1 trillion) followed by the transport sector (around \$33 billion or ₱1.9 trillion).

Figure 3: Emission shares of agriculture subsectors, 2010 national GHGI



Source: Department of Agriculture 2023

The above figure illustrates that in terms of percentage breakdown of the various emission sources in agriculture, rice cultivation comprises more than half (51.86%) of the combined contributions compared to other common agricultural produce. The figure illustrates clearly the significance of rice cultivation within the sectoral total of 51.86%.

2.2.1 Rice Cultivation

The cultivation of rice, a staple PHL crop, is a source of methane (CH₄) emissions⁵. CH₄ is produced in flooded rice paddies through anaerobic conditions that promote the activity of methane-producing microorganisms⁶. Improvement in the management of water within rice production systems has been promoted as presenting the major opportunity to cut CH₄ emissions. Where rice is growing in permanently flooded conditions, methane is produced as organic matter decays with little access to oxygen. Subsequently, the methodology requires changing the water regime during the cultivation period from continuous to intermittently flooded conditions and/or a shortened period of flooded conditions. The alternate wetting and drying (AWD) method is also combined with switching from transplanted to direct-seeded rice (DSR). AWD water management allows rice fields to be periodically dried.

2.2.2 Livestock

Enteric fermentation from livestock, (particularly from ruminant animals e.g. cattle, water buffalo), whereby CH₄ is produced during the digestive process in these animals, and is thus another source of GHG emissions. Successful research and application of both seaweed and charcoal has been used to mitigate GHG in livestock. Use of this technology in the Philippines would not require a huge up-front cost and deliver immediate results. The practice falls into the category of mitigation, a status which has yet to be vigorously pursued by the DA.

2.2.3 Land Use Change

Changes in land use, such as deforestation for agricultural expansion, can also contribute to GHG emissions. Deforestation releases stored carbon in trees and vegetation and can result in the loss of carbon sinks.

2.3 Philippines Mitigation, Adaptation and Compliance

The Philippines, like many other countries, has been engaged in efforts related to CC mitigation and adaptation, as a practical compliance with international agreements. In what has been interpreted by some respondents as a very optimistic commitment to NDC, there is a pledge to reduce GHG emissions by 75% for the period of 2020–2030, of which 2.71 percent is unconditional and 72.29 percent is conditional. This commitment involves efforts across various sectors, including energy, transport, industry, forestry, and waste. The conditionality of this pledge assumes expected support and collaboration from multiple donors in the way of dedicated programs.

2.3.1 Existing Mitigation Measures

Currently it is estimated that existing coconut plantations totalling 3.6 million Hectares (Ha) in area annually stores about twice the total GHG emission from PHL agriculture⁷. This theme of revegetation is clearly a very attractive first step but in a holistic way, the question needs to be asked “what is DA institutionally doing about mitigation? At the national level, the Philippines has been working on implementing measures to reduce greenhouse gas emissions. This includes promoting renewable energy sources, improving energy efficiency, and addressing deforestation and land-use changes. However, this mission could find no in-

⁵ Globally, around 8% of agricultural greenhouse gas emissions are produced by growing rice.

⁶ The Global Methane Pledge, launched at COP26 in November 2021 to catalyse action to reduce methane emissions, has set a commitment to reduce methane emissions by at least 30% below 2020 levels by 2030.

⁷ CRAO – DA presentation

house DA program to evaluate energy usage and, as a result, incremental movement to a trajectory of lower (for example) energy usage and thus less GHG emissions?

2.3.2 Existing Adaptation Measures

Adaptation efforts in the Philippines focus on building resilience to the impacts of CC, considering factors such as rising sea levels particularly at the farm and settlement levels, extreme weather events, and changes in precipitation patterns. Adaptation strategies may include improving infrastructure, developing early warning systems, implementing sustainable agriculture practices, and enhancing the capacity of communities to cope with climate-related challenges.

2.3.3 Existing Compliance Mechanism

The Philippines, like other signatories of the Paris Agreement, is committed to fulfilling its obligations under the accord. This involves regular reporting on its progress in implementing climate actions and achieving its NDC targets. Compliance also includes participating in international discussions and negotiations related to CC, as well as contributing to the global effort to limit global temperature increases.

3 FRAMEWORK FOR MRV OF NDC IN THE AGRI-FISHERY SECTOR

The primary objective of the MRV framework is to establish a comprehensive system for tracking, assessing, and reporting on metrics that indicate progress towards achieving the Nationally Determined Contributions (NDCs) in the agri-fishery sector. This framework aims to provide stakeholders with clear guidelines on how to measure and report greenhouse gas (GHG) emissions reductions, utilizing technology, setting clear targets, and utilizing accurate data gathering methods.

The MRV framework categorizes the sources of GHG emissions in the agri-fishery sector and outlines specific methodologies and technologies to be employed to achieve these reductions.

3.1 MRV for Apiculture Sector

The MRV (Measurement, Reporting, and Verification) Framework for the Agriculture Sector is a structured approach aimed at reducing greenhouse gas (GHG) emissions within the sector, particularly in paddy rice cultivation, livestock management, and soil management. This framework sets forth comprehensive strategies for tracking progress, assessing technological impacts, and reporting on the effectiveness of these interventions annually or as needed.

In paddy rice cultivation, the adoption of Alternate Wetting and Drying (AWD) technology, combined with cropland management and renewable energy solutions for water management, is targeted to reach 100% adoption across 3.21 million hectares of irrigated paddy rice. This practice is split into two seasons—dry and wet—with specific hectares under AWD reported by region and province. The DA Rice Banner Program Directorate oversees the implementation and reporting, supported by sample surveys from the Crop Research and Applied Operations (CRAO) and the DA Planning & Monitoring Service (PMS).

For livestock, the focus is on reducing enteric fermentation through nature-based solutions and breeding interventions, targeting a 50% reduction per animal. This initiative is monitored by the DA Livestock Banner Program Directorate, which collects data on livestock numbers and fermentation reduction rates across different regions and provinces. The data collection process is supplemented with joint surveys by CRAO and DA PMS.

Soil management involves decreasing nitrous oxide (N₂O) emissions from cultivated soils by 25% through the adoption of cropland management, precision agriculture, and biotechnological crops. This sector's emissions data are gathered from an 8.017 million hectare area, with annual surveys commissioned to evaluate progress.

Manure management strategies include implementing biodigester and other nature-based solutions across the livestock sector, aiming for 100% adoption. This is tracked through surveys, with data collection responsibilities assigned to specific directorates and supported by CRAO.

Urea application is another critical area, where a 50% reduction is sought through precision agriculture and improved cropland management. Data on urea application rates are collected through the Registry System for the Basic Sectors in Agriculture (RSBSA) and supplemented by surveys.

Finally, emissions from biomass burning are addressed through the adoption of circular bioeconomy solutions, with progress assessed through independently commissioned surveys by CRAO.

Table 2: MRV Framework for Agriculture Sector

Metrics (sources of GHG emission in the sector)	Technology to be used	Targets		Data Required	Baseline Values		Data Sources and Generation Tools	Data Tables/ Templates	Responsible Unit/Position	Frequency of Reporting
		Year	Value		Year	Value				
Adoption of Alternate wetting and drying (AWD) technology + cropland management + renewable energy for water management in Paddy Rice cultivation (51.97% share in total emission)	Dry Season: AWD + cropland management + renewable energy (RE) for water management	20xx	100% adoption in total irrigated paddy rice areas = 3.21mln Ha (Source: xxx)	Dry Season: Ha. under AWD (by region, by province)	20xx	x%	DA Rice Banner Program Directorate reports	Form/s No. xx and Title	(from CRAO/ DA PMS, DA Rice Banner Program)	Annual
	Wet Season: AWD + cropland management + RE-powered flood control and water management systems			Wet Season: Ha. under AWD (by region, by province)	20xx	x%	Sample survey jointly by CRAO, DA Planning & Monitoring Service (PMS)	Form/s No. xx and Title		Annual
Reduction in Livestock Enteric Fermentation (9.65% share in total emission)	Nature based solutions + breeding interventions.	20xx	50% reduction in enteric fermentation per animal (Source: xxx)	Number of livestock by type, region, province	20xx	x%	DA Livestock Banner Program Directorate reports Sample survey jointly by CRAO, DA Planning & Monitoring	Form/s No. xx and Title	(from CRAO/ DA PMS, DA Livestock Banner Program)	???

Metrics (sources of GHG emission in the sector)	Technology to be used	Targets		Data Required	Baseline Values		Data Sources and Generation Tools	Data Tables/ Templates	Responsible Unit/Position	Frequency of Reporting
		Year	Value		Year	Value				
							Service (PMS)			
Nitrous oxide (N ₂ O) emission from cultivated soils (16.2% share in total emission)	Cropland management + precision agriculture + biotech crops.	20xx	25% reduction in total) N ₂ O emission (total annually cultivated area = 8.017 million Ha	N ₂ O	20xx	x%	Survey to be commissioned by CRAO	Form/s No. xx and Title	(from CRAO/ DA PMS, other concerned DA unit/s)	Annual
Livestock Manure management (9.7%)	Biodigester nature-based solutions.	20xx	100% adoption by livestock sector		20xx	x%	Survey to be commissioned by CRAO	Form/s No. xx and Title	(from CRAO/ DA PMS, DA Livestock Banner Program)	
Urea application (1.6% share in total emission)	Precision agriculture + cropland management	20xx	50% reduction in urea application		20xx	x%	Registry System for the Basic Sectors in Agriculture (RSBSA) Sample survey jointly by CRAO, DA Planning & Monitoring	Form/s No. xx and Title	(from CRAO/ DA PMS, other concerned DA unit/s)	Annual

Metrics (sources of GHG emission in the sector)	Technology to be used	Targets		Data Required	Baseline Values		Data Sources and Generation Tools	Data Tables/ Templates	Responsible Unit/Position	Frequency of Reporting
		Year	Value		Year	Value				
							Service (PMS)			
Emissions from biomass burning (0.88% share in total emission)	Nature-based solutions – circular bioeconomy	20xx			20xx	x%	Independent survey to be commissioned by CRAO	Form/s No. xx and Title	(from CRAO/ DA PMS, other concerned DA unit/s)	

3.2 MRV Framework for Capture Fish Sector

The MRV (Measurement, Reporting, and Verification) Framework for the Capture Fish Sector in the Philippines outlines a comprehensive approach to reducing greenhouse gas (GHG) emissions associated with marine and freshwater fisheries. This framework targets the main sources of emissions within the sector: motorized fishing boats, the transport of fish to markets, and the fish processing stages.

For motorized fishing boats, the strategy is to improve fuel efficiency and shift towards less carbon-intensive fuels. The goal is to increase fuel efficiency by 10% in half of all boats and convert 20% of diesel-fueled boats to alternative fuels such as biofuels. This requires data on the number, age, and fuel consumption efficiency of the boats, which will be collected through independent surveys commissioned by relevant governmental bodies. However, the framework does not specify the frequency of reporting, suggesting a need for a defined schedule to monitor progress effectively.

Transportation emissions are addressed by enhancing the efficiency of engines used in transporting fish from farms to markets and ensuring that refrigerated transport systems are leak-free. The framework aims for 10% of diesel-powered transport vehicles to switch to more efficient engines, and for all refrigerated vehicles to be leak-proof, thus reducing their environmental impact. Detailed information on the vehicles, including age, fuel type, and maintenance of refrigeration systems, will be crucial for this initiative, though specific reporting guidelines need further clarification.

In the area of fish processing, the framework promotes the adoption of solar drying technologies and other renewable energy solutions to replace traditional fuels like charcoal and wood. This transition not only aims to reduce emissions but also enhances the sustainability of fish processing practices. The implementation will be monitored through data on processing methods and energy sources, though again, the framework would benefit from clear directives on how this data should be collected and reported.

Overall, the MRV framework for the capture fisheries sector is geared towards significant emission reductions through technological upgrades and efficient practices. Establishing and adhering to a regular reporting schedule will be essential for assessing progress and ensuring that the fisheries sector contributes effectively to national and global environmental goals.

Table 3: MRV Framework for Capture Fish Sector

Metrics (sources of GHG emission in the sector)	Technology to be used	Targets		Data Required	Baseline Values		Data Sources and Generation Tools	Data Tables/ Templates	Responsible Unit/Position	Frequency of Reporting
		Year	Value		Year	Value				
1) Emissions from motorized fishing boats (fishing in Philippine EEZ and freshwater bodies)	<p>Improve fuel efficiency with more efficient engines</p> <p>Reduce GHG emission by switching to fuels that emit less CO2 than currently being used</p>	20xx	<p>50% of all boats fishing in marine and freshwater improve fuel efficiency by 10%</p> <p>20% of diesel fuelled boats convert to bio-fuel other less carbon generating fuels</p>	<p>(No. and age of motorized boats and average fuel consumption efficiency</p> <p>Type of fuels being used</p>	20xx	x%	Independent survey to be commissioned by CRAO	Form/s No. xx and Title	(from CRAO/DA PMS, other concerned DA unit/s)	???
2) Emissions from transport of fish to markets	<p>Improve fuel efficiency with more efficient engines</p> <p>Reduce GHG emission by</p> <p>i. switching to fuels that emit less CO2</p> <p>ii. fixing leakages in refrigerated transports</p>		<p>10% of diesel powered vehicles switch to less carbon generating engines.</p> <p>All refrigerated vans are certified without leaks</p>	<p>No. and age of vans, trucks used for transporting fish to from farm to major markets</p> <p>Types of fuels used</p>						

Metrics (sources of GHG emission in the sector)	Technology to be used	Targets		Data Required	Baseline Values		Data Sources and Generation Tools	Data Tables/ Templates	Responsible Unit/Position	Frequency of Reporting
		Year	Value		Year	Value				
3) Emissions from fish processing	Improved solar drying technology Use of energy efficient/renewable energy for processing technology		Zero use of charcoal and wood	Processing methods practiced Source of energy for processing						

3.3 MRV Framework for Aquaculture Sector

The MRV (Measurement, Reporting, and Verification) Framework for the Aquaculture Sector in the Philippines is designed to reduce greenhouse gas (GHG) emissions through a variety of targeted strategies focused on technology upgrades and improved management practices across different aspects of the sector.

In the realm of aquaculture, the first significant area of focus is the motors used to power pond aerators. The framework proposes improving fuel efficiency and adopting cleaner energy sources, such as solar-powered generators, to achieve a 50% increase in power efficiency. Additionally, it sets a target for 10% of aquaculture farms to use solar power for running pumps and aerators. To monitor progress, data on the number and total horsepower of all power generators used, as well as their source of power, will be collected through independent surveys.

Transport of fish from farms to markets is another critical area. The framework aims to improve the fuel efficiency of vehicles and reduce GHG emissions by switching to fuels that emit less CO₂ and ensuring that all refrigerated transports are leak-free. The objective is for 10% of diesel-powered vehicles to switch to more efficient engines, and for all refrigerated vans to be certified leak-free. This will require detailed data on the number, age, and type of fuels used by the transport vehicles.

Fish processing emissions are addressed through the adoption of improved solar drying technology and other renewable energy-based processing technologies. The framework targets the elimination of the use of traditional fuels like charcoal and wood, shifting instead to energy sources that have a lower environmental impact. This will necessitate data on the processing methods practiced and the sources of energy used, ensuring that all processing facilities comply with the new standards.

Lastly, the framework tackles the issue of hydrogen sulfide and nitrous oxide (N₂O) emissions resulting from uneaten fish feed in aquaculture operations. The strategy here includes promoting more efficient feed conversion rates (FCRs), better feeding practices, and the use of high-quality commercial feeds alongside improved water quality management. The target is for all intensive farms to adopt these improved practices and for the FCRs of these farms to align with the manufacturers' ratings for their feeds. Data will be collected from farm surveys, which will record the rated and actual FCRs for various fish species such as milkfish, tilapia, shrimp, and grouper.

Overall, the MRV framework for the aquaculture sector aims to significantly reduce GHG emissions through technological improvements and more sustainable management practices. This comprehensive approach will not only contribute to environmental sustainability but also enhance the efficiency and productivity of aquaculture operations in the Philippines.

Table 4: MRV Framework for Aquaculture Sector

Metrics (sources of GHG emission in the sector)	Technology to be used	Targets		Data Required	Baseline Values		Data Sources and Generation Tools	Data Tables/ Templates	Responsible Unit/Position	Frequency of Reporting
		Year	Value		Year	Value				
1) Emissions from motors that power pond aerators	<p>Improve fuel efficiency with more efficient engines</p> <p>Reduce GHG emission by switching to fuels that emit less CO2 than currently being used (i.e. Solar powered generators)</p>	20xx	<p>50% increase in power efficiency</p> <p>10% of farms use solar power to run pumps and aerators</p>	No. and total horsepower of all power generators used in pond aeration and water pumping. Source of power.	20xx	x%	Independent survey to be commissioned by CRAO	Form/s No. xx and Title	(from CRAO/ DA PMS, other concerned DA unit/s)	???
2) Emissions from transport of fish to markets	<p>Improve fuel efficiency with more efficient engines</p> <p>Reduce GHG emission by: i. switching to fuels that emit less CO2 ii. fixing leakages in refrigerated transports</p>		<p>10% of diesel powered vehicles switch to less carbon generating engines.</p> <p>All refrigerated vans are certified without leaks</p>	<p>No. and age of vans, trucks used for transporting fish to from farm to major markets</p> <p>Types of fuels used</p>						
3) Emissions from fish processing	<p>Improved solar drying technology</p> <p>Use of energy efficient/renewable ebergery processing technology</p>		<p>Zero use of charcoal and wood</p>	<p>Processing methods practiced</p> <p>Source of energy</p>						

Metrics (sources of GHG emission in the sector)	Technology to be used	Targets		Data Required	Baseline Values		Data Sources and Generation Tools	Data Tables/ Templates	Responsible Unit/Position	Frequency of Reporting
		Year	Value		Year	Value				
4) Hydrogen sulfide and N2O generation from uneaten fish feed	<p>More efficient feed conversion (better/lower FCR): Better feeding practices in cage and pond culture;</p> <p>Use of high quality commercial feed Improved pond water quality management</p> <p>Use of higher quality/certified fry.fingerlings</p>		<p>100% of intensive farms adopt better feed management and feeding practices, better farm management practices and certified quality fry or fingerlings.</p> <p>FCRs of surveyed farms conform with manufacturers' ratings for their feeds.</p>	Rated FCRs of various feeds for major species (milkfish, tilapia, shrimp, grouper) from feed manufacturers Average FCRs from farm surveys of milkfish, tilapia, shrimp and grouper farms						



4 APPROACHES, MEASURES AND GAPS IN NDC COMPLIANCE AND MRV

4.1 Nationally Determined Contributions (NDCs)

NDCs constitute the pledges made by individual countries as part of international climate agreements associated with the Paris Agreement. They outline the country's climate actions, goals, and contributions to global efforts to mitigate CC. The terms "NDC Compliance" and "MRV" refer to key elements of international CC agreements, specifically related to NDC and Measurement, Reporting, and Verification (MRV) processes. A pertinent summary these concepts and some considerations for approaches, measures, and potential gaps follow.

4.2 Approaches to NDC Compliance

Logically and generically, there are three major trajectories which can be interpreted as contributing approaches to foster NDC compliance. These trajectories include, but are not limited to, the following approaches.

- a) **Legislative and Policy Frameworks:** Countries may adopt and implement specific laws and policies to achieve the targets set in their NDCs.
- b) **Technology Deployment:** Utilizing and investing in climate-friendly technologies and practices to meet emission reduction goals.
- c) **International Collaboration:** Collaborative efforts with other nations, sharing expertise, technologies and financial resources.

It is relevant to understand the brief historical footprint regarding the NDC compliance by the PHL government to the Paris agreement. Approach to this compliance can now be interpreted across three Presidential regimes. The original signing in 2015 was under President Aquino who committed to what some see as a generous figure of a reduction in GHG emissions by conveyed a conditional 70 percent GHG reduction target.

The approach by President Duterte (2016-2022) was to ratify the previous agreement, but to qualify the commitment to one where it was 75% by 2030, with 72.29% being conditional and the balance 2.71% being non-conditional⁸. The conditionality clause anticipated external (e.g. bilateral and multi-lateral donor) support, along with the expectation that programs and projects would strategically improve the plight of farmers such that they could benefit positively from the NDC through improved productivity and thus livelihoods.

“The Philippines is submitting an ambitious NDC target of 75% reduction of GHG emissions by 2030 in the name of climate justice. The NDC will be our tool to upgrade our economy by adopting modern and low carbon technologies and approaches that would help mitigate the climate crisis and make our economy more resilient and our growth sustainable.”⁹

The current President Marcos (2022 – 2027) has indicated obligation to the Paris Agreement commitments while identifying the need for ASEAN unity in tackling CC. In doing this, he has further underlined the need for collaboration and support by the “developed countries”.

⁸ <https://www.dof.gov.ph/president-duterte-approves-phl-commitment-of-75-percent-emissions-reduction-target-by-2030/>

⁹ Finance Secretary Carlos Dominguez III, Chairman-designate to Climate Change Commission (CCC), which facilitated the NDC formulation process.

“Developed countries have a moral obligation to support adaptation and mitigation efforts of the most vulnerable countries through technology transfer, capacity building, and climate financing, this to address loss and damage, and to achieve necessary breakthroughs for climate action at a global scale.”¹⁰

4.2.1 Philippine Statistics Authority (PSA)

The Philippine Statistics Authority (PSA) is the office officially mandated to assemble the national GHG inventory, a critical component of the NDC compliance. The PSA operates under a number of discrete departments. The operating unit in-charge regarding computation of GHG inventory in the agriculture sector is the Environment and Natural Resources Accounts Division (ENRAD) of the PSA. In addition, the Livestock and Poultry Statistics Division of the PSA is responsible for the collection and generation of data on animal inventory, production, slaughter and farmgate prices. The GHG data that the PSA generate appears to be extrapolated from a rounded out generalised GHG unit linked to national annual production.¹¹

4.2.2 Climate Resilient Agriculture Office (CRAO)

Around 2015 the DA established what is known as the Climate Resilient Agriculture Office (CRAO). The mandate of this office was to draw together and extend to farmers improved farming practices such that they could adapt to the expected impacts of CC. The office has a staff of 11 (this number fluctuates) with only one a permanent DA employee and the balance on short-term six-monthly contracts.

The activity footprint of the CRAO over the last 12 years has met with many challenges, many of which have been well documented in a recent study by the ADB.¹² These challenges include a clarity of the office mandate across the entire DA, a need for long-term dedicated staffing with specialist skills, resources to rigorously evaluate the achievements of the AMIA program and to re-calibrate as needed. Efforts led by the CRAO office to address and reduce agricultural-related GHG emissions in PHL have involved the promotion and thus adoption of more sustainable farming practices, improved rice cultivation techniques, and the promotion of climate-smart agriculture at the village level. Unfortunately, there has been no baseline information developed as a part of the work and thus it is difficult to verify the efficacy of any initiatives. Government, non-governmental organizations, and international agencies may collaborate on initiatives to enhance agricultural productivity while minimizing environmental impacts but it is an imperative step to assemble base-line data as a starting point of any initiative.

What is perhaps not explicitly dealt with are the challenges within any institution where a new office with anticipated activities of a “cross sub-sectoral” character is introduced into an existing sub-sectoral hierarchy. The feedback offered by respondents to this report is that the sub-sectoral nature of the DA, whereby there are technical specialists working in discrete units dealing with the diversity of farming activities (i.e. cropping / rice, livestock, forestry, etc) can present challenges to any initiative which aims to work across these sub-sectors. Due to its “cross-sectoral impacts”, successful CC adaptation at the farm level needs to be accompanied by vigorous and enthusiastic adaptation within the DA hierarchy. There is an essential multi-

¹⁰ <https://pia.gov.ph/news/2023/05/10/president-marcos-urges-asean-unity-in-tackling-climate-change>

¹¹ We await feedback to direct questions regarding the field work / methodology the PSA use for data collection and assembly.

¹² Deepening Climate-Related Da Organizational Reforms To Sharpen And Better Harmonize Climate Action, (2023) Institutional Study Team, ADB

disciplinary dimension required for adaptation (and mitigation) to be successful, incorporating both the 'hard' and 'soft' sciences. The CRAO office is seen as being deficient of hard science technicians. While this can be overcome through sound cooperation with sub-sectoral technicians within DA, the feedback offered to this report indicates that attempts to foster cooperation has not been as fruitful as it could be.

CRAO and DA respondents to this report were unified in qualifying the need for interventions with the understanding that the Philippine GHG emissions are not globally significant, and that the signing of the Paris agreement was interpreted as an opportunity for farmers to benefit from NDC actions through both enhanced resilience to CC while enjoying anticipated increases in productivity.

4.2.3 Unit price and regulation of irrigation water

Alternate wetting and drying (AWD) is a management practice in irrigated lowland rice paddy that reduces considerably GHG emissions (CH₄ in particular), and saves water while maintaining yields. Under the best management practice developed by International Rice Research Institute (IRRI) water scientists, the AWD water regime starts two weeks after transplanting.

A major hurdle in the adoption of AWD in the Philippines is the price and regulation of irrigation water. The implementation of AWD in paddy rice systems means that the 'set and forget' process associated with 'permanently flood irrigated' paddy would need to change. Such a change implies or would require greater work by farmers over the life of the crop. Therefore, AWD will only be attractive to farming communities if there are management incentives to implement the practice. At the current time water derived from national irrigation systems which is used for irrigation to farms of eight (8) hectares and below are exempted from paying irrigation service fees.

Statistics from 2016 indicate that the average farm size in the Philippines is 1.54 Ha.¹³ The change in water pricing was introduced in February 2018 and introduced by the President Duterte. The result of this policy of exemption is that for the greater number of farmers there is more work involved in adoption of and application of AWD, and no incentive.

4.3 Measures for NDC Compliance

The vehicle which has been facilitated to promote the CRAO measures has been aiming at improving the resilience of individual farmers at the village level and is known as the Adaptation and Mitigation Initiative in Agriculture (AMIA) program. AMIA *"envisioned the Philippines where all rural communities, especially those dependent on agriculture and fisheries, would become resilient to the increasing adverse effects of climate change"*¹⁴. To date, the AMIA program has been seen as very successful initiative with 152 villages having been volunteered into an adoption of improved cultivation and husbandry practices. The AMIA program promotes:

1. Timely, relevant, and site-specific climate information via Climate Information Services (CIS)
2. Easy access to credit and affordable insurance

¹³ [Farm Size and Ownership \(philrice.gov.ph\)](http://philrice.gov.ph)

¹⁴ DA – CRAO promotional material.

3. Computer-aided decision-making technology
4. Training on CCA/DRR (Climate Change Adaptation / Disaster Risk Reduction) productivity-enhancing practices/technologies
5. Improved links to markets

Selection of AMIA villages has been based upon (i) a Climate-Risk Vulnerability Assessment (CRVA), (ii) the presence of farmers' organizations, (iii) presence of financial institutions (banks, lending/credit, risk transfer facility), (iv) presence of Agricultural Extension Workers (AEWs), (v) Active participation & support of LGU and (vi) the potential for out-scaling. As a result, the program has strategically targeted farmers that have been identified as being motivated but also needing support. It is acknowledged that the strategy behind the village selection is sound.

As of 2017, achievements include a mobilized program across Provinces with completed CRVA establishing 10 AMIA Village Sites covering 26 barangays, 294 LGUs with Climate-Risk Vulnerability Assessment, 45 discrete Project initiatives and 54 trained weather observers from participating LGUs and DA-RFOs in partnership with Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA) and Rice Watch Action Network.¹⁵

Theoretically the AMIA approach could be improved through the addition of a whole farm planning (WFP) process whereby farming systems are surveyed and linked with land capability, crop diversity explored, and efficacy of irrigation systems assessed. As a component of the AMIA program, a climate risk vulnerability assessment (CRVA) for 10 selected provinces in the Philippines has been completed in collaboration with CIAT. In a broad province based the information gained from this CRVA can inform the village-based program at the province level, and thus inform future potential NDC's. The figure below illustrates the framework used for CRVA and the operational definition of the three key components for the agricultural sector.

¹⁵ <https://amia.da.gov.ph/index.php/amia-villages/>

Figure 4: The CRVA Framework and three key components; Source CIAT

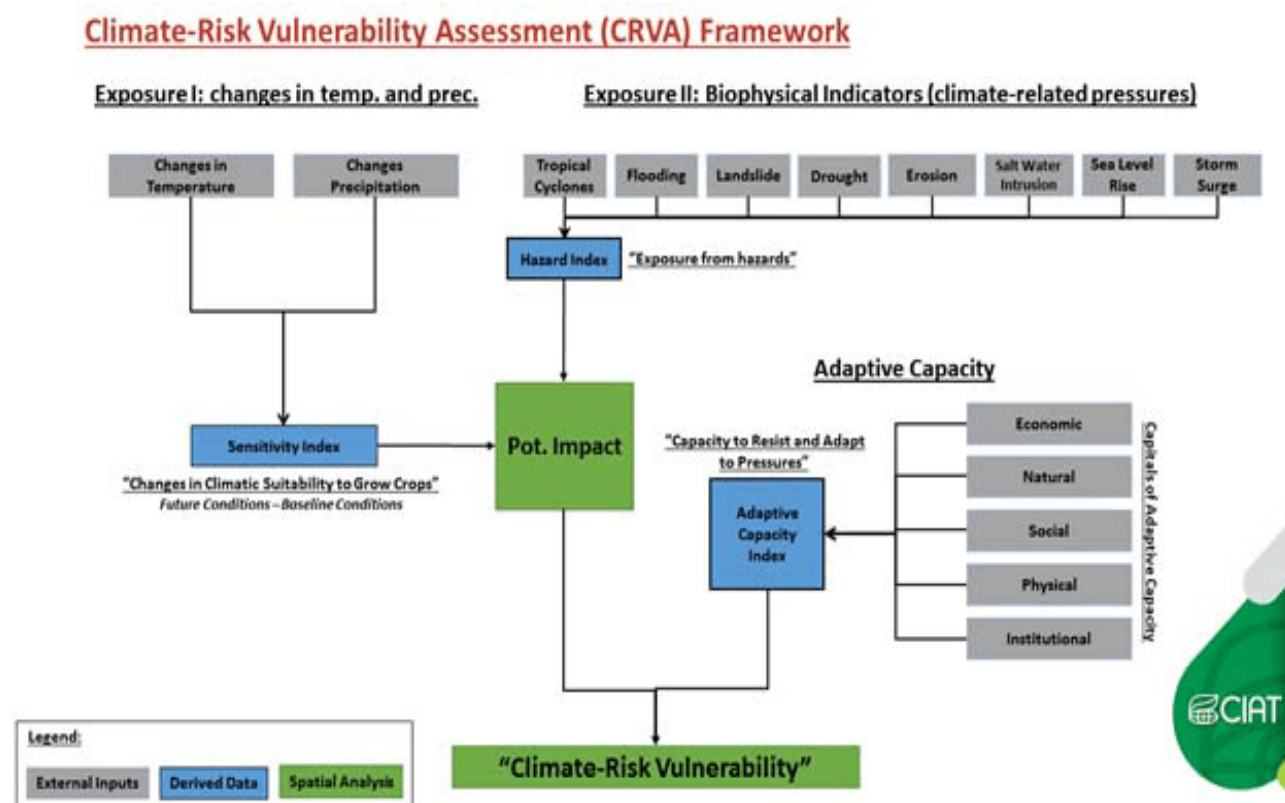
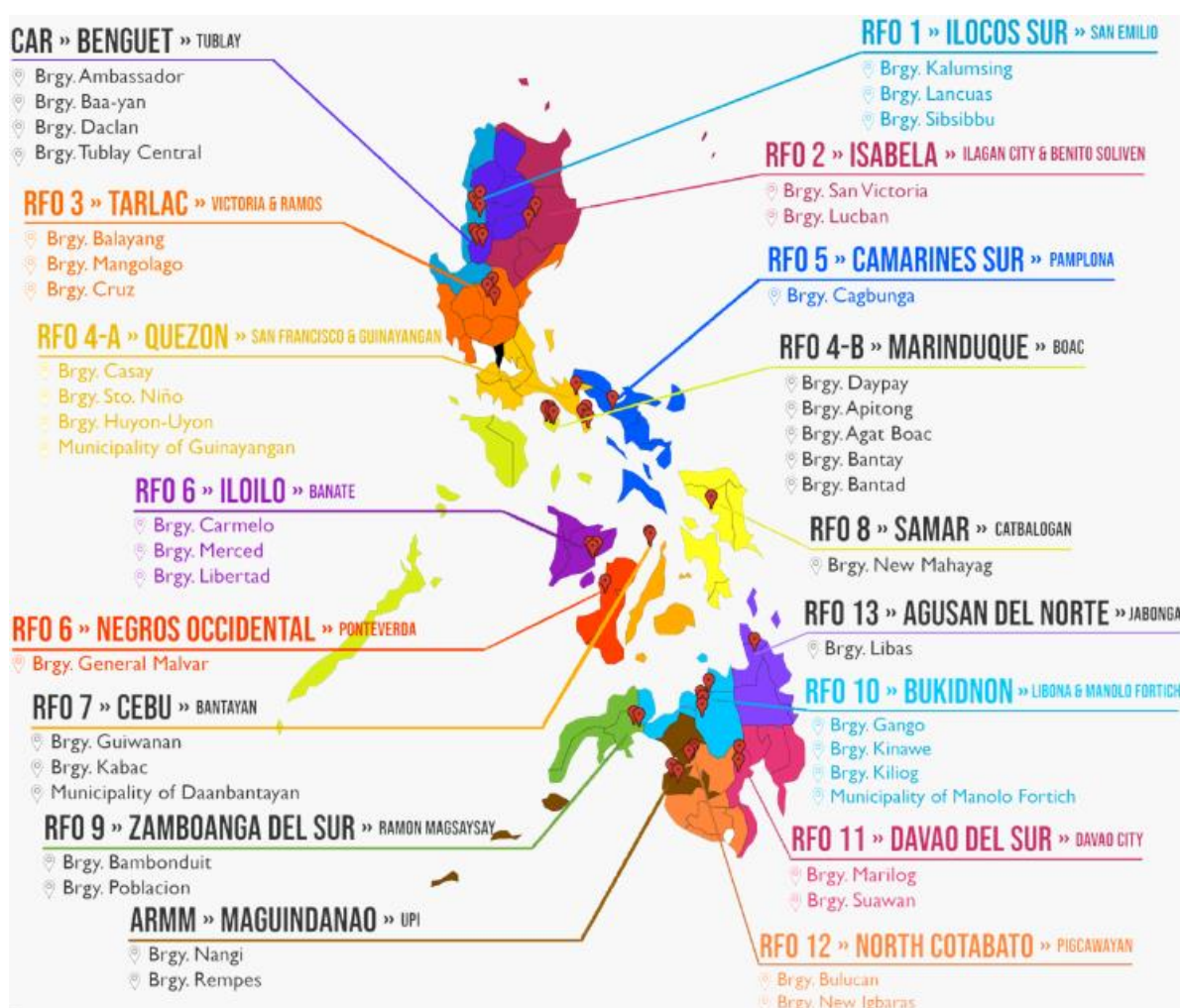


Figure 4 illustrates the three components which are core to the vulnerability. The three components are:

- **Sensitivity Index** – changes in climatic suitability to grow crops. The crop sensitivity was assessed by changes in climatic suitability to grow crops by the year 2050 in comparison with the baseline crop suitability. The sensitivity (changes in climatic suitability) of crops to CC was derived from changes in temperature and precipitation using the ensemble of 33 GCM models. For baseline condition, the climate data was acquired from www.worldclim.org. The maximum entropy (Maxent) model to perform crop suitability analysis. Twenty (20) Bioclimatic variables (<http://www.worldclim.org/bioclim> + Number of consecutive dry days) was used to assess crop suitability in baseline vs future conditions. The modelled crops include rice, maize/corn, vegetables (squash, eggplant, tomato), and integrated farming combinations (cacao, coffee, mango banana). Higher losses of crop suitability are projected to occur in low-lying areas (0-500m ASL) in the Philippines. However, there are also opportunity areas, especially in Mindanao areas, that are projected to become more beneficial for some commodities.
- **Hazard Index** – exposure from hazards - A list of eight recurrent hazards were assembled as a checklist against which each village was also assessed.
- **Adaptive Capacity Index** – Capacity to resist and adapt to pressure. Adaptive capacity forms one of the three pillars of the vulnerability assessment in addition to exposure and sensitivity to climate change. For example, within the AMIA village

program there is increasing availability and promotion of the need for drought tolerant varieties. Adaptive capacity is also one of the three components when measuring resilience, in addition to absorptive coping capacity and transformative capacity. Both are integrated concepts in a coupled human-environment system (Lei et al. 2014).

Figure 5: The AMIA villages sites as per 2017. Source DA-CRAO



Respondents from CRAO were keen to promote the message that GHG emissions from agriculture in the country were counterbalanced by the carbon capture from large coconut plantations. There is a follow-on conviction from CRAO that the resultant carbon credits from these plantations were double to that of small holder farmer emissions. So, from the CRAO perspective, the AMIA village strategy aims to strengthen the resilience of farms and farmers rather than focus upon rigorous data gathering of GHG at the farm level. This includes promotion of adaptation measures through a village and farmer group focus upon capacity building.

One respondent pointed out that as the AMIA village-based model has incorporated participatory rural Appraisal (PRA) methodologies for the establishment of vulnerability and risk analysis, it is predicted that there will be an easy adoption of support for the MRV if

required. However, there is also conviction that if data is to be collected at the AMIA level, then appropriately skilled consultants should be used.

4.4 Gaps in NDC Compliance

From the perspective of DA and the CRAO, the existing gaps in the NDC compliance are associated with:

- (a) the previous explicit strategy behind the CRAO office towards adaption rather than adaptation and mitigation. The WFP approach previously mentioned would aim to engage a rigorous methodology with thorough outcomes combining both adaptation and mitigation. It is necessary to point out and emphasise that vigorous application of adaptation measures will have a fraction of the impact on reducing GHG emissions as opposed to a program which embraces simple mitigatory practices (or a combination of both) as well.
- (b) lack of dedicated long-term resources to support rigorous CRAO led field work.
- (c) institutional ownership of the data gathering and reporting processes associated with NDC in the mandated hands of the PSA.

4.5 Previous Explicit CRAO Strategy

It is well acknowledged by the TA consulting team that the CRAO office has been responsible for many positive initiatives incorporated over the period of time since its commencement. Assuming that there have been positive changes for farmers, theoretically the AMIA initiative is well conceived and intended. AMIA has indeed been the principal action in a strategy which recognised that CC would increase the likelihood of uncharacteristic weather events, a scenario which would add to the livelihood challenges faced by farmers, particularly small holder farming communities.

Several observations concerning AMIA became clear when the TA team visited AMIA farmers and LGU support staff including that:

- Successful interventions at AMIA level have not been well documented, nor have
- mitigation opportunities of the “low hanging fruit” variety been explored with enough stealth and diligence,
- program design has been shy in understanding recognising that when farmer productivity increases, then it is imperative to have a marketing strategy in place to ensure that farmers don't become victims of a commodity price collapse.

These sad realities and are perhaps well recognised thru the CRAO monitoring and evaluation processes, but perhaps have not been acted upon in a pro-active manner.

4.6 Resources Gap

An observation shared from respondents and verified by the ADB report (July 2023) is that the CRAO office has been without bureaucratic imprimatur. This is manifest by the fact that apart from the CRAO Director, all of the other 10 staff are on 6 monthly contracts. Staff will and understandably do leave the CRAO if they are successful in applying for and being offered a permanent role elsewhere within DA. The staff impermanence means that there are routinely many systemic and important building blocks of positive institutional delivery absent including (i) a dynamic corporate and collegiate memory of previous activities, (b) commitment and understanding of staff concerning appropriate follow up, (c) loss of staff who have gained important technical experience as positions become available elsewhere. The non-

permanence of staff runs in parallel with the lack of dedicated budget and thus there has been an ad-hoc characteristic to funding and resources.

Recognizing the need for external support to actualize the NDC Prioritized Action Plans (PAPs), the DA sector seeks a comprehensive support system. Many developing nations, including the Philippines, face significant challenges in mobilizing a suitable approach to the needs. Financial support is deemed crucial for the successful implementation of appropriate plans and programs towards enabling the agriculture sector to meet its climate-related needs and targets. Additional support required may encompass technological assistance including hardware and software, capacity-building initiatives to improve understanding of staff and thus ownership and commitment, or other essential resources which become apparent over time and are vital for the sector's contribution to the broader national climate objectives.

CRAO has basically been seen as a small policy and research unit but what is needed is action to mainstream, to contribute to the building of understanding and capacity across the entire DA. Its current status leaves it with a limited profile within the Department.

4.7 Institutional Ownership and gaps in Data Gathering

As previously noted, the PSA is the agency given responsibility for GHG data relevant to the NDC and thus the PA. Feedback from CRAO indicates that DA provide secondary data to the PSA. Determination of the source and specifics of this secondary data is not clear but what is clear is that PSA is recognised and mandated as the lead agency concerning NDC data. As a result, CRAO does not have ownership and appears not to be a stakeholder in systematic NDC data collection.

A second major and significant gap in the current NDC compliance is that there is no baseline data collated pre-commencement of the AMIA initiatives. It is very difficult to assemble data associated with changes in GHG emissions if there is no baseline to compare subsequent performance. At the same time, it needs to be recognised that if a program of adaptation is being pursued as opposed to one where it is hand in glove with mitigation, then the contribution to NDC will be, over the short to intermediate term, tiny and inconsequential.

The gap in data gathering, one which is well acknowledged by the CRAO team, is significant and needs to be rectified as part of a vigorous future plan of action. At the same time, mitigatory measures need to be embraced if there is any expectation that there will be a contribution to the NDC. The need for baseline data, recognition of the importance of combining adaptation and mitigatory practices, understanding of cost-benefit analysis as well as deploying resources to gauge any important changes in GHG emissions of proposed NDC PAPs in the agricultural sector is basic for GHG MRV.

4.8 Status and Way ahead

Observations from the Niras-ICEM TA Team consultation with the CRAO-DA (November 2023) it was found out that the CRAO contribution to NDC implementation within the agricultural sectors compliance to the PA has limited accomplishments to date. The sector's commitment to climate action currently hinges on conditional objectives, indicating that most of its goals are contingent on actions to be met by outside assistance. As a result, the CRAO requires;

- a) **Finance** - securing the necessary funds to implement climate actions outlined in the NDCs. There are numerous dedicated CC finance opportunities including the three below

Table 5: Range of potentially supportive external funding sources

Name	Description	Status
ADB	NDC Advance is a technical assistance platform established by the Asian Development Bank (ADB) to help its developing member countries (DMCs) mobilize finance, build capacity, and provide knowledge and other support to implement their nationally determined contributions (NDCs).	Already a major supporter with the GoP.
GCF	The Green Climate Fund (GCF) is the world's largest dedicated climate fund, with a mandate to foster a paradigm shift towards low emission, climate-resilient development pathways in developing countries. GCF has a portfolio of USD 13.5 billion (USD 51.9 billion including co-financing) delivering transformative climate action in more than 120 countries.	GCF will support programmes that build capacity and helps countries develop long-term plans to fight CC. GCF is an operating entity of the financial mechanism of UNFCCC and serves the 2015 Paris Agreement, supporting the goal of keeping average global temperature rise well below 2°C.
WB	Climate Support Facility: is a multi-donor trust fund administered by the World Bank which supports developing countries to implement their NDCs, develop long-term climate strategies and achieve a green economic recovery from the impacts of COVID-19.	WB active in Philippines.
Bilateral	Government to government support.	The Japanese JIKA was sited as a donor that was particularly interested in supporting the MRV of GHG emissions. There are certainly other possible players in this space.
Private & Crowd Source	Globally, there are philanthropic organisations which could be very interested in supporting the AMIA model. This could take for example support to help support a "free trade" market model for AMIA rice, or donate such that farmers can go solar for energy.	This possibility had not been explored as far as the TA Consultancy team were aware.

- b) **Strategic design** of farmer programs needs to embrace mitigation and adaption.
c) **Technological Gaps:** Technical enhancement through hiring of dedicated staff as well as hardware and software.

- d) **Policy Implementation Gaps:** Inconsistent or insufficient policies and regulations hinder effective NDC implementation.

4.9 Snapshot of AMIA activity

TA colleagues within the Output 1.1 section of the TA have visited up to six AMIA village sites to gauge the impact of the program and to see how it may be assisted to greater achievement. The fieldwork methodology included interviews with farmers and attempts to meet with the responsible liaison persons within the LGU. As previously outlined and verified by the interviews, there is a need for baseline data to be gathered.¹⁶

The next step is to develop a comprehensive and rigorous system of implementation of climate smart farming which adopts a holistic approach needs to be collaboratively applied with farmers. Such a step implies a greater profile of appropriate agricultural extension and would include farmers being involved in regular verification and testing, routine tweaking to respond to findings, and acknowledgement that without dedicated collaboration between farmers and technicians, production and marketing there will be limited change at the farm level to be resilient towards CC.

Without agreement of what is possible and how to achieve, then programs with the best intentions will and do falter. So, the Output 1 colleagues found that AMIA could do with improvements. For a start, the name of the program is Adaptation and Mitigation Initiative in Agriculture and this name explicitly states that mitigation is an equal part of the implementation approach. Currently the CRAO office is only supporting adaptation practices.

An overall revamp of the AMIA system should be seen as a logical building and enhancement step. Similar programs elsewhere have dramatically benefited from incorporating a “Whole Farm Planning” approach, whereby the village farms are surveyed with farmers using PRA, the efficacy of farming systems are assessed and questioned, the potential impacts of CC and the need for adaptation practices are explored with farmers and the potential for resilience, potential changes in approaches to marketing etc are all explored. There is no evidence that this last critical step has been explored and to make any appropriate impacts it needs to be both adopted and rolled out. To do so requires a marriage of both soft and hard skills at the AMIA village level.

4.10 Measurement, Reporting, and Verification (MRV)

The planning, delivery, and MRV processes are crucial components of the NDC implementation. MRV is a process to track and assess the progress in implementing the NDCs. The outputs of this process involve measuring emissions, reporting on national climate actions, and verifying the accuracy of the reported information. There are a number of differing dimensions and approaches to the MRV, process including the development of “National Inventories” whereby signatory countries develop and maintain inventories of their GHG emissions.

One particular interest of the DA in the NDC MRV is the potential monetization of GHG reduction, thus there is the need to put up a functional carbon credit mechanism. Such system is required for benchmarking as what other countries are doing. By incentivising GHG reduction this will be advantageous first and foremost to the Philippine government as it anticipates that infusion of the Green Climate Funding support from developed countries. This

¹⁶ Personnel Communication with David Moles (Value Chain Specialist)

will ultimately trickle down to farming communities and at the household levels in the form of subsidies and other free production inputs provision.

4.10.1 Approaches to MRV:

Orthodox approach and techniques for MRV would ideally include the following specific actions and qualification:

- a) **National Inventories:** A GHG inventory which will be unique to each country reflects the impact of a country's economic activities and its domestic carbon footprint.
- b) **Technology-Based Monitoring:** Portable and dedicated GHG reading equipment is readily available and could be utilized as a part of the AMIA program. GHG can be augmented with the use of satellite imagery and remote sensing. Farmers should be offered opportunity to be involved in such monitoring. Rigorous, systematic, transparent and repeatable monitoring will achieve the best results.
- c) **Third-Party Verification:** Involvement of independent entities to verify reported data for accuracy. This step is important and some respondents have suggested the potentially important role that privatization or PPP (Public, Private, Privatization) could achieve.

4.10.2 Measures for MRV

The need for the MRV, the adoption of a rigorous process, one which is familiar with the characteristics and specific needs associated with agriculture could currently be compromised as the DA is not a significant player nor is it responsible for the collection of GHG data in agriculture. While it can be of great value to have an independent agency monitoring and reporting, and the PSA maybe fully capable of surveying production figures, prices and exporting extrapolated GHG numbers, the monitoring of GHG, including the establishment of baseline data and the verification of the whole process, may not be their forte. Respondents report that the PSA is working in a collaborative way, is part of the NDC working group and that if improvements are made the PSA will be part of any plan of action. There is a need to emphasise again that if DA-CRAO are to make any contribution to the NDC, then there needs to be a firm and explicit embrace of mitigation and adaption at the AMIA level.

4.10.3 Gaps in MRV

Unconditional and conditional response to the NDC. The conditionality revolves around the fact that GoP saw that to achieve the NDC goals there was a need for outside support from external donor sources (e.g. multilateral development agencies and bilateral), and support from those countries responsible for the greatest share of carbon emissions. However, there is no comprehensive donor supported program to bring rigor and thoroughness to CRAO involvement at the farm level.

Data Availability and Quality: The PSA produces a comprehensive range of data concerning agricultural production but there are obvious data gaps associated with the CRAO program of promoting change at the on-farm and AMIA level if no known baseline is available.

Capacity Gaps: The CRAO may currently lack the technical capacity and resources to establish an effective MRV system for the NDC. However, it is simply a matter of adopting a system of protocols and putting a system in place. No doubt there are personal who can be trained but any such personnel need to be offered some longer contractual status.

Consistency in reporting: There is a need to establish firm protocols to ensure that reporting standards and methodologies used are consistent and assist a range of stakeholders including groups like AMIA.

Need to commence: As per the conditionality of the GoP’s NDC, addressing these gaps may require international cooperation, financial support, and ongoing commitment from all in-country parties involved in CC mitigation and adaptation efforts with agriculture. However, to get a simple “pilot” system moving forward should not present great difficulties. Such a system is not beyond existing skills and should be commenced. Subsequently, the pilot system can be built upon and improved with regular assessments and updates to NDCs, along with improvements in any MRV processes, are essential for tracking progress and enhancing global climate action. Currently, a dedicated program is required to be established.

5 PLANNING AND DELIVERY OF MRV FOR PHILIPPINES NDC

NDCs outline a country’s climate action plan, including its mitigation and adaptation goals. The following outlines current achievements and indicates further necessary steps to take.

5.1 CRAO, AMIA, PSA, LGU’s, NGO’s

Potentially there are many players in any comprehensive NDC. Each of these players can bring a positive set of skills to enhance the MRV process, but there is a need for coordinating body focused upon agricultural GHG. The following table (developed by the CRAO) outlines a simple strategy they have produced to commence and the target reduction from major sources of GHG emission in the agriculture sector.

Figure 6: Outline of the CRAO plan of action.

Source of GHGs (% total emission)	Targets	Technology to be used	Needed activity
Paddy Rice cultivation (51.97%)	100% adoption in total irrigated paddy rice area = 3.21m Ha		
	Dry Season	AWD + cropland management + renewable energy for water management	Technology development plus
	Wet Season	AWD + RE-powered flood control and water management systems + cropland management	Technology development plus promotion.
Livestock Enteric Fermentation (9.65%)	50% reduction in enteric fermentation / animal	Nature based solutions + breeding interventions.	Technology development plus promotion.
N2O emission from annually cultivated soils (16.2%)	25% reduction in total N2O emission (total annually cultivated	Cropland management + precision agriculture + biotech crops.	Technology development plus promotion.

Source of GHGs (% total emission)	Targets	Technology to be used	Needed activity
	area = 8.017 million Ha		
Livestock Manure management (9.7%)	100% adoption by livestock sector	Biodigester nature-based solutions.	Technology development plus promotion.
Urea application (1.6%)	50% reduction in urea application	Precision agriculture +cropland management	Technology development plus promotion.
Emissions from biomass burning (.88%)		Nature-based solutions – circular bioeconomy	Technology development plus promotion.

Source CRAO

Table 8 illustrates the position that there is plan to roll out mitigatory and adaptive measures but so far it has not been successfully implemented and monitored. However, the promotion of AMIA appears to recommend that all activity is focused upon adaptation at the farm level. Mitigation appears to be over-looked, as is any potential change within the institutions of CRAO or DA. For example, one return journey from Manila to the AMIA Cruz in a comfortable diesel Toyota by the TA team generates a significant levels of CO₂, and the question arises should there be a strategy to minimise and rationalise such movement?

AMIA

The focus and trajectory of the AMIA strategy has been both appropriate and significant as it provides and promotes improved technologies for farmers while providing the CRAO office with a network to commence putting in place climate smart and resilient farming practices against which the NDC processes can be measured. However, as previously indicated, efforts at mitigation will deliver far greater and significant declines in GHG emissions, and should be vigorously promoted and implemented. The ANCP TA team found that if there has been any significant developments and effective changes and achievements of AMIA in the NDC space, any data is yet to be documented. When offered two tables to outline the rigor required to both (a) quantify GHG emissions in small scale agriculture and (b) doing the same for carbon trading purposes (See Appendix 3) there was a negative response. In fact the CRAO team indicated that collection of such data should be left to an independent body or a team of experts.

In January 2024 the TA Consultancy met with approximately 20 farmers at the AMIA Cruz offices (see Appendix 2). In attendance as well were LGU agriculture extension agents accompanied by three support staff from the DA-CRAO office.

The conversation with the farmers was revealing. The TA Consultancy outlined the context of our visit (NDC, Paris Agreement, CC and the need for data). It was clear that although the AMIA Cruz was set up in 2017, there were no baseline data assembled. This is not unique – there is a concerning absence of such data! We discussed what baseline data might look like and all were very excited to potentially have a template to work by, and an approach which they could follow.

We had a question time and one farmer in particular wanted to share some very rational grievances. Only about 7% of the groundwater extraction in the AMIA Cruz uses solar driven pumps, the rest are of the diesel-powered mechanical variety. So, as a project aligned with

addressing CC and with our visit to the project focusing upon the importance of GHG monitoring reporting and verification, he asked why we could not get solar panels – thus explicitly requesting key elements of a mitigatory practices. So, there is certainly a case to rethink such dimensions of AMIA. NDC data from fossil fuel substitution would be substantial.

Another question and discussion from farmers concerned the fact that when farm production was increased (which was seen as a core attribute of AMIA) the prices farmers were attaining collapsed. This highlights the issue that AMIA should be exploring with the LGU's issues of "marketing" – maybe all AMIA villages across the PHILS could graduate to (for example) long grain fragrant varieties which could offer a great ROI? Alternatively, AMIA rice could be sold under a "Fair Trade" label. With some creativity, sourcing funding to transfer the entire management and movement of water within the AMIA program from diesel-powered to solar should be highly achievable. As a result, there would be immediate positive and easily measurable contribution to the NDC.

5.2 Planning

Generically there are three important steps to take in commencing the MRV for the NCD. The first of these have been commenced and will need to be constantly reinforced.

1. **Stakeholder Engagement:** Any planning process typically involves extensive consultation with various stakeholders, including government agencies, local communities, non-governmental organizations (NGOs), and the private sector. It should be emphasised that the social dimensions whereby establishment of the process needs the recognition and support of many needs to involve numerous players. This inclusive approach will help ensure that the NDC reflects a broad spectrum of perspectives and priorities. The evidence is clear that this process has begun through the various workshops and conferences staged and witnessed by the consultants during November 2023¹⁷
2. **Baseline Assessment:** A comprehensive assessment of the country's current emissions, vulnerabilities, and existing climate policies needs to be conducted. This baseline information serves as the foundation for setting ambitious yet realistic targets as a starting point. As of January 2024 there have been no energy put into this.
3. **Setting Targets:** The NDC already outlines specific targets for reducing GHG emissions, and so it is simply a matter of identifying and moving in the direction of stated goals. Such targets can be expressed as a percentage reduction from a baseline year. increasing renewable energy capacity, enhancing resilience to climate impacts, and other relevant goals.

5.3 Delivery

Policy Implementation: CRAO and the AMIA approach can be strengthened and supported through adoption of government-wide policies and measures to achieve outlined targets. (See Policy Brief specifically related to NDC as Appendix 2). This may involve enacting new laws, regulations, and incentives, as well as revising existing ones.

Capacity Building: Building the capacity of relevant institutions, agencies, and communities is crucial for successful NDC delivery. This includes providing training, resources, and technical

¹⁷ For example, the "16th Annual Global Warming & Climate Change Consciousness Week", 19-25th Nov, Manila.

support to ensure that all stakeholders can contribute effectively to the NDC's implementation. This should not rule out institutional change as well.

International Cooperation: GoP may seek financial and technical support from the international community to help fund and implement the NDC. This can involve collaborations with international organizations, donor countries, and climate finance mechanisms.

5.4 MRV

Monitoring: Establishing a robust monitoring system is essential to track progress toward NDC goals. This involves collecting and analysing data related to emissions, adaptation efforts, and other relevant indicators.

Reporting: Countries are required to regularly submit reports on their progress toward NDC targets. These reports should be transparent and include comprehensive data to facilitate international assessment.

Verification: Independent verification processes, often involving international review, help ensure the accuracy and reliability of reported data. Verification enhances accountability and builds trust among the global community.

As cited by the Senior Technical Officer of CRAO-DA during the consultation (November 2023), research institutions and academics can actively contribute to MRV of GHG metrics in agriculture through the following key roles:

- **Conducting Comparative Analyses.** Research institutions can undertake in-depth comparative analyses of existing MRV frameworks, both within the country and globally. This involves evaluating the effectiveness, efficiency, and applicability of different systems to the unique conditions of Philippine agriculture.
- **Adapting MRV Systems for Agriculture.** Based on the analyses, research institutions can collaborate with academics and stakeholders to adapt or develop MRV systems specifically tailored to the nuances of agricultural practices in the Philippines. This involves incorporating relevant indicators, methodologies, and technologies.
- **Pilot Testing and Validation.** Academics, in collaboration with research institutions, can conduct pilot testing of the adapted or developed MRV systems in real-world agricultural settings. This phase allows for validation of the systems' accuracy, reliability, and practicality.
- **Capacity Building and Training.** Research institutions and academics can play a crucial role in capacity building by organizing training programs and workshops. These initiatives aim to enhance the knowledge and skills of farmers, extension workers, and other stakeholders in utilizing MRV systems effectively.
- **Knowledge Dissemination.** Disseminating research findings and best practices is essential. Research institutions can contribute by publishing research papers, organizing conferences, and collaborating with academics to integrate MRV-related topics into agricultural curricula.
- **Participatory Research and Stakeholder Engagement.** Engaging stakeholders, including farmers, policymakers, and local communities, is crucial. Research institutions can conduct participatory research to ensure the inclusion of diverse perspectives in developing MRV systems and fostering a sense of ownership among stakeholders.
- **Policy Advocacy and Integration.** Research institutions can advocate for the integration of effective MRV systems into agricultural policies. By collaborating with policymakers,

they can contribute to the development of regulatory frameworks that support the widespread adoption of MRV practices.

- **Continuous Monitoring and Improvement.** Establishing a feedback loop for continuous monitoring and improvement is key. Research institutions can engage in ongoing assessments of MRV systems, incorporating technological advancements and addressing emerging challenges in the agricultural sector.

In summary, the effective planning, delivery, and MRV of the GoP NDC will involve inclusive planning processes, policy implementation, capacity building, and transparent monitoring and reporting mechanisms. International collaboration and support may also play a crucial role in achieving the country's climate goals.

6 INSTITUTIONAL FRAMEWORK, ARRANGEMENTS AND ISSUES

As of 2022, the Philippines has been actively engaged in addressing CC and has committed to reducing its GHG emissions and enhancing resilience to climate impacts. Here is a general overview of the institutional framework, arrangements, and issues related to the delivery of NDC in the Philippines

6.1 Institutional Framework

The Climate Change Commission (CCC): The CCC is the lead agency mandated to coordinate, monitor, and evaluate government programs and ensure the mainstreaming of CC considerations into national, local, and sectoral plans. The CCC is responsible for overseeing the development and implementation of the country's NDC.

LGUs: The LGU's are an important stakeholder at the AMIA / farm level, delivering agricultural extension in collaboration with DA. While the model has merit, this TA found that there are opportunities to improve the CC and NDC contributions..

Other relevant Government Agencies: Various government agencies are involved in implementing specific actions outlined in the NDC. These may include the DA / CRAO, Department of Environment and Natural Resources (DENR), Department of Energy (DOE), and others, depending on the nature of the commitments.

6.2 Issues for NDC Delivery

Capacity Building: Building institutional and human capacity is crucial for effective NDC delivery. The government may collaborate with international partners and organizations to enhance technical and financial capacities

Financial Resources: Adequate funding is essential for implementing NDC commitments. Access to climate finance, both domestic and international, may be a challenge for the Philippines.

Technological Support: Some NDC commitments may require access to new technologies. Collaborations and partnerships for technology transfer may be necessary.

Policy Coherence: Ensuring that CC considerations are integrated into various policies and plans at the national and local levels is critical for effective NDC implementation.

Stakeholder Engagement: Engaging various stakeholders, including local communities, NGOs, and the private sector, is crucial for the success of NDC implementation.

6.3 NDC Partnership

The NDC Partnership is a global initiative to help countries achieve their national climate commitments and ensure financial and technical assistance is delivered as efficiently as possible. The NDC Partnership is part of World Resources Institute (WRI) Climate Program.¹⁸ The Philippines has been a member of the NDC Partnership since 2017, and has adopted a whole-of-government approach ensuring its Partnership Plan includes cross-sectoral targets and priority actions, aligning with the country's national development plan.

¹⁸ This consultancy met with the Philippines NDC Partnership coordinator.

7 ASSESSMENT OF THE CURRENT SITUATION

The following table highlights significant challenges and gaps in data collection and management within various agricultural and environmental units, focusing primarily on the need for baseline data to monitor and adapt to climate change effectively. There is a universal absence of baseline data across all units, including DA, CRAO, and AMIA, which hinders effective project planning and evaluation. This lack of data also impacts the ability to adopt methodologies for systematic data gathering for Nationally Determined Contributions (NDCs) and other critical data categories.

CRAO, while focused on adaptation over mitigation, lacks a systematic method to measure progress, with no baseline data, tools, or dedicated personnel for effective monitoring. This gap is exacerbated by a reliance on anecdotal rather than systematically collected data to showcase achievements.

Additionally, there is a little understanding of relevant data needs and capacity-building requirements across units. This limits the potential to leverage climate financing effectively, as there is no robust system to argue needs at various levels. Moreover, the private sector's role in stimulating investment and optimizing value chains remains underutilized.

Policy briefs have been developed to address these gaps, emphasizing the need for ownership and improvement in data collection practices that are relevant to agricultural needs and climate change metrics. However, a lack of institutional credibility and standardization in data collection practices further complicates the situation.

Figure 7: Current situation related to MRV and NDC

Issues / Aspect	Current Situation
<p>MRV database gaps</p>	<ul style="list-style-type: none"> Universally across all units in DA, in CRAO and at the AMIA level, (as well as the Global Climate fund!) – we have found a lack of ‘Baseline data’ is the most recurring issue. Projects, Planning, CRAO, AMIA etc, no one appears to collect baseline data. There is no demand, and subsequently no data available. Anecdotal data may be used at a promotion level by CRAO to endorse the success of AMIA, but it is not the product of a system and is more commonly linked to trumpeting increase in production figures rather than comprehensive systemic type data. Subsequently – there is no identified methodology for data gathering for NDC (nor any other potential data categories). There is a need for this gap to be emphasized across all DA units / activities. CRAO are not alone. CRAO maintain they are focused (or locked in) on adaptation not mitigation so the importance of data gathering associated with NDC has been overlooked. It is only with review and need for NDC data that the topic has arisen. If data collection is to be done, CRAO has preference to rely on ‘experts’ to complete data collection and analysis. On the one hand, this is understandable as taking for example carbon (C) readings from soil requires laboratory work and will be expensive per test. However, to pinpoint any “progress” in soil development will require the establishment of baseline figures. The role to complete collection of data is currently seen to be the business of PSA – an office which delivers very generic and indicative outputs, not specifically oriented towards the rigor required for NDC nor relevant agricultural dimensions thereof.

Issues / Aspect	Current Situation
	<ul style="list-style-type: none"> As far as we have been able to gauge, the CCC has distributed numerous manuals on the need for data gathering but no graduation towards sectoral nor sub-sectoral specifics.
<p>Gaps in CRAO NDC monitoring ability</p>	<ul style="list-style-type: none"> <i>Background - When dealing with numerical data, you can't manage what you can't measure, and approximately right is better than precisely wrong! Standards and procedures are needed to aim for approximately right. Without a standard there is no logical basis for making a decision or taking action. In other words, you get what you measure!</i> There is currently no systematic ability to measure progress in CRAO; no baseline, no tools, no dedicated people, no benchmarking system, nor is there an acknowledged matrix of metrics associated with NDC. Although there is an M&E component in CRAO, we could not establish how they monitor without any baseline body of work. There are numerous documents highlighting the achievements of CRAO // AMIA farmers, but this appears to be anecdotal and incidental and not based upon a rigorously developed system.
<p>Development & implementation of capacity building plan</p>	<ul style="list-style-type: none"> There is a shallow understanding across CRAO, DA units and at the AMIA level of what specific data could be relevant. Feedback from presentation of two matrix (tabled as an appendix in our report) highlighted to the NIRAS team a lack of interest at this stage to go to worlds best practice (WBP). WBP is too complex and difficult given current limitations. There is currently no capacity to match financing modalities required by some donors for say, consideration of benefitting from any C financing initiatives. There is also a limited understanding of CBA. There is no connection, understanding nor conviction regarding the need for an 'enterprise' approach for the farmers that AMIA is specifically working with. While it is OK to double production for example, if farmers receive no incentive to do that (a point which the farmers at AMIA Cruz made very clearly), there is a collapse in the relevance of the AMIA model. Such a situation reveals that there is a need for capacity building in enterprise thinking, particularly as this is then linked to data gathering. This is a problem as "enterprise thinking" is not a quality that is front and centre for your average civil servant – it is not their skill base. BUT – such skills are required if "extension programs" like AMIA increase production and farmers are disappointed and angry when they see prices collapse at harvest.
<p>Mechanisms to leverage climate financing</p>	<ul style="list-style-type: none"> Collection of rigorous baseline database is required to argue needs at the farming, institutional, and policy level. Private sector - - this should be interpreted as a market force but also a private production force. There is no incentive nor promotion to accelerate private investment, and nor is there an overt stimulus in the market to optimize a potential AMIA value chain. Leverage for financing – there is no accreditation nor checks and balancing to attest that what the seller is quoting – there needs to be a third party to accredit, a need which can require a statute body, or alternatively, a private enterprise body. Climate Change (CC) - the Relevance and credibility of government departments is really challenged by the onset of CC – Understanding that

Issues / Aspect	Current Situation
	<p>there are very positive opportunities to gain funding and what is needed to do that is currently lacking.</p>
<p>Policy brief on best practices</p>	<ul style="list-style-type: none"> • The structure and scope of the draft policy brief we have developed is succinct and to the point. • The problem identified is that there is no specific data available right now and this needs to change. The PSA develops generic data with values extrapolated from production figures. This is indicative and not accurate, but is globally acceptable. • Ownership of relevant CC data needs to be executed across DA and specifically at the project level, producing data which is cognizant and relevant to agriculture. • Acknowledging that it will take time, adoption of this data collection could be then implemented from an established date moving forward as capacity is built and data components and methodologies are improved at the field level. For example, if Bureau of Animal Industry had an initiative, bolted onto the proposed project activities is the question – <i>“what influence does this have on the NDC figures and what data should be identified for collection”?</i> Etc. • From our understanding, the Climate Change Commission currently does not promote quality control in data development. This should be altered. All data collection processes will benefit from a standardization of collection practices. • Due to its ad-hoc nature, CRAO appears to suffer from a lack of institutional credibility from DA peers, and as a result, issues related to CC are likewise seen as “someone else’s business”. All units in DA need to be given the opportunity to ask – (a) “What should our contribution to CC and NDC look like, and (b) How do we respond to the need?” (This could be assuming a collaborative role for CRAO as well.) • CRAO does not currently have any best practice policy nor procedure on data gathering from the different units. <p>There is a view that all data collection is associated with C trading and credit, and the very need for baseline data and then subsequent graduation is therefore lost. There is a myriad of ‘other’ data which could have been assembled but has not.</p> <ul style="list-style-type: none"> • Cost Benefit Analysis (CBA) – there is a limited understanding of CBA and it should be part of a policy – currently there is a shortfall in basic research procedures to understand the comprehensive benefits of CBA. The AMIA field-based feedback reveals the gap in added values associated with AMIA. Enterprise in particular is not a feature of the current thinking. Expectations are not holistically exploratory of CBA. (e.g. As previously noted above, if a project helps farmers double production, it should also be thinking – “so what do we do with the added production?”. AMIA has failed in this area and this is part of a rigorous data gathering and subsequent analysis of data – and the realities faced by the farmers! Feedback from farmers revealed that prices collapsed when they doubled production! So, while they might be grateful for the AMIA model, farmers see no benefit in that particular element in the process! Enterprise development and what that might look like for NDC is highly relevant data to be collecting with the implication that the LGU / AMIA & CRAO UNIT has the capacity and capability to look at the entire value chain.

Issues / Aspect	Current Situation
Adaptation Mitigation V's	<ul style="list-style-type: none"> ● At the directive sent to CRAO by the DA leadership, it was pre-determined that Adaptation should become their area of focus. Gathering data from the impact of adaptation will, given the current extent of the AMIA activities, be almost futile. ● Were the CRAO office, in association with LGU agriculture extension team, to promote and measure impacts of 'Mitigation' at farm level (which ironically is part of the AMIA title), they would immediately have something tangible to measure. (Farmers pointed this piece of logic out at our sessions with them!) ● There is a very low understanding of the growing importance of taking the 'organic' pathway as a significant 'impact' component. Our brief desk research indicates that over the last two years, synthetic fertilizer prices have risen over 30% in the Philippines. How should this reality impact upon CRAO and DA! ● The combination of global trends and of course CC means that it will be strategically prime time to rapidly consider a change of course for the AMIA program. Prices for synthetics will keep increasing, and the slow impacts upon soils means that there will be an impasse. ● Staff need to gain an understanding and conviction of soil science fundamentals to know that building of C in soil takes time, but continued use of synthetics will cause deterioration of C numbers.

8 RECOMMENDATIONS TO ENHANCE THE DA CRAO NDC MRV SYSTEM

Capacity Building and Training

There is a need to conduct regular capacity-building programs and training sessions for relevant stakeholders involved in data collection, reporting, and verification. This includes farmers, extension workers, and government officials. Successful training and collaboration will ensure that they are well-versed in using the MRV system, understand the importance of accurate data, and can contribute effectively to the reporting process. It is important to adopt the mantra that “learning by doing” is the process by which adults more commonly learn.

Integrated Data Management System

Implement an integrated data management system that consolidates data from various sources, including satellite imagery, weather stations, and on-the-ground observations. This system should provide a comprehensive and real-time overview of climate-related variables affecting agriculture. Integration can improve data accuracy, reduce redundancy, and facilitate efficient analysis.

Incorporate Remote Sensing Technologies

Leverage remote sensing technologies, such as satellite imagery and drones, to enhance the monitoring and reporting of climate-related changes in agriculture. These technologies can provide near real-time data on land use, crop health, and climate conditions, contributing to more accurate and timely reporting of NDC targets.

Stakeholder Engagement and Collaboration

Foster collaboration with relevant stakeholders, including academia, non-governmental organizations (NGOs), and private sector entities. Establish partnerships to share data, resources, and expertise. Engage farmers and local communities in the MRV process, ensuring that their traditional knowledge is integrated with modern technological solutions for a holistic understanding of climate resilience in agriculture.

Regular Review and Adaptation

Establish a mechanism for regular review and adaptation of the MRV system. Given the dynamic nature of CC and agriculture, it is crucial to periodically assess the effectiveness of the system and make necessary adjustments. This includes incorporating new technologies, updating methodologies, and aligning the MRV system with evolving national and international standards.

Organizational Arrangements, Staffing and Training

Reform and reconstitution of the CRAO office –

- Give the new CRAO the capacity, strength of staff to mainstream the CC across the department
- Target the data AMIA village as the primary – PRA, link the climate resilient technologies with the NDC
- Steer away from demonstration pilots and upscale what is known at the LGU / AMIA level.

9 CAPACITY BUILDING IMPLEMENTATION IN THREE SELECTED DA OFFICES & LGUs

Based on the results of the interviews with key actors and informants in the agriculture sector, it appears there is a big need for continuous capacity building, specifically on the aspect of GHG reduction, and MRV within the agriculture sector. Two levels of interventions were initially set to be carried out either as stand-alone activity for each or could be simultaneously be taken up under one package of training course. Institutionally there appears to be a lack of conviction within units other than CRAO that they have any need nor responsibility to respond to CC. Indeed, DA would benefit from a greater understanding that all are responsible for rolling-out a response to the PA and the NDC's, and also begin to explore at the institutional level what their own contribution to NDC could look like.

Level 1: Awareness Building on CC Impacts, the Paris Agreement and the Philippine Nationally Determined Contributions to GHG Reduction.

The main objective of this course is for the participants to recognize the grave dangers of CC and impacts. This is to enable them to realize the importance of the Paris Agreement and the Philippines Nationally Determined Contribution to GHG reduction.

Level 2: Skill Training on GHG Reduction Monitoring, Reporting and Verification

The main objective of this course is for participants to gain knowledge, skills and mastery of how to estimate, measure, report and verify GHG reduction rate in the agriculture sector. It is recognised that the collation of these metrics will need to involve and incorporate all the relevant PHP government departments, plus the private sector where applicable. In this regard, GoP may adopt a PPP approach to the data collection.

9.1 Results of the Training Need Assessment

Key Respondents: There were 16 Key Respondents taken for the study: six (6) from DA-CRAO, five (5) from DA Regional 3 Office, and five (5) from the AMIA LGU of Victoria, Tarlac. The selection of Key Respondents was based on staff's direct involvement in the DA-AMIA Program.

Training Background: Table 6 presents the list of training courses and seminars the six (6) staff of CRAO (who participated in the TNA) had in the past four (4) years

Table 6: List of training courses the DA-CRAO staff had attended in the past

TRAINING WORKSHOP/CONFERENCE/SEMINAR TITLE	YEAR	DAYS	PROVIDER
1. Climate, Land, Energy, and Water Systems (CLEWS) Modelling Asia Pacific Training Course, Part 1: Introductory Training	2020	8	UNDP
2. Establishing Climate Resilient Agriculture and Fisheries Villages	2021	5	DA
3. Climate-Smart Agriculture Techniques and Practices	2022	3	DAP
4. Climate Information Services (CIS) Towards Resilient Agriculture and Safe Rural Communities	2022	2	DA

TRAINING WORKSHOP/CONFERENCE/SEMINAR TITLE	YEAR	DAYS	PROVIDER
5. Use of Climate Services for Agriculture	2022	2	DOST-PAGASA
6. Community Preparedness and Resilience to The Challenges of Climate Change	2022	5	UPLB
7. Training on Climate and Disaster Risk Assessment (CDRA)	2023	5	DA
AMIA Decision Support Tools and Development Pathway	2023	5	DA
4. Roll-Out of Agro-Climatic Advisory Portal	2023	5	ADB-NIRAS

Most of the past trainings taken by the CRAO staff were not much related to GHG inventory and MRV. This is quite understandable because the main emphasis of AMIA at the beginning of the program was more on climate adaptation measures dealing with flood and droughts hazards in the agriculture sector

Level of Awareness: A summary result of TNA revealed that consistently, there is medium awareness on the topics of The Science of Climate Change and Climate Disaster and Risk Management among the three (3) targeted audience of the capacity building activity (Table 7). Further, there is low awareness of the topics: 1) GHG Reduction Adaptation and Mitigation, 2) Climate Change International Agreements and Local Enactments, and 3) Carbon Trading and Climate Financing.

Table 7: Summary results of the TNA conducted at DA-CRAO, DA-R3O and AMIA-LGU

SUBJECT MATTER MAIN THEME	LEVEL OF AWARENESS ¹⁹		
	CRAO	DA-R3O	AMIA-LGU
1. The Science of Climate Change	Medium	Medium	Medium
2. Climate Disaster and Risk Management	Medium	Medium	Medium-High
3. GHG Reduction Adaptation and Mitigation	Low	Low	Low
4. CC International Agreements and Local Enactments	Low	Low	Low
5. Carbon Trading and Climate Financing	Low	Low	Low

For more details on the results of the TNA, refer to Appendix 2

9.2 Briefing/Orientation Seminar Design and Highlights

Target Audience: Based on the results of two (2) consultation meetings conducted with the DA-CRAO staff on November 13, 2023 and January 19, 2024, and substantiated by the TNA survey outcome, certain adjustments in the capacity building focus (that was initially designed supposedly on NDC compliance and GHG emission MRV) were made. This is in response to the real current felt needs of the targeted clients.

1. ¹⁹ The awareness level comprised of three categorical degrees with the following equivalents:

LOW: Not Familiar, **MEDIUM:** Familiar On The Concept, **HIGH:** Understand of the Concept with the Methodology

Table 8: Nature and scope of the orientation seminars conducted according to the type of client

CLIENT	CURRENT FELT NEED	PROPOSED ACTIVITY
1. CRAO Staff	<ol style="list-style-type: none"> How to conduct baseline study on the GHG emission metrics? Understanding the importance of Benefit-Cost Analysis in every NDC measure towards Low carbon emission in agriculture. Concept on Carbon Credit, Trading and Climate Financing 	Two (2)-Hour Orientation Seminar on the data requirements for NDC compliance in the agriculture sector as well as protocols and mechanisms on Carbon Credit, Trading and Climate Financing
2. Planning Unit Staff	Background about the Paris Agreement, National Determined Contribution (NDC) and the importance of GHG emission Measurement, Monitoring, Reporting, and Verification for climate financing	Two (2)-Hour Orientation Seminar on the Paris Agreement, NDC, GHG MRV and Climate Financing Mechanisms
3. AMIA LGU & Farmers	Background of the Paris Agreement, NDC, GHG emission reduction MRV and how farmers can benefit from Carbon Trading through climate financing mechanisms.	Three (3)-Hour Orientation Seminar on the Paris Agreement, NDC, GHG MRV and Climate Financing Mechanisms

Objective of Orientation Seminar: For the CRAO staff the Orientation Seminar was primarily designed to feedback the institutional and technical gaps and needs of the said office, particularly, in carrying out the GHG reduction MRV for NDC compliance in the agriculture sector. Likewise, it was meant to introduce the prevailing practices in establishing the metrics associated with the NDC with certain guidelines. For the DA-Planning Unit, the Orientation Seminar was mainly intended to provide a forum to discuss policy measures and mechanisms needed for efficient GHG reduction MRV in compliance to the NDC target of the agriculture sector. (Refer to Appendix 5 for the PPT slides used) For the DA-Region 3 Office and the AMIA LGU, the Orientation Seminar was meant to introduce to the participants the background of the Paris Agreement, the NDC and the Agriculture Sector's commitment to the NDC. But most importantly, the activity was conceived to elicit AMIA farmers' response to the issue of involving them to take part in the GHG emission reduction MRV in terms of incentives and capacity building needs it entails for them. (Refer to Appendix 6 for the PPT slides used)

Table 9: Summary highlights of the three (3) briefing and orientation seminars

CONCERN	CLIENTS' PERSPECTIVE ON KEY ISSUES RELATED TO THE NDC		
	DA-CRAO	DA-Planning Unit	AMIA LGU
Paris Agreement	<ul style="list-style-type: none"> Philippine agriculture sector's contribution to global GHG emission is relatively insignificant compared to the advanced developed economies. If the agriculture sector pursues the low carbon pathway as mitigation measure which is rather expensive and low yield, much leverage and negotiation for climate funding is needed to 	<ul style="list-style-type: none"> DA is committed to pursuing its sectoral target on GHG emission reduction. It just have to put in place the necessary mechanisms and processes to make it happen at the department level. Pathway to low Carbon agriculture is expensive that it requires support from outside (international community) to meet the NDC target. 	<ul style="list-style-type: none"> Paris Agreement could be a good source of incentive for smallholder farmers to go into low carbon agriculture. The mechanism on how to avail of the climate financing is a big challenge to the government, and to DA in particular,

	<p>finance the 72.29% conditional commitment</p> <ul style="list-style-type: none"> ● In some projects in the country, both adaptation and mitigation can simultaneously be achieved. A system to account our Carbon credits for trading is needed 	<ul style="list-style-type: none"> ● Thus, much international cooperation and partnership is needed in the process 	<ul style="list-style-type: none"> ● How individual farm household would really benefit from climate financing is a big operational issue
GHG Metrics	<ul style="list-style-type: none"> ● AMIA outreach is on the road to upscaling, but GHG metrics have not been given much attention at the start because of the program's overly concern on adaptation rather than in mitigation measures. ● In terms of capacity building, AMIA farmers can provide the baseline data. On the other hand. the technical experts will do the GHG emission reduction measurements, analysis and MRV 	<ul style="list-style-type: none"> ● DA Secretary has to issue a memorandum calling all the 41 organic units and offices to do their GHG emission data collection for CRAO to consolidate and submit to CCC for reporting, ● Supports the institutionalization of CRAO to become an organic unit of DA as the focal office for the NDC provided it has a clearly defined mandate and interoffice coordinative function 	<ul style="list-style-type: none"> ● AMIA farmers can participate in the GHG emission reduction MRV for as long as they will be capacitated, ● GHG metrics should be introduced to them ● Need a sample Baseline Template as a guide.
Carbon Credit, Trading & Climate Financing	<ul style="list-style-type: none"> ● To attain the 72.29% conditional target in the NDC, there are still a number of systems and mechanisms to be put in place in order to avail of the global climate funding. ● The coming in of the private sector and multi-lateral international groups is crucial 	<ul style="list-style-type: none"> ● There is a need for capacity building at all levels in the agriculture sector, i.e. from project research, feasibility study, designing, implementation & monitoring down to farmers' level. ● Tools and mechanisms are need to be in placed 	<ul style="list-style-type: none"> ● Farmers will assist in the GHG emission reduction MRV but will leave the task of negotiating, leveraging and applying for Carbon, trading to the government agencies.

Each client-respondent type has its own political view and means to meet the NDC target of the agricultural sector. The higher the responsibility attached to the unit, the NDC tends to be perceived as a pressure more than an incentive.

The CRAO being the focal point for the NDC compliance in agriculture sensed the urgency of putting in place the necessary conditions, mechanisms and instruments prior to getting climate support funding which is tedious and long process from the technical standpoint. Whereas in simplistic terms, the Planning Unit and AMIA LGU farmers merely see the whole thing as a matter of improved policy measures and mundane operational adjustments. Hence, in this context, capacity building design should be tailored fit according to the type of responsibility and function certain actor category has in the NDC target compliance.

9.2.1 Proposed Training Courses in the Future

Figure 9 presents the capacity building framework in carrying out NDC awareness building as well as MRV knowledge, skill and mastery acquisition.

Table 10: Capacity Building Plan Framework: NDC Awareness Raising and MRV Skill Development

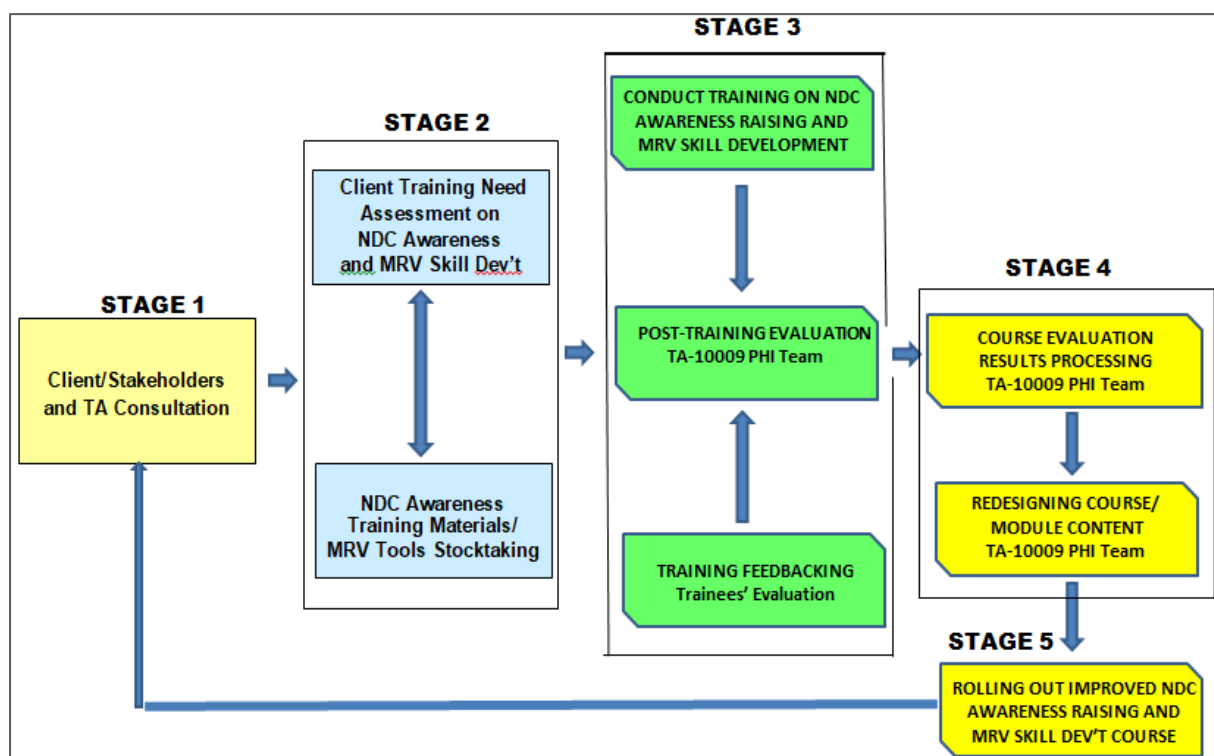


Table 11: Stages of the Capacity Building Plan for NDC Awareness Campaign and Mainstreaming

STAGE	OBJECTIVE	ACTIVITIES	EXPECTED OUTPUT
Stage 1: Levelling Off- Session	❖ Define training output, procedure and logistic requirements	<ol style="list-style-type: none"> 1. Coordinate with the CRAO, DA for the conduct of client-stakeholders' consultative levelling-off meeting, 2. Consult CRAO to identify focal persons, officers, key respondents who will be later on potential participants for the training course, 3. Come up with "do list" and tasking arrangements. 	Training Implementation Plan
Stage 2: Diagnostic Survey	❖ Assess training need, skills and level of competence the target trainees have	<ol style="list-style-type: none"> 1. Carry out Training Need Assessment 2. Conduct Stocktaking of NDC Awareness Campaign modules and MRV tools and techniques 3. Create a Study Work Group to be spearheaded by the TA to 	<ol style="list-style-type: none"> 1. Training Need Assessment Report 2. Stocktaking Report of existing course

STAGE	OBJECTIVE	ACTIVITIES	EXPECTED OUTPUT
	❖ Inventory existing training modules, tools and courses	review, analyze and streamline training materials on MRV tools and techniques 4. Identify appropriate trainers and modules for the training course	modules and tools
Stage 3: Training and Post-Training Assessment	❖ Transfer knowledge and skills to future trainers ❖ Assess training delivery effectiveness ❖ Solicit trainees' feedback in terms of extent of knowledge and skill transfer	1. Conduct the training course by training provider 2. Assess training delivery performance, in terms of effectiveness in building knowledge, skills and competence among the trainees, and 3. Assist trainees to make critical evaluation on the extent of knowledge, skill and competence built on them towards appreciating the NDC and capturing a user-friendly MRV tools and techniques.	Post-Training Assessment Report
Stage 4: Training Course/ Materials Revision and Improvement	❖ Process TA and trainees' post-training evaluation results ❖ Develop improved course/module and MRV tools/techniques	1. Consolidate and analyze TA assessment and trainees feedback results, 2. Institute appropriate revisions and improvements on course content, delivery and impact monitoring towards a user-friendly MRV tools and techniques, and 3. Conduct Writeshop for new module preparation	Revised and Improved Training Modules and Curriculum
Stage 5: Mainstream an improved awareness raising course/ module MRV & tools/techniques	❖ Field-test the improved awareness campaign course/ module and MRV tools and techniques	1. Field-test the improved NDC awareness campaign course and MRV tools and techniques 2. Roll Out the Improved Training Course/ MRV Tools/Techniques to other provinces 3. Conduct Post-Training Assessment	Post-Training Assessment Report

There has never been any specialized training specifically for MRV of GHG reduction, although GHG inventory has been done by many assisting organizations of various CC-related projects in the past. Thus, the focus of future capacity building should be more on instrumentation and the use of digital technology in gathering data, results dissemination and field verification.

9.3 TNA and Training Design

Training Need Assessment (TNA) will be carried out at CRAO-DA and the Provincial and Local Government Agricultural Officers of the three (3) selected pilot areas. An interview questionnaire will be used for baseline survey to determine prospective trainees' initial awareness, knowledge and competence level.

A total of 50 respondents from CRAO-DA, provincial and local government units will be selected for interview using survey instrument. The purpose of this survey is to get the profile of the incoming trainees in terms of the following attributes:

- nature of work and designation in the DA
- level of initial awareness, understanding, and mastery of the subject matter to be lectured,
- inventory of past training attended, i.e. similar or related to the subject matter,
- topic or course preference (which they marginally know or do not have any knowledge or information about it yet)
- mode of transfer of learning
- training schedule

The results of the TNA alongside with the outcome and inputs of the technical experts of CRAO-DA shall be the basis in designing the training curriculum.

For those topics that require field exercise or "hands on" practice, the use of more manageable settings, facilities and gadgets is recommended. The choice of site to visit depends greatly on the budget available for travel as well as the significance and uniqueness of the place to visit in relation to the subject matter to be learned.

10 WAY FORWARD

10.1 Leveraging Climate Financing

Leveraging climate financing to facilitate NDCs involves strategically utilizing financial resources to support the country's efforts in meeting its climate goals. Below are several steps and strategies that the Philippines can consider:

Assessment of Financial Needs:

- a) **Conduct a comprehensive assessment** of the financial requirements for implementing the NDCs. This includes identifying mitigation and adaptation projects, assessing their costs, and determining the financial gap that needs to be filled.
- b) **Engage in International Climate Funds:**

Explore and engage with international climate funds such as the Green Climate Fund (GCF), Adaptation Fund, and Climate Investment Funds. These funds provide financial support to developing countries for climate-related projects. The Philippines can submit project proposals aligned with its NDC goals.
- c) **Public-Private Partnerships (PPPs):**

Foster collaboration between the public and private sectors to attract additional funding and expertise. Private sector involvement can bring innovation, technology, and additional financial resources to climate projects.
- d) **Domestic Climate Finance Mechanisms:**

Establish and strengthen domestic climate finance mechanisms. This may include setting up a national climate fund or enhancing existing financial instruments to mobilize resources within the country.
- e) **Mainstreaming Climate into the national budget:**

Integrate climate considerations into national budgeting processes. This involves allocating a portion of the national budget to finance climate-related projects and initiatives.
- f) **Policy and Regulatory Reforms:**

Implement policies and regulatory reforms that create an enabling environment for climate finance. This may include providing incentives for private investment in climate-resilient and low-carbon projects.
- g) **Capacity Building:**

Build the capacity of relevant government agencies, local governments, and other stakeholders to effectively access and manage climate finance. This includes developing skills in project design, implementation, and monitoring.
- h) **Project Bank and Pipeline Development:**

Develop a robust pipeline of bankable climate projects. A well-prepared project bank can attract interest from various sources of climate finance, making it easier to secure funding.
- i) **Monitoring and Reporting:**

Implement robust monitoring and reporting systems to track the effectiveness of climate finance in achieving NDC targets. Transparency and accountability are crucial for maintaining trust and attracting further investments.

j) Regional and Global Partnerships:

Collaborate with regional and global partners to leverage additional resources and share best practices. Participate in international forums and networks to access knowledge and financial support.

By implementing these strategies, CRAO can optimize the use of climate financing to fulfill its NDC commitments and contribute to global climate action. It requires a coordinated effort involving government agencies, the private sector, and civil society to ensure successful implementation.

10.2 Inter-Government Collaboration

10.2.1 Inter-Government Collaboration to deliver on the NDC in the Philippines

NDCs are commitments to outline their climate action plans and goals. Collaborative efforts between governments play a crucial role in successfully delivering on these commitments. In the case of the Philippines, inter-government collaboration for NDC implementation involves various stakeholders at different levels, including national, regional, and local governments. Here are some key considerations:

Policy Coordination:

- a) Establish clear lines of communication and coordination among relevant government agencies responsible for climate action and NDC implementation.
- b) Develop a comprehensive national climate policy that aligns with the NDC and involves input from various government departments.
- c) Capacity Building:
- d) Invest in building the capacity of government officials at all levels to understand and effectively implement climate actions outlined in the NDC.
- e) Provide training programs, workshops, and resources to enhance technical skills related to CC mitigation and adaptation.

Data and Monitoring:

- a) Establish a robust monitoring and evaluation system to track progress in NDC implementation.
- b) Ensure data sharing and collaboration among government agencies for collecting and analysing relevant climate and environmental data.

Financial Mechanisms:

- a) Collaborate on developing and implementing financial mechanisms to support NDC goals.
- b) Explore partnerships with international organizations, development banks, and other countries to secure funding for climate projects.

Multi-stakeholder Engagement:

- a) Foster collaboration with non-governmental organizations (NGOs), the private sector, academia, and local communities to enhance the effectiveness of climate actions.
- b) Engage civil society in the development and monitoring of NDC-related policies to ensure inclusivity and transparency.

Technology Transfer:

- a) Facilitate the transfer of climate-friendly technologies through international collaborations, partnerships, and knowledge-sharing initiatives.

Legal Frameworks:

- a) Ensure that the legal framework supports NDC implementation and provides a basis for collaborative efforts.
- b) Develop and strengthen laws and regulations that promote climate resilience and sustainable development.

International Collaboration:

- a) Actively participate in international climate forums and collaborate with other countries to share experiences, best practices, and challenges in NDC implementation.
- b) Leverage international partnerships for technical assistance and capacity building.

Public Awareness and Participation:

- a) Promote public awareness and participation in climate action efforts.
- b) Involve citizens in decision-making processes related to NDC implementation to ensure that policies reflect the needs and priorities of the population.

Adaptation and Resilience:

- a) Collaborate on developing and implementing adaptation strategies that address the specific climate challenges faced by the Philippines.
- b) Foster partnerships for building climate-resilient infrastructure and communities.

Inter-government collaboration is essential for the Philippines to effectively address CC and meet its NDC commitments. This collaborative approach ensures a holistic and coordinated effort that considers the diverse needs and challenges across different levels of government and sectors within the country.

10.2.2 The NDC Partnership

The NDC Partnership refers to the "Nationally Determined Contributions Partnership." The NDC Partnership is a global initiative that was established to support countries in their efforts to implement and enhance their Nationally Determined Contributions (NDCs) under the Paris Agreement on CC.

NDCs are the commitments that countries make under the Paris Agreement, outlining their climate action plans and goals to address CC. The NDC Partnership facilitates collaboration and coordination among governments, international organizations, the private sector, and other stakeholders to help countries achieve their climate targets.

The partnership provides technical and financial support, facilitates knowledge sharing, and assists countries in accessing resources to implement their NDCs effectively. It aims to strengthen the capacity of countries to design and implement climate actions and encourages the integration of climate objectives into broader sustainable development strategies.

10.3 Work Plan

Developing a workplan to deliver NDCs in the Philippines involves a comprehensive and collaborative approach. This workplan provides a holistic approach to NDC implementation, covering various aspects of mitigation, adaptation, and sustainable development. Customizing it to the specific context and priorities of the Philippines will enhance its effectiveness. Below is the skeleton of a generic workplan outline that can be customized based on the specific needs and context.

- Stakeholder Engagement and Capacity Building:
 - Identify and engage relevant stakeholders, including government agencies, local communities, NGOs, and private sector partners.
 - Conduct workshops and training sessions to build capacity and awareness about NDC goals and strategies.
- Baseline Assessment:
 - Evaluate the current status of greenhouse gas emissions, vulnerability, and adaptation measures in various sectors.
 - Identify key sectors contributing to emissions and assess their potential for mitigation.
- NDC Goal Setting:
 - Establish clear and measurable targets for emission reductions and adaptation efforts, taking into account the country's sustainable development goals.
- Align NDC goals with national policies and priorities.
- Policy and Regulatory Framework:
 - Review and update existing policies to align with NDC goals.
 - Develop new regulations and incentives to support the implementation of NDC strategies.
- Financial Planning and Resource Mobilization:
 - Assess the financial requirements for implementing NDC goals.
 - Explore domestic and international funding sources, including climate finance mechanisms and partnerships.
- Technology Transfer and Innovation:
 - Identify and promote the adoption of clean and sustainable technologies.
 - Facilitate technology transfer through partnerships and collaboration.
- Monitoring, Reporting, and Verification (MRV) System:
 - Establish an MRV system to track progress towards NDC goals.
 - Develop standardized reporting mechanisms and ensure transparency in data collection and reporting.
- Adaptation Planning:
 - Assess vulnerability to climate impacts and develop adaptation strategies.
 - Integrate adaptation measures into national and sectoral policies.
- Implementation Roadmap:
 - Develop a detailed roadmap outlining specific actions, responsibilities, and timelines for NDC implementation.
 - Foster inter-agency coordination and collaboration.
- Public Awareness and Communication:
 - Implement a communication strategy to raise awareness about the importance of NDCs and engage the public.
 - Encourage public participation in climate action initiatives.
- Review and Evaluation:
 - Establish a regular review process to evaluate the effectiveness of NDC implementation.
 - Adjust strategies and actions based on feedback and changing circumstances.
- International Collaboration:
 - Engage in international forums to share experiences and best practices.
 - Collaborate with other countries and organizations to enhance capacity and knowledge exchange.

- Legislation at National level.
 - Seek legislative support for NDC implementation through the enactment of supportive laws and policies.

ANNEX

Annex 1: Policy briefing regarding best practices in MVR on agriculture sector adaptation related NDC commitments

Introduction

This policy brief aims to relate to the motherhood framework of the ANRE project to the national NDC commitments. The goal of ANRE is to support the GoP to move forward on the climate resilience reform agenda of the Philippines Climate Change Action Program (CCAP), covering agriculture, natural resources, and the environment. Given the critical role of agriculture in CC adaptation, effective MVR mechanisms are crucial for ensuring transparency, accountability, and successful implementation of NDC commitments. Climate Change (CC) Action needs to be viewed through an understanding which encompasses holistic planning and strategic programming established on sound policy, appropriate program and project activity development, subsequent investment budgeting supported by government and donor inputs, monitoring, evaluation and effective cumulative response to lessons learnt.

To be successful, the NDC requires data. Currently little verifiable data appears to exist. To achieve the goal of collecting data and verifying its validity requires a shift in practices including a greater institution-wide understanding of CC, adoption of a proactive response and an adoption of processes which will promote the flow of accurate and verifiable data.

The Problem

There are three dimensions to the current problem. (A) An institution-wide lack of a data gathering culture to NDC and baseline information, (B) a consolidated trajectory towards seeing the value of promoting adaptation measure only and ruling out the legitimacy of influencing mitigatory actions and contributing that data to the NDC, (C) the institutional status of DA-CRAO.

- There is a currently an absence within the DA regarding the collection of baseline data. Although short in time, this mission has found that a data gathering culture appears to be absent and its absence is universal, with a glaring shortfall in the systematic collection of baseline data either associated with specific projects or otherwise. This is a lost opportunity, one which should be an integral component in any activity or project aiming to promote, accelerate or cultivate changes in farming practices and farming outcomes specifically within the context of CC, but also from a general perspective.
- At the field level, the high profile AMIA program appears to have no protocols for the development of baseline at the commencement of each initiative. This is a problem. As an example of how profound the problem is, it was revealed that the Project Development unit within DA-Planning, (a group which has responsibility for the development and documentation of international donor projects), has just been successful in the finalization of a project formulated in collaboration with the Global Climate fund, a process which has taken six years to identify, formulate, document and recently successfully achieve funding. According to the respondents to the current research, at no point in that six-year period of project identification and development has the explicit need to assemble relevant baseline data been identified or discussed.

- The PA creates the expectation that signatories to the agreement will be able to verify their anticipated success in curbing GHG emissions, systematically achieved through the tabling of hard data which proves a decline in GHG. To successfully achieve a decline in emissions, there is a need to promote both mitigation and adaptation practices and procedures.
- Strategically, DA-CRAO have anticipated that successful compliance with the PA creates an opportunity for the Philippines to make positive strides in assisting farmers to be more resilient towards the impacts of CC. The pathway adopted promotes adaptation over mitigation. While this trajectory has merit, it rules out the “low-hanging-fruit” offered by mitigation. Expecting to record changes in GHG emissions as a result of adaptation will reap minimal change. For example, when interviewed, AMIA farmers themselves identified the need to “solarize” their water managements which could very rapidly cause measurable decline in GHG emission.
- subset of the problem is that currently DA CRAO is currently seen as the “go-to” place should any issue regarding CC be on the agenda. This can be interpreted that all CC issues requiring the attention of DA belong in CRAO. The current situation indicates a lack of understanding regarding the PA and the holist contribution required to respond both institutionally, and as well, in relation to farmers. In fact, successfully responding to CC requires a highly geared “philosophical and action-based change” across the entire DA institution. And, given the uncertain institutional status of DA-CRAO (a situation well documented in the ADB July 2023 report), the tenuous status of pro-activity to CC and the PA is highlighted even more.

Policy Options

- a. Instigation of a DA wide approach which foresees adoption of both mitigation and adaptation measures within the AMIA programme as being the building blocks for rapid decline in GHG emissions. Such a step would envisage all units becoming individually responsible for metric development associated with the NDC, both within the institution (monitored internally within each office) and as a core component in extension activities. Such a move would require the development of a DA action plan with directive from the Secretary for involvement of the entire department by adoption of mitigatory emissions cutting as part of all activity.
- b. Development and application of a user-friendly baseline data framework for a generic data gathering system for agriculture which can be applied at representative agro-geographic regions and specific project sites across the county. This option would emphasize the need at the resource and client/farmer level through ‘extension’ style initiatives and see GHG data as included within a wider framework.
- c. The reinstatement of a dedicated agricultural statistics bureau whereby a team of officers extrapolate from production data across the organization to establish broad bench-line data sets and include GHG data.
- d. Institutionalization of CRAO as a dedicated unit with power to take assemble all GHG data across DA and contribute to the NDC. This option would promote DA-CRAO as the unit responsible for an issue which should be universally adopted by all.

Decision-making

- It is recommended that from the policy options stated above, that options A, B and D be adopted.

Agenda Setting

- The Secretary of DA send a directive to all divisions (e.g. Planning, Projects, Finance, Operations, etc) (and specific projects) whereby they are all involved in recognizing the need for NDC data.
- Capacity building program fostering “institutional change” in understanding the issues, development of actions to both mitigate and adapt both at an institutional level, but also inculcated with any interactions with farmers via extension activities.
- Adoption of a baseline proforma approach applied across the institution and at project level activities.
- ADB report from July 2023 be mobilized incorporating all considerations and recommendations,

Implementation

- Establish what CRAO and then each relevant department can do to contribute to the need for data.
- Agree on the metrics, the breadth of mitigation and adaptation possibilities at institutional and project level, and then have an understanding of alignment of relevant departments to the needs.

Evaluation.

- Establish a time line and estimate what can be achieved within CRAO and other units over incremental periods; three months, for six months and then 1 year.

Annex 2: Theoretic methodology to quantify GHG emissions in small scale agriculture & Steps in development of a Carbon Trading Mechanism

Quantifying greenhouse gas (GHG) emissions in small-scale agriculture requires a systematic approach that considers specific characteristics of any agricultural system in question. Below is a theoretical / general methodology which would need to be adapted to the context and available resources. Assumption should be that the following steps comprise a longitudinal study with a rigorous process put in place.

	Steps	Systems, Processes, and Requirements
1	Scope Definition	Identify study boundaries (village / farm). Determine GHGs to measure e.g. (carbon dioxide (CO ₂), methane (CH ₄), & nitrous oxide (N ₂ O)) Decide on scope of study: e.g. does it include only on-farm activities, or does it also consider upstream & downstream processes (e.g., fertilizer production, transportation).
2	Activity Inventory	Create a detailed inventory of all relevant activities on the farm. E.g. crop cultivation, livestock management, fertilizer use, energy consumption, & waste management.
3	Data Collection	Gather inputs & outputs data for each activity. This may involve direct measurements, surveys, & existing data sources. SOC is important in small scale cropping systems. Use emission factors: Emission factors are coefficients that convert activity data into GHG emissions. Numerous databases provide emission factors for various agricultural practices.
4	Calculate GHG emission	Use the collected data and emission factors to calculate GHG emissions for each activity. The formula generally used is: Emissions = Activity Data × Emission Factor
5	Soil Carbon Sequestration considerations	Small-scale agricultural practices can influence soil carbon sequestration. Consider changes in soil carbon stocks when assessing the net carbon balance. SOC
6	Time Frame & Metrics	Decide on time frame for the assessment (e.g., annual, per crop cycle) and express results in common metrics (e.g., CO ₂ equivalent) for easier comparison.
7	Quality Assurance	Implement quality assurance and quality control measures to ensure data accuracy and reliability. Document sources and assumptions made in the calculations.
8	Sensitivity Analysis	Conduct sensitivity analyses to identify key variables influencing emissions. This helps to understand the uncertainties in your calculations.
9	Mitigation Strategy	Identify opportunities for reducing emissions through mitigation strategies. This could involve changes in management practices, technology adoption, or alternative approaches.
10	Reporting and Communication	Summarize your findings in a clear and concise manner. If applicable, compare emissions per unit of production (e.g., emissions per kilogram of product)
11	Continuous Improvement	Agriculture is dynamic, and practices may change over time. Consider revisiting your assessment periodically to incorporate updated data and refined methodologies.

Source: After World Bank, *Greenhouse Gas Assessment Handbook* & (After) Rotz, *Modelling greenhouse gas emissions from dairy farms in [Journal of Dairy Science](#), Volume 101, Issue 7, July 2018, Pages 6675-6690*

Annex 3: Carbon Trading Mechanism (CTM) ²⁰

Establishing a carbon trading mechanism involves creating a framework to enable the buying and selling of carbon credits, with the goal of reducing GHG emissions. The below table summarizes the key systems, processes, and requirements typically involved in setting up a carbon trading mechanism (CTM).

A CTM is a complex process that requires careful planning, collaboration, and ongoing monitoring. The success of such a system depends on the effectiveness of its design, implementation, and adaptability to changing environmental and economic conditions. A primary assumption should be that the following steps comprise a longitudinal study with a rigorous approach established such that it can be replicated across the country, including a variety of farming systems.

Table 12: Establishing a Carbon Trading Mechanism (after Guigon 2016)

	Steps	Systems, Processes, and Requirements
1	Regulatory Framework	Develop legal and regulatory framework that governs a carbon trading system. Framework should define the rights and responsibilities of participants, set emission reduction targets, and establish the overall structure of the market.
2	Emission Inventory	Establish robust system for measuring & reporting greenhouse gas emissions. This involves creating standardized methods for calculating emissions & monitoring compliance with emission reduction targets
3	Baseline Determination	Define baseline against which emission reductions can be measured. Baseline represents expected level of emissions without any intervention & serves as reference point for calculating emission reduction.
4	Carbon Credits Allocation	Determine initial allocation of carbon credits to participants. This could be based on historical emissions, sector-specific benchmarks, or other criteria. The allocation process should be transparent and fair.
5	Verification & Certification	Implement rigorous system for verifying & certifying emission reduction. Third-party auditors or government agencies may be involved to ensure accuracy & credibility of reported reductions.
6	Market Infrastructure	Implement rigorous system for verifying & certifying emission reduction. Third-party auditors or government agencies may be involved to ensure accuracy & credibility of reported reductions.
7	Market Participants	Define types of entities eligible to participate in carbon market, such as companies, industries, or even individual projects. Ensure that there are clear rules for entry and exit from the market.
8	Monitoring & Enforcement	Establish a monitoring and enforcement system to track compliance with emission reduction targets. Penalties for non-compliance should be clearly defined to ensure effectiveness of the trading mechanism.
9	Market Oversight	Assign a regulatory body or authority to oversee & regulate the carbon trading market. The entity needs the power to enforce rules, resolve disputes, & adapt the system to changing circumstances
10	Market transparency	Ensure transparency in the market by providing accessible information on carbon prices, trading volumes, and overall market performance. Transparency fosters trust & confidence among market participants.
11	International collaboration	Consider international collaboration and alignment with global standards to enhance the effectiveness of carbon trading mechanism. This may involve linking with other carbon markets or adopting common methodologies

²⁰ [Pierre Guigon, \(2016\) 10 practical steps to create an Emissions Trading System \(Worldbank.org\)](#)

12	Stakeholder Engagement	Engage with various stakeholders, including businesses, environmental groups & local communities, to gather input & address concerns. Building consensus & support is crucial for success of the carbon trading mechanism.
13	Education & Outreach	Conduct educational programs to raise awareness about benefits & requirements of participation in a carbon market. This includes training for market participants and outreach to the public