DEPARTMENT OF AGRICULTURE
PROPOSED POLICY FRAMEWORK ON CLIMATE CHANGE

ANNEX 1. Climate change risks, adverse impacts, adaptation, mitigation strategies and possible government action in Agriculture and Fisheries

Risk	Adverse impact	Adaptation	Mitigation	Action
CHANGING WEATHER PATTERNS	Failure on crop establishment	Make available weather-resilient crops	Reduce methane and nitrous oxide production in agriculture	Breeding and screening of crops resilient to changing weather patterns
	Poor crop yields	• Efficient weather forecasting and cultural management strategies • Adjust cropping calendar • Modify crop establishment	• Use of organic fertilizers and pesticides • Mulching and zero to minimal tillage captures CO_2 • Use of pesticides derived from non-fossil fuel based systems • Use of plant incorporated pesticides	• Breeding and screening of crops resilient to changing weather patterns • On-Farm testing and IEC • Make available non-fossil fuel based pesticides • Make available plant incorporated pesticides
	Increased energy costs and reduced harvest in poultry and hog production	• Energy-efficient poultry and hog raising systems adopted to changing weather patterns • Feed formulation and feeding strategy for ruminants • Energy efficient buildings	• Harvesting of methane from animal manures • Adoption of energy- efficient or green machinery • Timely delivery of locality-specific weather information to farmers • Methane harvesting for self contained energy use	• Make available energy-efficient or green machines • Energy audit of post harvest facilities and design energy efficient infrastructure • Facilitate timely delivery of reliable, locality-specific weather information to farmers • Make available appropriate technologies for harvesting and using methane from livestock wastes
LANDSLIDES	• Destruction of upland agriculture systems • Collateral damage to lowland agriculture, aquaculture, coastal fishery resources, settlements, and infrastructure	• Soil and water conservation • Agro reforestation of denuded landscape • IEC and early warning to downstream inhabitants	CO_2 sequestration of agro reforestation	• Provide reliable and accurate weather forecasting • Backyard seed nursery for indigenous agro-forestry species • Implement community-based integrated watershed management • Community organizing

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Risk	Adverse impact	Adaptation	Mitigation	Action
SEVERE SOIL EROSION	• Soil nutrient depletion • Siltation of irrigation systems, rivers and streams • Increase occurrence of dust storm especially during El Niño events	• Slope stabilization using engineering solution and vegetative strips technology • Cover cropping using legumes in denuded landscape	CO_2 sequestration of agro reforestation	• Provide planting materials for agro-reforestation and cover crops • Screen crop species that minimize soil erosion
FLOODS	• Destruction of crops and fisheries in flood-prone areas • Destruction of post harvest facilities and farm to market roads	• Submergence and flood tolerant rice & corn. • Early maturing varieties to escape floods during the first cropping. • Weather resilient infrastructures	Convert to wetlands or other uses areas that are not economically viable for fish production. Conversion strategies should have mitigation potential.	• Planting materials made available on time coupled with IEC • Early warning systems to harvest fish earlier
	Destruction of livestock houses in flood prone areas	• Properly situated livestock housing • Weather resilient infrastructures • Appropriate feed formulation	• Methane capture • Reduce methane output	• Make capital available to replace destroyed properties • Facilitate timely delivery of reliable, locality-specific reliable weather information to farmers • Early warning systems • Make available information on flood-prone areas • Make available advisories on emergency procedures during floods • Subsistence subsidies
	Destruction of residence	• Weather resilient infrastructures		
	Loss of life	Evacuation protocol and centers above flood level		
	Loss of farm inputs, machinery, implements	Storage shed should be above flood levels Savings and seed banks established in flood free areas		
	Hunger and capital loss among farmers			

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Risk	Adverse impact	Adaptation	Mitigation	Action
DROUGHT	• Significant reduction in yield and crop losses • Water shortage • Heat stress on people and farm animals	• Drought tolerant crops • Water use efficiency in irrigation systems (drip irrigation) • Used early maturing varieties to escape drought • Crop establishment technology that shorten turn-around time between cropping • Functional irrigation system • Timely and appropriate release of water • Drip irrigation instead of surface irrigation • Well ventilated buildings and dwellings	• GHG capture of crops or limited GHG capture • Organic fertilizer to increase soil capacity to capture CO_2 • Special planting programs for drought prone areas	• Make water available at the right time or when the crop needed it. • Efficient irrigation and drainage systems • Provide planting materials • Make available water use efficient/drought tolerant crops • Watershed management approach to agriculture and fishery establishment. • Make available water conservation practices • Put out advisories on drought-prone areas • Facilitate timely delivery of reliable, locality-specific weather information to farmers
	Increased energy cost to poultry and hog raisers Hunger and capital loss among farmers	• Poultry and hog tolerant to higher temperatures • Energy efficient buildings • Water conservation practices		• Make available livestock breeds tolerant to higher temperatures • Subsistence subsidies
INCREASED PEST PRESSURE	• Crop losses • Livestock losses • Aquaculture losses	• Pest resistant crops, livestock and fishes • Environment-friendly pest control strategies • Biocontrol of pest and diseases	Establish bio-pesticides serving as carbon sink e.g., Neem tree	Make available pest resistant crops and environment-friendly, non-fossil fuel-based pesticides

Risk	Adverse impact	Adaptation	Mitigation	Action
STRONG WINDS	Lodging of rice and corn, fruit trees, plantation crops, and others	• Shift to short and early maturing rice and corn varieties and other food crops • Early maturing, shorter, sturdy bananas, fruit trees and coconuts	• Shift crop establishment from irrigated rice to dry/wet seeded that minimize CO_2, NH_4, and NO_2 generation • Fruit trees serving as carbon sink	• Availability of planting materials • Provide early warning system and advisory • Provide risk map • Make available early maturing, shorter, sturdy bananas, fruit trees and coconuts
	Poultry and pig pen destruction	• Housing for pigs and poultry designed and situated against gale-force winds • Wind resistance infrastructure • Plant wind breaks	• Wind breaks serving as carbon sink	• Ensure the availability of construction materials of high quality • Screening of plant materials resistant to strong winds
	Destruction of residence and fishing vessels Loss of life	• Reliable and localized weather forecasting • Wind resistance infrastructure • Evacuation protocol and centers during strong typhoons		• Make available advisories on emergency procedures during typhoons • Make available capital to replace fishing boats • Ensure the availability of construction materials of high quality • Make available information on typhoon path • Subsistence subsidies

ANNEX 2. Necessary government action and policy instruments to deliver action

Necessary action	Policy instrument	Concerned Units
1. Make available weather - resilient crops	R & D, regulation, extension	BAR, NARS, BPI, ATI, RFUs
2. Make available energy-efficient or green machines	R & D, extension	BAR, NARS, ATI, RFUs, BPHRE
3. Make available non-fossil fuel based pesticides	R & D, regulation, extension	BAR, NARS, BPI, ATI, RFUs
4. Make available plant incorporated pesticides	R & D, regulation, extension	BAR, NARS, BPI, ATI, RFUs
5. Make available appropriate technologies for harvesting and using methane from livestock wastes	R & D, extension, regulation	BAR, NARS, BPI, ATI, RFUs
6. Make capital available to replace destroyed properties	Insurance, extension	PCIC, RFUs
7. Make available flood tolerant rice, corn and upland crops and vegetables	R & D, insurance, extension	BAR, NARS, PCIC
8. Make available information on flood-prone, drought prone, landslide prone, and sea level rise areas through maps.	Extension, insurance, policy & planning (SAFDZ characterization)	ATI, PCIC, PPO, BSWM
9. Make available advisories on emergency procedures during floods	Extension	ATI, RFUs
10. Make available early maturing, shorter, sturdy bananas, fruit trees and coconuts	R & D, insurance, extension	BAR, PCIC, ATI, RFUs
11. Ensure the availability of construction materials of high quality	Regulation, insurance, extension	BPI, PCIC, ATI
12. Make available capital to replace fishing boats	Insurance, extension	PCIC, ATI
13. Make water available	Irrigation, extension, R & D	NIA, PCIC, ATI
14. Make available water use efficient/drought tolerant crops	R & D, insurance, extension	BAR, PCIC, ATI
15. Make available water conservation practices	Extension	ATI, RFUs
16. Make available livestock breeds tolerant to higher temperatures	R & D, insurance, extension	BAR, PCIC, ATI
17. Put out advisories on drought-prone areas	Extension	ATI, RFUs
18. Make available pest resistant crops and environment-friendly, non-fossil fuel-based pesticides	R & D, insurance, regulation, extension	BAR, NARS, BPI, PCIC, ATI
19. Provide advisory on mudslide-prone areas	Extension, policy & planning (SAFDZ characterization)	ATI, RFUs, PPO, BSWM, ITCAF
20. Facilitate timely delivery of reliable, locality-specific weather information to farmers	PAGASA, extension	DOST, ATI, DA-ITCAF
21. Production of bio-charcoal from crop residues, and animal waste	R & D, extension	DA-PhilRice, BPHRE, ATI
22. Subsistence subsidies	Extension	ATI, RFUs