IMPACT MANAGEMENT PLAN
CHAPTER IV

Bagtingon Small Reservoir Irrigation Project (BSRIP)

Barangay Bagtingon, Buenavista, Marinduque

4 Impact Management Plan

The Impacts Management Plan (IMP) serves as the commitment of NIA in addressing the potential impacts that will result in project development. The plan aims to ensure that environmental and social impacts associated with the project will be addressed and monitored throughout project life.

Project Phase/ Environmental Aspect	Affected Module	Project Activity	Potential Impact (+/-)	Options For Prevention Or Mitigation Or Enhancement	Location Of Impacts	Responsible Entity	Indicative Cost	Guarantee/Financial Arrangements
PRE-CONSTRUCTION PHASE								
Vegetation removal and habitat Loss	Land	Earth scraping and excavating	(-)Change in land use due to localized removal of trees and vegetation	• Maintain land clearing within designated limits • Isolate undisturbed vegetation by fencing the perimeter • Revegetation and Reforestation	Direct impact areas	NIA/Contractor	Php 60, 000 per hectare	Dependent on loan arrangements or contractor agreements.

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PRE-CONSTRUCTION PHASE								
Acquisition of clearances, approvals, permits, endorsements, and ROW	Land People	Land	(-) Possible tenurial/ land issues	• Ensure that all identified project-affected properties are fully compensated as appropriate.	Direct impact areas	NIA/Contractor	Php 2M	
CONSTRUCTION PHASE								
General construction activities (e.g. vegetation removal, excavation, use of heavy equipment)	Land	Land clearing and grubbing	(-)Change in land use due to localized removal of trees and vegetation	• Develop and implement a construction plan ensuring that construction activities will not encroach other areas and will consider existing land use	Direct impact areas	NIA/Contractor	Php 60,000 per hectare	

				• Limit land-clearing perimeter • Install temporary fencing to protect the vegetation apart from the project • Distinctly mark heavy transport lanes to protect undisturbed vegetation • Conduct rehabilitation and reforestation activities within the affected and adjacent areas that considers soil containment and act as wildlife buffer • Designing relevant infrastructure to incorporate measures minimizing vegetation clearing around				

				the project proximity				
	Land	Land clearing and submersion	(-) Encroachment of an ECA (i.e. Marinduque Wildlife Sanctuary, tourism site, areas frequently visited and/or hard hit by natural calamities, and water bodies)	• Undertake the process of SAPA application • Conduct engineering, geological, and geotechnical studies around the project footprint • Follow provisions of National Building Code and Structural Code of the Philippines	Direct impact areas	NIA/ Contractor	Php 2M	
General construction activities (e.g. vegetation removal, excavation, use of heavy equipment)	Land	Slope alteration and excavation of canals	(-) Change in surface landform/ underground geology	• Install slope protection devices on steep slopes • Barriers and warning signs must be installed to protect workers from the movement of disturbed terrain	Direct impact areas	NIA/Contractor	Php 3.5M	

	Land	Displacement of natural soil formation	(-) Inducement of subsidence Soil erosion/ Loss of topsoil/ Overburden	• Start the construction within the dry season • Develop a comprehensive plan to control soil erosion • Construct structural and vegetative soil erosion control measures around the quarry, stockpile, and project site areas • Incorporate benches in moderate to highly sloped areas to prevent excessive runoff • Attain stability in soil surface by growing various grass species • Promote less intensive agricultural methods to the	Direct impact areas	NIA/Contractor	Php 2.5M	

				nearby communities • Comply with the DENR Administrative Guidelines on Engineering Geological and Geo-hazard Assessment (EGGA)				
			(-) Change in soil quality/ fertility	• Comply construction with Ecological Solid Waste Management Act • Proper handling, restoring, and store, and dispose of all collected solid waste				

	Land	Vegetation removal, excavation and use of heavy equipment	(-) Vegetation removal, loss of habitat, threat to existence and abundance and/or loss of important local species Hindrance to wildlife access	• Minimize tree removal • Rehabilitate native vegetation • Prepare a Biodiversity Management Plan	Direct and indirect impact areas	NIA/Contractor	Php 200,000	
	Water	Water diversion will impact water flow and morphology	(-) Change in drainage morphology	• The completed dam will function as a flood control structure, designed to capture excess water, and prevent	Direct and indirect impact areas			

Water impounding	Water	Increase in water levels upstream	(-) Change in stream water depth	downstream flooding in low-lying areas				
General construction activities (e.g. vegetation removal, excavation, use of heavy equipment	Water	Construction activities create dust and siltation. Seepage of untreated domestic wastewater into water sources	(-) Degradation of surface and groundwater quality	• Implement proper management and treatment of wastewater • Install portable sanitation facilities around the construction site • Install silt and sediment tarps in rivers • Keeping earthworks to the required minimum and within necessary areas only • The stockpile area must be located on an elevated area	Direct and indirect impact areas	NIA/Contractor	Php 500,000	

				• Undisturbed site protection, soil erosion mitigating practices, and rehabilitation must be an integral part of the contractor's obligations. • Increased surface runoffs must be controlled by hydraulic conveyances • Develop and implement oil spill management plan • Designate storage areas for waste and hazardous materials that will be located away from surface water sources				
Water impounding	Air	Submersion of lands	(-) Change in local climate and	• Incorporate climate change and disaster risk	Direct impact areas	NIA/Contractor	Php 150,000	

		with vegetation	contribution in terms of greenhouse gases due to Increase in methane and disruption of the natural carbon cycle	in Project design and operation • Removal of trees in areas that will be submerged by the reservoir • Replanting of fast growing trees				

General construction activities (e.g. vegetation removal, excavation, use of heavy equipment	Air	Heavy equipment operations	Degradation of air quality	• Proper maintenance of construction equipment and vehicles • Sourcing of materials from local suppliers thereby preventing long distance materials transport • Use most efficient technology for generators to ensure maximum efficiency and least fuel use • Development and implement a Transport Management Plan • Use truck-mounted sprinklers to wet potential dust-generating areas before and	Direct impact areas	NIA/Contractor	Php 150,000	

				during earthworks • Regular engine tune-ups of heavy equipment and vehicles • Build/install personnel quarters a few meters away from operational areas to reduce vehicle emissions • Reduce vehicle speed (10 to 20 mph) during dry and windy seasons • Implement a Road Water Plan • Provide personal protective equipment (e.g. mask) to workers				

General construction activities	Land Air People	Heavy equipment activities	(-) Increased generation of machinery-related noise and vibration	• Limit working hours during the day • Shut noise-generating equipment when not in use • Notify community of major noise-generating activities • Identify routes of heavy equipment and avoid proximity to residential areas • Limit vehicle speeds near construction site	Direct and indirect impact areas	NIA/Contractor	Php 100,000	
Land and ROW acquisition	People	Land preparation, clearing and general construction activitiwa	(-) Displacement of settler, properties, and livelihood	• Identify affected lots, properties and livelihood • Provide necessary compensation to affected lots and properties • Develop and implement Resettlement	Direct impact areas	NIA/ Contractor	Php 1,000,000	

				Action Plan and Livelihood Restoration Plan to mitigate losses related to resettlement and disruption of livelihood activities				
General construction and domestic activities	People	General construction activities	(-) Change/ conflict in land ownership and ROW	• Conduct land and asset and socio-economic survey to base compensation of affected lots and livelihood • Document and verify land ownership in coordination with local government units • Provide due compensation to legitimate owners and manage expectations of other parties	Direct and indirect impact areas	NIA/Contractor	Php 33.99 million	

	People	In-migration of construction workers	(-)Large-scale construction activities creates temporary population growth	• Hiring qualified locals (both men and women) • Demolition of temporary accommodation facilities after project completion	Direct and indirect impact areas	NIA/Contractor	Php 100,000	
	People	Impact on public access	Pathways used by the locals from their residence to their agricultural lands, other livelihood activities, and access to other areas (e.g. other barangays and sitios) may be potentially be severed during project activities	• Assessment of local pathways that will be severed • Identify and provide alternative routes for locals • Identify locals and their usage of river • Determine alternative water source and provide water supply, if needed • Compensate locals during the span of construction for their loss of livelihood	Direct and indirect impact areas	NIA/Contractor	Php 500,000	

				related to river usage, if applicable				
	People	In-migration of construction workers	(-) Threat to delivery of basic services/ resource competition	• Construct temporary accommodation facilities with source of drinking water, solid waste management facilities, pest control services and medical facility and security • Construction workers' accommodation site in compliance with local labor laws	Direct and indirect impact areas	MIA/Contractor	Php 100,000	
General construction activities (e.g. vegetation removal, excavation, use of	People	Construction will result in increase in noise and vibration, dust and	(-)Threat to public health and safety	• Noise generating activities will be limited during daytime • Consultation with barangay LGU regarding construction	Direct and indirect impact areas	NIA/Contractor	Php 100,000	

heavy equipment		other emissions, wastes, and safety hazards Impacts of climate change on public health and safety		and noise-generating activities • Install a wall around construction site to prevent outsiders entering • Implement dust suppression methods • Install safety signages • Designate safety and traffic spotters • Provision of PPEs • Designate safety officers in compliance with local safety laws • Implement health projects across the affected areas through the Social Development Program • Develop and implement				

				Emergency Response Plan for extreme climate event scenarios				
	People	Construction will provide employment activities to the public Operation of the project will benefit farmers since project will provide irrigation to agricultural lands	Generation of local benefits from the project	• Hiring of qualified locals • Souring raw supplies from local providers • Sourcing operations and maintenance activities from local providers	Direct and indirect impact areas	NIA/Contractor		

General construction activities (e.g. vegetation removal, excavation, use of heavy equipment	People	Presence of heavy equipment will increase traffic congestion in the vicinity	(-) Traffic congestion	• Install proper signage and scheduling of construction in coordination with barangay LGUs • Transportation of construction supplies will be done during non-peak hours • Hiring of locals	Direct and indirect impact areas	NIA/Contractors	Php 200,000	
OPERATION AND MAINTENANCE PHASE								
Geologic-related and natural events impacts	Land	Results of natural geologic hazards and calamities	Natural catastrophes such as earthquakes may cause damage to life and property	Disaster risk management and mitigation plans during and after the event. Structures must comply to local and international building standards.	Irrigation and facilities and nearby areas	NIA	No Cost	
Soil quality changes	Land	Heavy equipment operations	Waterlogging and changes in salinity	• Exposed soil must be overlaid with mulch to reduce evaporation • Efficient use of water • Adequate surface and	Direct impact areas	NIA	Php500,000	

				subsurface drainage • Canal must be lined to minimize seepage				
Inadequate planning and design-induced incidences of subsidence, landslides, or other natural hazards	Land	Design errors	Erosion, landslides, and siltation	Regular monitoring activities	Irrigation and nearby areas	NIA	Php 5M	
Change in drainage, morphology, flood inducement, reduction in stream volumetric flow	Water	In depth design and construction of a network of levees, canals and other structures which will control undue flooding	Unmitigated flooding, erosion, siltation, and potential danger to the community	• End user of the project plays integral part in overall dam specification planning. • Assessment of the volume allocated for irrigation • Assessment of the resulting level of inundation the dam structure will produce	Direct and indirect impact areas	NIA	Php 2M	

Surface water quality degradation	Water	Operations and maintenance activities	Water pollution due to the use of pesticides and fertilizers	• Proper use of agrochemicals in upstream farms and local communities • Implement the Integrated Pest Management Program (IPM) in upstream farms and local communities • Farmer training for organic fertilizer composting procedures in upstream farms and nearby communities	Direct and indirect impact areas	NIA	Php500,000	
Groundwater quality degradation	Water	Operations and maintenance activities	Water pollution due to excessive use of pesticides and fertilizers	Ensure the following in upstream and nearby communities of the SRIP: • Proper application of chemical fertilizers • Adoption of the Integrated Pest Management (IPM)	Direct and indirect impact areas	NIA	Php500,000	

				• Educational campaign about the least harmful pesticide to use • Seminars on proper disposal of pesticide containers, residuals and waste must be conducted for farmers • Proper handling and storage of pesticides • Regular groundwater quality monitoring				
	Water	Operations and maintenance activities	(-)Depletion of water source	Comprehensive Watershed Management Plan for Caigangan River	Direct and indirect impact areas	NIA/LGU	Php 15M	
	People	Establishment of commercial activities at and near the SRIP	(-/+) Generation of local benefits from the project	• Regular stakeholder meetings with Local Government Unit (LGU), NIA and other government	Direct and indirect impact areas	NIA/LGU	Php10M	

				agencies with peoples' organization who depend on the SRIP for their livelihood s. • Secure permit to operate for certain economic activities related to the SRIP. • Ensure local residents are prioritized in the application of businesses related to the SRIP.				
ABANDONMENT /DECOMMISSIONING PHASE								
Accumulation of domestic solid and constructions wastes	Land	Deconstruction activities	Improper disposal of domestic and waste and construction materials	Hauling of solid waste to the nearest sanitary landfill and recycling of recyclable material	Direct and indirect impact areas	NIA/Contractor	Php 8M	
Surface water quality degradation	Water	Deconstruction activities	Siltation-induced water pollution	Implementation of mitigating procedures spanning pre-construction and post-construction stages	Direct and indirect impact areas	NIA/Contractor	Php 10M	