CLIMATE CHANGE ASSESSMENT

I. BASIC PROJECT INFORMATION

Project Title:	Proposed Programmatic Approach and Policy-Based Loan for Subprogram 1 Republic of the Philippines: Competitive and Inclusive Agriculture Development Program
Project Cost ($ million)**:**	400.0
Location:	Philippines
Sector:	Agriculture, Natural Resources and Rural Development
Theme:	Inclusive economic growth; environmentally sustainable growth
Brief Description:	**Background.** While the Philippines has outperformed many regional peers in terms of overall annual economic growth, averaging 6.3% from 2010 to 2018,[1] it has lagged in terms of agriculture sector growth, averaging 1.3%.[2] This sector's poor performance resulted in (i) high prices of food, particularly rice, for all Filipinos; and (ii) low rural household incomes and a high poverty incidence in rural communities.[3] The root causes of the poor performance, to be addressed in the program, are (i) decades of protective policies and regulations for agricultural trade, (ii) inadequate provision of public services and finance for agriculture development, and (iii) adverse impacts of climate change, variability and extreme events.[4] **Proposed policy reforms.** The program will support the government's efforts to increase competitiveness and inclusiveness of the agricultural sector in three reform areas: (i) agricultural trade policy and regulatory framework, (ii) public services and finance to the agriculture sector, and (iii) social protection to rural families. The program is consistent with the Philippine Development Plan (PDP), 2017–2022 and supportive of the Philippines' Paris Agreement Commitments as stated in its Intended Nationally Determined Contributions (INDC). The program is included in ADB's country operations business plan, 2020−2022.[5] 1. **Reform area 1: Agricultural trade policy and regulatory framework.** Under this policy reform area, the government liberalized and facilitated rice trade to make sufficient rice available at affordable prices in the domestic market. Under subprogram 1, the government enacted the Rice Tariffication Law (RTL) and adopted its implementing rules and regulations. The RTL (i) removed quantitative restrictions on rice imports and replace them with a pure tariff system, and (ii) removed NFA's

[1] Government of the Philippines, Philippine Statistics Authority. National Accounts. Data Series (accessed on 28 February 2020); ADB. 2019. *Key Indicators for Asia and the Pacific 2019*. Manila. The average gross domestic product growth during 2010–2018 was 5.5% for Indonesia, 3.8% for Thailand, and 6.2% for Viet Nam.

[2] Government of the Philippines, Philippine Statistics Authority. National Accounts. Data Series (accessed on 28 February 2020); ADB. 2019. Philippines – Key Indicators. Manila. The average growth in agricultural value added during 2010–2018 was 2.0% for Cambodia, 3.9% for Indonesia, and 2.7% for Viet Nam.

[3] Poverty incidence in rural areas was at 30.5% in 2015, compared to 11.5% in urban areas. Philippine Statistics Authority. *http://www.psa.gov.ph/sdg/Philippines/baselinedata/1%20No%20Poverty.*

[4] National Economic Development Authority. Accessed on 06/04/2020. Philippines Development Plan 2017-2022. Source: http://pdp.neda.gov.ph/

[5] Asian Development Bank (ADB). 2019. *Country Operations Business Plan: Philippines, 2020-2022.* Manila. (formerly Support for Agri-Food System Competitiveness for $300 million. Government later requested to increase the amount to $400 million given the substantive reforms to be supported by the program).

	regulatory powers and commercial functions over the domestic and international trade of rice and other grains. The government also facilitated trade of non-rice agricultural products by removing administrative barriers for their import. Under subprogram 2, the government will issue implementing rules of NFA's buffer stock management to better cope with any emergency situations including infectious disease outbreaks. 2. **Reform area 2: Public services and finance to the agriculture sector**. Under this policy reform area, the government improved (i) land and water resources use planning and management, which are key production factors for agriculture; (ii) financing to make the Philippine rice industry competitive under the liberalized trade regime; and (iii) extension services. Under subprogram 1, the government enacted the Agriculture Free Patent Reform Act to retroactively remove the restrictions on the sale and transfer of agriculture land for its efficient and effective utilization. The government (i) took steps to create the Department of Water Resources as a significant institutional reform aiming at coordinated and efficient water resource management; (ii) formulated and adopted the National Irrigation Master Plan (NIMP) for efficient and sustainable planning, and management of irrigation; and (iii) developed FRMMPs for major river basins. The government set up the Rice Competitiveness Enhancement Fund (RCEF) to strengthen the rice industry in 57 rice-competitive provinces during 2019–2024 in accordance with Philippine Rice Industry Roadmap. The RCEF provides an annual budget of ₱10 billion from increased tariff revenue of rice import for four primary programs: (i) rice farm machineries and equipment (₱5 billion); (ii) rice seed development, propagation and promotion (₱3 billion); (iii) expanded rice credit assistance (₱1 billion); and (iv) rice extension services (₱1 billion). The RCEF further finance, with the excess of ₱10 billion from the rice tariff revenue: (i) rice farmer financial assistance, (ii) titling of agricultural rice lands, (iii) expanded crop insurance program on rice, and (iv) crop diversification program. To improve the targeting of RCEF programs, the government started updating the Registry System for Basic Sectors in Agriculture to identify the beneficiary farmers, farmworkers, and their dependents. **Reform area 3: Social protection to rural families**. Under this policy reform area, the government (i) mitigated impact of RTL and COVID-19 on smallholder rice farmers and fisherfolks; and (ii) institutionalized delivery of basic services for the poor. Under subprogram 1, the government established the Rice Farmer Financial Assistance Program and allocated ₱3.0 billion to provide unconditional cash transfer to smallholder rice farmers who were most affected by the RTL. the government established unconditional cash transfer programs for smallholder rice farmers who were most affected by low farmgate rice prices as a result of the RTL and allocated ₱3.0 billion under the Rice Farmer Financial Assistance Program and an additional ₱3.0 billion under the Financial Subsidy to Rice Farmers Program. The government established (i) the Expanded Survival and Recovery Assistance Program for Rice Farmers (SURE Aid, which is one of the SURE assistance programs) providing 163,827 small rice farmers (one hectare or below), of which 45% are female, with interest-free loans in total of ₱2.5 billion and (ii) SURE Aid Covid-19 Program with an additional ₱2.5 billion to provide interest-free loans for small farmers and fisherfolks (three hectare or below) and agri- and fishery-based micro- and small-sized enterprises affected by COVID-19 pandemic. The government launched a national feeding program for undernourished children in public day care, kindergartens, and elementary schools to address high rates of child malnutrition and stunting rates, improving nutritional status of children. **Context of Vulnerability.** Philippines is highly vulnerable to climate change variability and impacts. The weak performance of the crop subsector, the largest subsector in agriculture, is highlighted and attributed to its vulnerability to extreme weather events

	(i.e., drought and typhoons) and limited adoption of high yielding varieties.[6] It has experienced strong tropical cyclones, extreme heat, drought, wildfire, intense precipitation leading to floods, landslides, and plant/crop infestation.[7] Climate projections indicate an increase in frequency and/or intensification of these events.[8] The agriculture sector, from production to post harvest, is the worst hit by these events. Loss and damages exacerbate further the poor conditions of the marginal farmers, micro-, small-, and medium-sized enterprises; and the agriculture value chains, key inputs (land, water, crops), agriculture infrastructure (irrigation, roads, processing facilities, markets). The **target beneficiaries** of the PBL comprise of two groups covering almost the entire population. First, virtually every Filipino family who buys rice will be impacted through substantially cheaper rice prices due to the rice trade liberalization. Second, farmers and workers in agriculture and larger rural population will benefit from various policy and institutional reforms and effective planning of flood risk management and irrigation development. Particularly, rice farmers, including smallholders, will benefit from various intensive and comprehensive technical and financial programs so that they can adjust to the international competition led by the rice trade liberalization. **Program's climate response.** Eleven out of 13 policy actions have climate adaptation elements, while 5 of the 13 policy actions have climate mitigation co-benefits. The proposed program will (i) promote crop diversification, which aims to enhance climate resilience of the sector, (ii) increase disposable income of all Filipinos, particularly the poor and vulnerable, through substantially decreased rice price to cope with climate shocks, (iii) improve the national buffer stock management for emergency events including adverse climate events, (iv) enable access to finance for farmers and provide concessional financing to small rice farmers, (v) mainstream climate adaptation in irrigated agriculture and improve overall water resources management for the agriculture sector and the entire economy to be resilient to droughts and water shortage, and (vi) improve planning of flood risk management and irrigation development for the agriculture sector and the entire population to be resilient to adverse climate events (e.g., droughts, typhoons, floods). Enabling policies and mechanisms supportive of greenhouse gas reduction via crop diversification, reduced loss of agriculture and food products through improved trade administration, resource-efficient farming and post-harvest activities. **Statement of Intent.** The government recognizes the adverse impacts of climate change on the agriculture sector. Recognizing the vulnerability of Philippines to climate change and its impacts, and supporting the implementation of the Philippines INDC under the Paris Agreement, the government stated its intention to enhance climate change resilience of its communities/people, institutions, resources, built infrastructure, and investments, and considers this program a valuable vehicle to strengthen the sector's resilience to climate change.

[6] Ibid.

[7] Thinkhazard Philippines Mindanao Regions. Prevalent pests in Mindanao region include (i) Tungro virus from grasshoppers, with hotspot areas recorded in Davao del Norte and del Sur, North Cotabato, Sarangani, Bukidnon, and Lanao del Sur; (ii) white stembore, with hotspot areas recorded in Agusan del Norte, North Cotabato, Davao del Sur, and Bukidnon, primarily affecting rice; (iii) black bug (Scotinophara coarctata), while currently confined to Zamboanga provinces, has alarmingly moved toward Lanao del Sur and Maguindanao. Source: http://agris.fao.org/agris-search/search.do?recordID=PH19960096685

[8] PAGASA. 2019. Drought advisory for Mindanao; PAGASA. 2019. Climate Outlook January-June 2019.

II. SUMMARY OF CLIMATE CHANGE FINANCE

ADB will provide a loan amounting to $400 million to support the program. As loan proceeds are not mapped per policy action under the three reform areas, climate adaptation and mitigation finance corresponding to the policy actions is estimated through a proportionality approach.[9] The $400 are assigned equally to each of the 13 policy actions ($30.77 million each) and then each allocation is pro-rated corresponding to climate related elements of each policy action. Climate mitigation finance amounts to $12.31 million and climate adaptation finance amounts to $40.00 million. ADB will finance 100% of mitigation adaptation costs.

Table 1: Summary of Climate Change Finance

Project Financing		**Climate Finance**	
Source	**Amount** ($ million)	**Adaptation** ($ million)	**Mitigation** ($ million)
Asian Development Bank			
Ordinary capital resources (regular loan)	400	40.00	12.31

Source: Asian Development Bank.

III. SUMMARY OF CLIMATE RISK SCREENING AND ASSESSMENT OF TARGET BENEFICIARIES OF THE PBL

A. Methodology

Preliminary risk screening was conducted in accordance with the Asian Development Bank's climate change risk management framework, and the project is rated as "low" for climate change impacts since the program will not finance any physical works. However, the target sector and beneficiaries of the PBL may be at risk to climate impacts. A literature review of climate impacts related to the program was conducted, using most recent data and information (e.g., Observed Climate Trends and Projected Climate Change in Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA); the Nationwide Operational Assessment of Hazards, Global Data Risk Platform) and international literature (footnotes 14, 15, 16, 18).

B. Climate Projections for Philippines

Using the data from PAGASA, the PRECIS (Providing Regional Climates for Impact Studies) model was used. PRECIS is a PC-based regional climate model developed at the UK Met Office (Hadley Centre for Climate Prediction and Research) to facilitate impact, vulnerability, and adaptation assessments in developing countries where capacities to do modeling are limited. The following are based on PAGASA climate projections.

Temperature increase. An average rate of 0.1 ˚C/ decade increase in temperature has been observed and the continuing warning is projected in the future. By 2036−2065, the country's average mean temperature is projected to be at 0.9˚C to 1.9 ˚C and 1.2 ˚C to 2.3 ˚C under the RCP 4.5 and RCP 8.5 scenarios respectively. Similarly, by 2070–2099, warmer temperatures are further expected from 1.3˚C to 2.5˚C and 2.5˚C to 4.1˚C under a 4.5 RCP and 8.5 RCP scenarios.

Rainfall increase. Increasing trends and rainfall intensities in annual and seasonal rainfall has been observed. Rainfall projections point to small changes in annual daily rainfall but will have annual variability under the two scenarios (RCP 4.2 and 8.5). Wetter seasons are projected during the mid-21st century

[9] As per Guidance Note on Counting Climate Finance at ADB Oct 2016 and 2018 Joint Report on Multilateral Development Banks' Climate Finance.

especially during the NE monsoon; a slight decrease in rainfall is expected toward the end of the 21st century. Extreme rainfall could be experienced in some areas while reduction in rainfall is also projected in some areas during the rest of the month; areas with longer dry days could experience droughts. Intense rainfall may cause flash floods in urban and rural areas affecting day to day worker outputs and business operations of industries affected; similarly, lack of rainfall also impacts industries dependent on water, worker's health, and livelihood opportunities.

Extreme Events. Tropical Cyclones with strong wind and rains. By mid-21st century, the number of tropical cyclones (TCs) crossing PAR are likely to remain the same or decrease. However, the study also shows that there will be an increase in intensity of the TCs; the number and intensity of TCs within PAR will also vary year to year. For the period 1951 to 2015, the observed trend is a slightly downward in number of TCs, a year on year variability of number of TCs occurring within the Philippine Area of Responsibility (PAR). On average, Philippines has 19 TCs per year but the country experiences as high as 32 TCs entering the Philippine Area of Responsibility (PAR). From 1949 to 2013, based on a 5-year frequency of TCs in Luzon, Visayas and Mindanao regions, the variability in the number of TCs persists. For the period 1999 to 2013, years in Mindanao, the frequency of TCs is increasing. There is an observed increasing trend in the number of extreme TCs that have a speed of 150 Kph and above. The number of 23 extreme TCs is also variable annually; examples of extreme TCs are experienced during El Nino events (e.g., Yolanda (Haian) and Lawin (Haima)). Extreme events may not only temporarily disrupt business operation and work activities in the short run but also in the long run or permanently destroy the business operations as what happened in the course of Haian extreme TC.

C. Sensitivity of Program Component(s) to Climate Change

Key climate change impacts on agriculture sector. Climate change will influence food production via immediate or short-term and long-term effects on crop growth processes. Short-term effects include impacts on productivity through adverse climate events such as typhoons, floods, and droughts. Long-term effects include impacts on productivity through declines in productive inputs or their productive capacity (e.g., water resource availability and seasonality, decline in arable areas due to the submergence of coastal lands and desertification, soil organic matter transformation, soil erosion). Changes in pest and disease profiles and the arrival of invasive species also pose long-term effects on crop growth processes. Shifts in the optimal and viable spatial ranges of certain crops are also inevitable, though the extent and speed of those shifts remains dependent on the emissions pathway. On an international level, these impacts are expected to damage key staple crop yields, even on lower emissions pathways. Tebaldi and Lobell (2018) estimate 5% and 6% declines in global wheat and maize yields respectively even if the Paris Climate Agreement is met and warming is limited to 1.5°C.[10]

Just over a third of the Philippine population is employed in the agriculture sector which contributes, when including fisheries, 15% of the country's GDP. The country's five main crops are rice, corn, sugarcane, banana and coconut, with 60% of rice production in the northern island of Luzon, 60% of corn and coconut and 80% of banana in the southern island of Mindanao, and 70% sugar cane from the Visayas Islands.

The dependency of large amounts of the population on the agriculture sector (either directly or indirectly) makes the country particularly vulnerable to climatic shocks, such as flooding and drought. For example, from 1970 to 1990, typhoons, floods and droughts were responsible for 84.2% of Philippine rice losses.[11] Indeed, Puhlin and Tapia (2016) describe how the Philippines is projected to experience an estimated decline in agricultural productivity of 9%−21% by 2050 as a consequence of climate change. Spatial analysis of how forecasted climate change impacts could affect agricultural land show that up to 85% of the country's strategically important agricultural land could be affected from typhoons, floods, and droughts.

A further, and perhaps less appreciated influence of climate change on agricultural production is through

[10] Tebaldi, C., & Lobell, D. (2018). Differences, or lack thereof, in wheat and maize yields under three low-warming scenarios. *Environmental Research Letters*: 13: 065001

[11] Lansigan FP, de los Santos WL, Coladilla JO (2000) Agronomic impacts of climate variability on rice production in the Philippines. *Agric Ecosyst Environ* 82(2000):129–137.

its impact on the health and productivity of the labor force. Work by Dunne et al. (2013)[12] suggests that labor productivity during peak months has already dropped by 10% as a result of warming, and that a decline of up to 20% might be expected by 2050 under the highest emissions pathway (RCP8.5). In combination, it is highly likely that the above processes could have a considerable impact on national food consumption patterns both through direct impacts on internal agricultural operations, and through impacts on the global supply chain.

Low climate risk. The impact of climate change on the proposed program, its intended outcome and the policy actions it supports, is low. However, the program targets a sector that is highly vulnerable to climate change and variability, and some of the policy actions partially address these vulnerabilities and implements climate resilience measures.

Vulnerable poor farmers and farm workers. The stakeholders/beneficiaries that will benefit from the program in terms of climate change impacts are climate vulnerable farmers and farm workers. In addition, micro-, small-, and medium-sized enterprises; cooperatives, and CCT beneficiaries in rural areas who buy and utilize primary agriculture products for further processing and trading will also benefit from the sufficient and stable supply of those products.[13] These stakeholders are considered as vulnerable to climate change. Empirical evidence has shown that natural disasters such as droughts, typhoons, and cyclones, play an important role in preventing people from moving out of poverty, and in pulling back into poverty people who were able to escape poverty.[14]

Vulnerable finance institutions. The financial institutions managing the RCEF and SURE assistance programs serving the vulnerable farmers and micro- and small-sized enterprises are also at risk to the impacts of climate change and variability. Disruption to loan servicing due to losses and damages incurred by the borrowers may put at risk the loan portfolio of those financial institutions involved.

[12] Dunne, J. P., Stouffer, R. J., & John, J. G. (2013). Reductions in labour capacity from heat stress under climate warming. *Nature Climate Change*, 3(6), 563–566.

[13] DSWD. Accessed on 08/04/2020. Listahanan: Statistics.Source: https://listahanan.dswd.gov.ph/reports/

[14] World Bank. 2019. Identifying the Vulnerable to Poverty from Natural Disasters: The Case of Typhoons in the Philippines. Source: https://reliefweb.int/report/philippines/identifying-vulnerable-poverty-natural-disasters-case-typhoons-philippines

IV. PROGRAM'S CONTRIBUTION TO CLIMATE RESILIENCE

The proposed program will contribute to the sustainability of agriculture production and income. It will also enable the sector to become climate-resilient by: (i) promoting crop diversification, (ii) increasing disposable income of all Filipinos, particularly the poor and vulnerable, through substantially decreased rice price to cope with climate shocks, (iii) improving the national buffer stock management for emergency events including adverse climate events, (iv) enabling access to finance for farmers and providing concessional financing to small rice farmers, (v) mainstreaming climate resilience in irrigated agriculture and improving overall water resources management, and (vi) mainstreaming climate and disaster resilience in flood risk management planning. Enabling policies and mechanisms supportive of greenhouse gas reduction via crop diversification, reduced loss of agriculture and food products through improved trade administration, resource-efficient farming and post-harvest activities. Eleven out of 13 policy actions have climate adaptation elements, while five of the 13 policy actions have climate mitigation co-benefits.

Table 2: Policy actions and their contribution to climate resilience

Policy Action	**Target Climate Risk**	**Estimated Adaptation Costs** ($ million)	**Adaptation Finance Justification**
Policy Reform Area 1: Agriculture trade policy and regulatory framework			
PA1	Food security, climate-induced poverty, extreme climate events	0	This policy action will indirectly contribute to enhanced climate resilience of (i) primarily the agriculture sector through crop diversification and (ii) secondarily the entire population, particularly the poor and vulnerable, through increases in their disposable income resulted from lower rice prices. Rice Tariffication Law (RTL) will reduce not only rice prices for consumers, but also farmgate paddy prices for farmers. As a result, a number of rice farmers, particularly those in non-rice competitive provinces, will be incentivized to diversify their production. With more diversified agricultural production, the agriculture sector is expected to become more climate resilient since water shortage will impact the sector that is diversified less than it does to the sector that is dominant with rice production as non-rice crops usually require less water than rice. Poor and vulnerable households spend over 20% of their total food expenditure on rice. Making rice more affordable will have a positive impact on their disposable income. Growth of real disposable incomes have long been linked to improved resilience and thus softening the blow of future climate change shocks and other abnormalities. Households with some savings will not need to revert to negative coping mechanisms as they have funds available for items like medicine and other emergency essential necessities. ➔ Indirect climate resilience benefit. No climate adaptation finance claimed.
PA2	Food security, climate-induced poverty, extreme climate events	0	The improved governance of buffer stock will ensure affordable rice prices in times of crisis as well as stabilize the (food) market. During crisis and national emergencies (i.e. climate or human- or animal-disease induced), the government can provide adequate amount of rice to its population, especially to the most vulnerable ones. This touches on two pillars of food security – affordability

			(economical) and availability (physical) – during extreme events. ➔ Indirect climate resilience benefit. No climate adaptation finance claimed.
PA3	Food security, extreme climate events,	0	The country is heavily reliant on food imports. In 2019, the Philippines surpassed the People's Republic of China as the world's biggest rice importer. Handling food imports fast and efficiently for and during the times of climate calamities and other shocks is a major priority for the government. Removing non-tariff barriers and streamlining administrative procedures on the importation of agricultural products will help the country to act fast in times of crisis and it will contribute to the strengthening of food security during such times; especially benefiting the most vulnerable. ➔ Indirect climate resilience benefit. No climate adaptation finance claimed.
Reform Area 2: Public services and finance to the agriculture sector			
PA4	Limited access to finance, extreme climate events	1.54 million [(400/13) * 5%]	One of the main bottlenecks to increase agricultural productivity is access to finance. Removing restrictions on agricultural land sales and transfers and making land titles bankable help farmers to access finance and credit. Improved access to finance will help farmers diversify from rice to other crops and adopt climate smart technologies and practices. Adaptive approaches include the use of stress tolerant varieties, water-harvesting technologies (small water impounding, drip irrigation) or integrated crop management (site-specific nutrient management, integrated pest management). The shift to non-rice crops that are more resilient to climate change will require capital investment. ➔ Climate adaptation finance claimed for this PA is 5%.
PA5	Water shortage and stress, extreme climate events, increased flood risks	15.38 million [(400/13)* 50%]	Better coordination between various government agencies related to water resources will result in a more cohesive integration of viable climate mitigation and adaptation measures in their respective work and policies. (e.g. the use of renewable energy and energy efficiency systems and bio-engineering). Climate change is one of the issues that the bill addresses. Water resources management takes a holistic approach that not only includes irrigation water delivery, but also water uses for residential, industrial and commercial purposes. The National Capital Region is increasingly experiencing water shortages during dry season. As drought and heat periods are expected to increase as a result of climate change, it will be crucial for the government to manage water resources in a coordinated manner while addressing the needs of the different types of water users. ➔ CC finance is assumed for 60% of the policy action, and split between adaptation (50%) and mitigation (10%)

PA6	Water shortage and stress, food security, extreme climate events (droughts)	4.62 million [(400/13) * 15%]	The National Irrigation Master Plan (NIMP) regards climate change as a major issue for adequate delivery of irrigation services and aims to build climate resilient irrigation infrastructure for 1.32 million hectares. Climate resilient irrigated agriculture planning is now fully streamlined in the NIMP. The NIMP introduces a range of options to help farmers cope with the different degrees and forms of water scarcity. Physical interventions include the use of shallow tube wells (including a solar power irrigation system), transitory water storage, and drainage reuse system (DRS). Procedural interventions, which aim at increasing crop water productivity, include water-saving practices such as AWD, aerobic rice, crop diversification, use of short duration and drought resistant varieties, among others. Climate-resilient irrigation services will help farmers to better adapt to climate change as they can adopt a more diverse agricultural production system.[15] Furthermore, only around 60% of irrigable land are under actual irrigation service so far.[16] Expanding irrigation service will help farmers to increase their income by harvesting multiple crops during the year. Higher disposable income will also lead to higher resilience to climate change events. ➔ CC finance is assumed for 30% and split between adaptation (15%) and mitigation (15%).
PA7	Extreme climate events (floods)	15.38 million [(400/13) * 50%]	The flood risk management plans integrate flood protection infrastructure with enhanced flood resilience and climate adaptation measures and responses. Having contingency plans in place is not only protecting agricultural land and livelihoods, but also expands protection to urban and semi-urban areas. Climate proofing critical infrastructure as well as increasing the capacity of communities for emergency preparedness will be a central pillar of the plans. ➔ CC adaptation finance claimed for the PA is 50%.
2.2 Public Financing Enhanced			
PA8 and PA9	Extreme climate events, food security	3.08 million [(400/13) * 10%]	The RCEF will primarily help (international) competitive rice farmers further enhance their rice production and profit margins. The RCEF can help farmers manage climate risks in rice production through providing funds for drought/flood tolerant varieties, new water harvesting technologies or capacity building. Knowledge of climate adaptation measures will be key for farmers. Under RCEF, the government plans to increase extension and training services, including sessions on climate smart agriculture. The RCEF secondarily supports uncompetitive rice farmers to diversify into other crops through its diversification program. ➔ CC finance for PA9 is assumed for 20% and split between adaptation (10%) and mitigation (10%)

Reform Area 3. Social protection to rural families			
PA11	Climate-induced poverty, extreme climate events	0	Rice farmers that will be affected by the RTL will be provided social assistance and affordable finance. This will help rice farmers with very low profit margins transit into other crops; most preferably to high-value crops. The unconditional cash transfer will buffer the rice price shock and set them on a path of recovery. Having access to zero interest loans will encourage farmers to diversify and thus increase their profit margins. ➔ Indirect climate resilience benefit. No climate adaptation finance claimed.
PA12		0	
	Subtotal	**40.00 million**	

Table 3: Policy actions and their contribution to climate mitigation

Mitigation Activity	Estimated Mitigation Costs ($ million)	Mitigation Finance Justification
PA4	1.54 million [(400/13) * 5%]	Agricultural Free Patent Reform Act (2019) allows farmers to trade their land titles, which opens up the possibility for more land consolidation and efficiency gains. Farmland consolidation has shown a positive impact on carbon emissions, particularly in a reduction in fuel emissions.[17] ➔ Climate mitigation finance is claimed for 5% of the total amount.
PA5	3.08 million [(400/13) * 10%]	Better coordination between various government agencies related to water resources will result in a more cohesive integration of viable climate mitigation and adaptation measures in their respective work and policies. As a result, efficient water use will be realized at different levels; hence, overall energy required for water supply, particularly for agriculture purpose, will be reduced. Climate is among several main issues that the bill addresses. ➔ CC finance is assumed for 60% of the policy action, and split between adaptation (50%) and mitigation (10%).
PA6	4.62 million [(400/13) * 15%]	The NIMP promotes water use efficiency and covers crop diversification in its scope. Having a supply driven water delivery system in place rather than a demand driven one, allows farmers to diversify into high value crops, away from rice. Around 60% of total agriculture emission comes from rice cultivation.[18] This crop shift and diversification can reduce overall emission levels as well as increase water preservation. Additionally, competitive farmers which stick to rice farming can adopt water and climate-smart agriculture practices for rice. These practices can include alternate wet and dry rice and integrated pest management. This is further reducing the climate footprint of rice

[15] Source: https://www.philstar.com/business/2016/12/23/1655931/nia-allots-p370-b-10-yr-masterplan); https://www.untvweb.com/news/nia-10-year-master-plan-expect-to-boost-construction-of-irrigation/

[16] https://psa.gov.ph/sites/default/files/Selected%20Statistics%20on%20Agriculture%202019.pdf

[17] Polat, H.Eylem & Manavbaşı, Doğukan. (2012). Determining the Effects of Land Consolidation on Fuel Consumption and Carbon Dioxide Emissions in Rural Area. Tarim Bilimleri Dergisi. 18. 157-165.

[18] https://cgspace.cgiar.org/bitstream/handle/10568/82572/CRA_Profile_Philippines.pdf?sequence=5&isAllowed=y

		cultivation. ➔ CC finance is assumed for 30% and split between adaptation (15%) and mitigation (15%).
PA8 and PA9	3.08 million [(400/13) * 10%]	The RCEF enables rice farmers to access finance and investments. For farmers, funds can be used to modernize rice production and to adopt climate-smart agriculture practices (e.g. Alternate Wetting and Drying during rice cultivation or fuel-efficient farm equipment).[19] ➔ CC Finance is assumed for 10% of PA8 and PA9.
Subtotal	**12.31 million**	

[19]UNDP. Accessed on 08/04/2020.Adaptation and Mitigation Initiatives in Philippine Rice Cultivation. Source file:///C:/Users/reygu/OneDrive/Desktop/ADB%20SERD/Philippines/CIADP%20PBL/AMIA%2520Philippines%2520Final.pdf