The Second STATE OF THE COASTS of Bataan Province

The Provincial Government
of Bataan, Philippines

GMEC
YOUR FIRST CHOICE

GNPower Dinginin

PEMSEA

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December 2023

Published by the Provincial Government of Bataan, Philippines with the support of GNPower Mariveles Energy Center Ltd. Co., GNPower Dinginin Ltd. Co., and the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA).

Printed in Balanga City, Bataan, Philippines

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Republic of the Philippines
Province of Bataan

Office of the Governor

Message

We, at the Provincial Government of Bataan, are pleased to share with everyone the 2nd State of the Coasts Report of Bataan Province (2nd SOC). This publication is another milestone in the Integrated Coastal Management (ICM) program of Bataan, which achieved Level 2 Certification in 2020.

The 2nd SOC serves as a reminder as to where we have been over the past half decade in terms of ICM implementation; and a guide on how we can sustain and continually improve ICM in Bataan, as we move towards our vision of quality growth driven by diversified economic investments and efficient governance resulting in stable and empowered families. As this report shows, significant strides have been made in the governance and sustainable development aspects of ICM in the province. However, the 2nd SOC also tells us that there is still much to be done.

We take pride in the peninsular make-up of Bataan, for not only has its strategic location spurred economic development, but we are also blessed with natural resources, all the way from our uplands down to our coastlines and municipal waters. Amidst rapid urbanization and industrialization, we will endeavor to act on the emerging issues and recommendations of this 2nd SOC, to ensure a sustainable environment that Bataeño families can enjoy today, and for years to come.

We thank our partners for this project: PEMSEA, for your technical assistance in the crafting of the 2nd SOC, and for your unwavering guidance and support to the Bataan ICM Program; and to GNPower, for your generous support in the publication of this report. I would also like to thank and laud all the stakeholders from the 11 municipalities and one component city of the province as well as the private sector, civil society organizations, and academe. Truly, your collective efforts for the conservation of our coastal and marine resources not only contribute to the spirit of '1Bataan,' but also to the institutionalization of ICM in the province.

Jose Enrique S. Garcia III
Governor

GMEC
YOUR FIRST CHOICE

GNPower Dinginin LTD. CO.

GNPower Mariveles Energy Center & GNPower Dinginin Ltd. Co.

Message

We, in GNPower Mariveles and GNPower Dinginin, are deeply honored to participate in the unveiling of the 2nd State of the Coasts of Bataan Province, marking yet another significant milestone in our enduring partnership with the Province of Bataan. This underscores our unwavering dedication to environmental stewardship and sustainability.

As a pivotal force in the energy sector of Bataan, we take immense pride in contributing to the empowerment of not only the province but also its environmental initiatives. More than sponsorship, our collaboration signifies our commitment to defining energy for progress and reflects our genuine dedication to enhancing the quality of life within the communities where we operate.

The release of the 2nd State of the Coasts of Bataan Province not only grants us insight into the breathtaking marine ecosystems but also educates us on ways to actively contribute to their preservation. Furthermore, it serves as a testament to our profound corporate social responsibility initiatives and our resolute actions in championing sustainability.

The meticulous efforts invested in producing this publication will serve as a foundation for the development of appropriate projects and programs benefitting the coastal communities of Bataan. These forthcoming initiatives will complement our existing environmental endeavors in the province, including our adopted mangrove site in Orani, *pawikan* hatchery site in Morong, coral reef restorations in Mariveles, and regular coastal cleanups in support of Integrated Coastal Management Programs.

As we delve into the pages of this insightful publication, let us be captivated by the splendor of Bataan and its magnificent coastlines and species. May it also serve as a poignant reminder of our inherent responsibility to safeguard the environment for the well-being of generations yet to come.

Together, let us continue to define energy for progress!

Dennis B. Jordan
President & Chief Executive Officer

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ABD	-	Acute Bloody Diarrhea
ABKD	-	*Ayusin, Buhayin, Kalingain Daluyan ng Tubig Natin*
ABMP	-	Area-Based Management Plan
ACBFMA	-	Alas-asin Community-Based Forest Management Association, Inc.
AFAB	-	Authority of the Freeport Area of Bataan
AFPAI	-	Alangan Farmer Producers Association, Inc.
AED	-	Automatic External Defibrillator
Agri	-	Agriculture
AICS	-	Assistance to Individuals in Crisis Situation
AIP	-	Annual Investment Program
AITC	-	Agriculture Innovation and Technology Center
ALPAS	-	*Ahon Lahat, Pagkaing Sapat Laban sa* COVID
AMFSKI	-	Association of Mt. Farmers of So. Kinainisan, Inc.
AP	-	Aquaprobe Package
ARG	-	Automatic Rain Gauge
ARI	-	Acute Respiratory Infection
ASEAN	-	Association of Southeast Asian Nations
ASF	-	African Swine Fever
AQI	-	Air Quality Index
AQMS	-	Air Quality Monitoring System
AUF	-	Alion Upland Farmers Cooperative, Inc.
AVP	-	Audio Visual Presentation
AWD	-	Acute Watery Diarrhea
BAC	-	Bids and Awards Committee
BACCII	-	Bataan Chamber of Commerce and Industry, Inc.
BAFNOMAI	-	Bataan Food and Non-Food Manufacturers, Inc.
BAMABA	-	*Balikatan ng Mangingisda Para sa Bakawanan,* Inc.
BAMASAGKAI	-	Banawang *Mamamayang Sagip Kalikasan* Association, Inc.
BASIL	-	*Balik Sigla sa Ilog at Lawa*
BBMC	-	Binukawan Bicol Marketing Cooperative
BBUFAI	-	Bangkal-Bataan Upland Farmers Association, Inc.
BCCFI	-	Bataan Coastal Care Foundation, Inc.
BCMH	-	Bagac Community and Medicare Hospital
BCS	-	Bataan Coastal Strategy
BEST	-	Basic Environmental Systems and Technology, Inc.
BFAR	-	Bureau of Fisheries and Aquatic Resources
BFMP	-	Bataan Forest Management Plan
BFP	-	Bureau of Fire Protection
BHSO	-	Bataan Human Settlement Office
BICMP	-	Bataan Integrated Coastal Management Program
BJMP	-	Bureau of Jail Management and Penology
BLG	-	*Bilang*
BLGU	-	Barangay Local Government Unit
BMB	-	Biodiversity Management Bureau
BMLCA	-	*Bayan ng* Mariveles Livelihood Community Association
BMS	-	Biodiversity Monitoring System
BNHS	-	Bataan National Highschool
BNP	-	Bataan Natural Park
BOD	-	Biochemical Oxygen Demand
BPO	-	Business Process Outsourcing
BPP	-	*Binhi ng Pag-asa* Program
BPSU	-	Bataan Peninsula State University
BRING	-	Biodiversity Resource Information Network Group
BSDCC	-	Bataan Sustainable Development Coordinating Council
BSDS	-	Bataan Sustainable Development Strategy
BTPI	-	Bataan Technology Park, Inc.

BuB	-	Bottom-up Budgeting
BUFAI	-	Bilolo Upland Farmers Association, Inc.
BWNP	-	Balanga Wetland and Nature Park
BYD	-	Build Your Dreams
BYDO	-	Bataan Youth Development Office
CABATALES	-	Cavite-Bataan-Zambales
CAH	-	Culture and Heritage
CBFM	-	Community Based Forest Management
CBFMA	-	Community Based Forest Management Agreement
CCC	-	Climate Change Commission
CCUFAI	-	Cabog Cabog Upland Farmers Association, Inc.
CDP	-	Comprehensive Development Plan
CDRA	-	Climate and Disaster Risk Assessment
CEC	-	Certificate of Environmental Compliance
CEMSI	-	Cleanway Environmental Management Systems, Inc.
CENRO	-	City Environment and Natural Resources Office
CENRO	-	Community Environment and Natural Resources Office
CEST	-	Community Empowerment Thru Science and Technology
CFARMC	-	City Fisheries and Aquatic Resources Management Council
CFLC	-	Community Fish Landing Center
CFV	-	Commercial Fishing Vessel
CIFAL	-	International Training Centre for Authorities and Leaders
CLSUZP	-	Coastal Land and Sea Use Zoning Plan
CLUP	-	Comprehensive Land Use Plan
CMD	-	Cubic Meters per Day
CO	-	Carbon monoxide
Coop	-	Cooperative
COVID-19	-	Coronavirus disease
CPM	-	Clean Planting Materials
CPR	-	Cardiopulmonary Resuscitation
CRM	-	Coastal Resource Management
CRMP	-	Coastal Resource Management Plan
CSC	-	Certificate of Stewardship Contract
CSIP	-	Coastal Strategy Implementation Plan
CSIU	-	Central Security and Intelligence Unit
CSO	-	Civil Society Organization
CSR	-	Corporate Social Responsibility
CSSR	-	Collapsed Structure Search and Rescue
CTI	-	Coral Triangle Initiative
CWUP	-	Coastal Water Use Plan
C.Y.	-	Calendar Year
C_6H_6	-	Benzene
C/MLGUs	-	City and Municipal LGUs
DA	-	Department of Agriculture
DAO	-	DENR Administrative Order
DEARRT	-	Disaster Emergency Assistance Rescue and Relief Training
DENR	-	Department of Environment and Natural Resources
DBM	-	Department of Budget and Management
DCA	-	Dead Coral with Algae
DEO	-	District Engineering Office
DepEd SDS	-	Department of Education Schools Division Superintendent
Dev	-	Development
DILG	-	Department of the Interior and Local Government
DILP	-	DOLE Integrated Livelihood Program
DO	-	Dissolved Oxygen
DOH	-	Department of Health
DOLE	-	Department of Labor and Employment
DOST	-	Department of Science and Technology
DPWH	-	Department of Public Works and Highways

DRRM	-	Disaster Risk Reduction and Management
DSWD	-	Department of Social Welfare and Development
DTI	-	Department of Trade and Industry
DUFAI	-	Damulog Upland Farmers Association Incorporated
DUBAGENFAI	-	Dunsulan-Banaba-General Lim Farmers Association Inc.
EAAF	-	East Asian-Australasian Flyway
EAS	-	East Asian Seas
ECA	-	Environmental Compliance Audit
ECQ	-	Enhanced Community Quarantine
ELCCAP	-	Enhanced Local Climate Change Action Plan
EMB	-	Environmental Management Bureau
EMLM	-	Enhancing Marine Litter Management in Manila Bay
EMS	-	Environmental Management Specialist
ENGP	-	Enhanced National Greening Program
ENIPAS	-	Expanded National Integrated Protected Areas System
EnMO/As	-	Environmental Monitoring Officers/Assistants
EnP	-	Environmental Planner
E.O.	-	Executive Order
EPEF	-	Environmental Protection and Enhancement Fee
EPT	-	Environmental Protection Training
ER	-	Estero Ranger
ERDB	-	Ecosystem Research and Development Bureau
ESRI	-	Environmental Systems Research Institute, Inc.
EST	-	Esplanade Seaside Terminal
EWS	-	Early Warning System
FAB	-	Freeport Authority of Bataan
FARMC	-	Fisheries and Aquatic Resources Management Council
FCT	-	FAB Central Terminal
FDMP	-	Foreshore Development and Management Plan
FHSIS	-	Field Health Service Information System
FIES	-	Family Income and Expenditure Survey
FishCA	-	Fisheries Compliance Audit
FLA	-	Foreshore Lease Agreement
FLAg	-	Forest Land Use Agreement
FLAgT	-	Forest Land Use Agreement for Tourism
FLET	-	Fisheries Law Enforcement Training
FLGMA	-	Forest Land Grazing Management Agreement
FLR	-	Forest Landscape Restoration
FMA	-	Fisheries Management Area
FMR	-	Farm to Market Road
FLUP	-	Forest Land Use Plan
FPH	-	First Philippine Holdings Corporation
FRE	-	FAB Registered Enterprise
FRP	-	Fiberglass Reinforced Plastic
F.Y.	-	Fiscal Year
GAA	-	General Appropriations Act
GAD	-	Gender and Development
GBFAI	-	*Gintong Biyaya* Farmers Association, Inc.
GCQ	-	General Community Quarantine
GEF	-	Global Environment Facility
GET EXCEL	-	Genetically Enhanced
GGGI	-	Global Green Growth Institute
GHG	-	Greenhouse Gas
GI	-	Galvanized Iron
GIA	-	Grants-in-Aid
GIDA	-	Geographically Isolated and Disadvantaged Area/s
GIS	-	Geographic Information System
GIZ	-	Deutsche Gesellschaft für Internationale Zusammenarbeit
GMEC	-	GNPower Mariveles Energy Center Ltd. Co.
GNPD	-	GNPower Dinginin Ltd. Co.
GRMMP	-	Groundwater Resources Management Master Plan
HCC	-	Hard Coral Cover
HEIP	-	Hermosa Ecozone Industrial Park

HVCD	-	High Value Crops Development
H_2S	-	Hydrogen sulfide
IAS	-	Internal Audit Services
IATF	-	Inter-Agency Task Force
IBAQ	-	Integrated Programme for Better Air Quality in Asia
iBEST	-	Improved Brackish Water Enhanced Selected Tilapia
ICC	-	International Coastal Clean-up
ICM	-	Integrated Coastal Management
ICRM	-	Integrated Coastal Resource Management
ICRMC	-	Integrated Coastal Resource Management Committee
ICS	-	Incident Command System
ICT	-	Information and Communication Technologies
IEC	-	Information, Education, and Communication
IFMA	-	Integrated Forest Management Agreement
INUFI	-	Ibis North Upland Farmers, Inc.
IP	-	Implementation Plan
IP	-	Indigenous Peoples
IRR	-	Implementing Rules and Regulations
ISF	-	Informal Settler Family
IUCGF	-	Integrated Upland Conservation Guided Farms
IUU	-	Illegal, Unreported, and Unregulated
JITC-KOTI-EACACN	-	Jeju International Training Center- Korea Transport Institute-East Asia Clean Air Cities Network
KATIG	-	*Kabarangay* Alangan *Tungo sa Isang Gabay,* Inc.
KIMAMA	-	*Kinikilalang Mangingisda ng* Mabatang, Inc.
KOICA	-	Korea International Cooperation Agency
LAG	-	Livelihood Assistance Grant
LAYAG	-	League of Advocates and Young Ambassadors of Goodwill
LCC	-	Live Coral Cover
LCCAP	-	Local Climate Change Action Plan
LCE	-	Local Chief Executive
LDIP	-	Local Development Investment Plan
LDRRM	-	Local Disaster Risk Reduction and Management
LDRRMO	-	Local Disaster Risk Reduction and Management Office
LDRRMF	-	Local Disaster Risk Reduction and Management Fund
LDRRMP	-	Local Disaster Risk Reduction and Management Plan
LEAD	-	Livelihood Enhancement Through Agricultural Development
LGSF-FA	-	Local Government Support Fund-Financial Assistance
LGU	-	Local Government Unit
LPI	-	Limay Power Inc.
LRC	-	Land Registration Case
MAAP	-	Maritime Academy of Asia and the Pacific
MAB PTWG	-	Manila Bay Provincial Technical Working Group
MACFA	-	Mt. View Alas-asin Cabcaben Farmers Association
MARPOLEX	-	Marine Pollution Exercise
MAWAFAS	-	Mariveles Watershed Farmers Association, Inc.
MBCO	-	Manila Bay Coordinating Office
MBDA	-	Metro Bataan Development Authority
MBSDMP	-	Manila Bay Sustainable Development Master Plan
MBTF	-	Manila Bay Task Force
MCM	-	Million cubic meters
MCS	-	Monitoring, Control, and Surveillance
MDH	-	Mariveles District Hospital
MECA	-	Management Effectiveness and Capacity Assessment
MEAT	-	Management Effectiveness Assessment Tool
MENRO	-	Municipal Environment and Natural Resources Office
METT	-	Management Effectiveness Tracking Tool

MFARMC	-	Municipal Fisheries and Aquatic Resources Management Council
MFDP	-	Municipal Fisheries Development Plan
MFO	-	Municipal Fisheries Ordinance
MGB	-	Mines and Geosciences Bureau
MIS	-	Management Information System
MISO	-	Management Information System Office
MLA	-	Miscellaneous Lease Agreement
MMT	-	Multipartite Monitoring Team
Mngt	-	Management
MOA	-	Memorandum of Agreement
MOPA	-	Memorandum of Partnership Agreement
MPA	-	Marine Protected Area
MPAN	-	Marine Protected Area Network
MPN	-	Most Probable Number
MRF	-	Materials Recovery Facility
MSI	-	Marine Science Institute
MSME	-	Micro, Small, and Medium Enterprise
MSMED	-	Micro, Small, and Medium Enterprise Development
MSMEDC	-	Micro, Small, and Medium Enterprise Development Council
MSWDO	-	Municipal Social Welfare and Development Office
MT	-	Metric Tons
MTFKI	-	Morong Task Force *Kalikasan*, Inc.
MUZ	-	Multiple Use Zone
MVMA	-	Marcos Venture *Masaganang Ani* Agri-Aquaculture Marketing Coop.
MVUFA	-	Mt. View Upland Farmers Association, Inc.
MW	-	Municipal Waters
NASAMACA	-	*Nagkakaisang Samahang Mandaragat ng* Camachile
NAMRIA	-	National Mapping and Resource Information Authority
NDRRMC	-	National Disaster Risk Reduction and Management Council
NEDA	-	National Economic and
NFA	-	National Food Authority
NGA	-	National Government Agency
NGO	-	Non-Government Organization
NGP	-	National Greening Program
NHA	-	National Housing Authority
NH_3	-	Ammonia
NRC	-	National Resilience Council
NSTP	-	National Service Training
NSWMC	-	National Solid Waste
NWRB	-	National Water Resources
N_2O	-	Nitrogen dioxide
OA	-	Organic Agriculture
ODH	-	Orani District Hospital
OFW	-	Overseas Filipino Worker
OIC	-	Officer-in-Charge
OJT	-	On-the-Job Training
OPA	-	Office of the Provincial
OPMBCS	-	Operational Plan for the Manila
OPT	-	Operation *Timbang*
Org	-	Organization
OSGP	-	Office of Senator Grace Poe
OSM	-	Office of Strategy Management
O_3	-	Ozone
PA	-	Philippine Army
PA	-	Protected Area
PAASE	-	Philippine-American Academy
PAF	-	Philippine Air Force
PAFC	-	Provincial Agricultural and
PAFC	-	Philippine Alternative Fuels
PAFES	-	Province-led Agriculture and
PAG-ASA	-	Philippine Atmospheric, Geophysical and Astronomical Services Administration

PAMB	-	Protected Area Management Board
PAMO	-	Protected Area Management Office
PASu	-	Protected Area Superintendent
PBO	-	Provincial Budget Office
PBSP	-	Philippine Business for Social Progress
PCACE	-	Pathways for Clean Air and Clean Energy
PCC	-	Project Coordinating Committee
PCCI	-	Philippine Chamber of Commerce and Industry
PCEDO	-	Provincial Cooperative and Enterprise Development Office
PCG	-	Philippine Coast Guard
PCL	-	Provincial Council of Leaders
P.D.	-	Presidential Decree
PDC	-	Provincial Development Council
PDO	-	Planning and Development Office
PDPFP	-	Provincial Development and Physical Framework Plan
PDRRM	-	Provincial Disaster Risk Reduction and Management
PDRRMC	-	Provincial Disaster Risk Reduction and Management Council
PDRRMO	-	Provincial Disaster Risk Reduction and Management Office
PE	-	Polyethylene
PEF	-	Peace and Equity Foundation
PEMSEA	-	Partnerships in Environmental Management for the Seas of East Asia
PENELCO	-	Peninsula Electric Cooperative, Inc.
PENRO	-	Provincial Environment and Natural Resources Office
PEO	-	Provincial Engineer's Office
PESO	-	Public Employment Service Office
PFDA	-	Philippine Fisheries Development Authority
PFDMP	-	Provincial Foreshore Development and Management Plan
PFI	-	Petron Foundation, Inc.
PGB	-	Provincial Government of Bataan
PG-ENRO	-	Provincial Government – Environment and Natural Resources Office
PGO	-	Provincial Governor's Office
PGSO	-	Provincial General Services Office
pH	-	Potential of Hydrogen
PhilGEPS	-	Philippine Government Electronic Procurement System
PHIVOLCS	-	Philippine Institute of Volcanology and Seismology
PHO	-	Provincial Health Office
Php	-	Philippine Peso
PHRMO	-	Provincial Human Resource Management Office
PIA	-	Philippine Information Agency
PICE	-	Philippine Institute of Civil Engineers
PIChE	-	Philippine Institute of Chemical Engineers
PIEP	-	Philippine Institute of Environmental Planners
PIO	-	Provincial Information Office
PM	-	Particulate Matter
PMO	-	Project Management Office
PNLC	-	PEMSEA Network of Learning Centers
PNLG	-	PEMSEA Network of Local Governments
PNOC	-	Philippine National Oil Company
PNP	-	Philippine National Police
PNP Maritime	-	Philippine National Police Maritime Group
PO	-	People's Organization
POPCOM	-	Commission on Population / Provincial Population Office
POPS	-	Peace and Order and Public Safety
PPA	-	Philippine Ports Authority
PPA	-	Programs, Projects, and Activities
PPE	-	Personal Protective Equipment
PPG	-	*Pagbangon at Ginhawa*
PPDO	-	Provincial Planning and Development Office

PPO	-	Provincial Police Office
PPP	-	Public-Private Partnership
PPPIC	-	Public-Private Partnership and Investment Center
PRA	-	Philippine Reclamation Authority
PRDP	-	Philippine Rural Development Project
PRF	-	PEMSEA Resource Facility
PRRI	-	Philippine Resins Industries, Inc.
PSA	-	Philippine Statistics Authority
PSCP	-	Public Service Continuity Plan
PSF	-	People's Survival Fund
PSP	-	Paralytic Shellfish Poisoning
PSTO	-	Provincial Science and Technology Office
PSWDO	-	Provincial Social Welfare and Development Office
PSWMB	-	Provincial Solid Waste Management Board
PTA	-	Parent Teacher Association
PTO	-	Provincial Treasurer's Office
PTWG	-	Provincial Technical Working Group
PUFMPC	-	Pita Upland Farmers Multi-Purpose Coop.
PVO	-	Provincial Veterinary Office
PWD	-	Persons with Disabilities
QUFAI	-	Brgy. Quinawan Upland Farmers Association, Inc.
QUFLCI	-	Quinawan Upland Farmers Livelihood Cooperative, Inc.
R.A.	-	Republic Act
RBO	-	Rural-Based Organization
RCA	-	Residual Containment Area
RCM	-	Rice Crop Manager
RDANA	-	Rapid Damage Assessment and Needs Analysis
RDRRMC	-	Regional Disaster Risk Reduction and Management Council
REACT	-	Regional Emergency Assistance Communications Team, Inc.
RPLS	-	Roosevelt Protected Landscape
RRP-CCAM-DRR	-	Risk and Resiliency Program for Climate Change Adaptation and Mitigation-Disaster Risk Reduction
RSET	-	Regional Social and Economic Trends
RUFAI	-	Roosevelt Upland Farmers Association, Inc.
R3	-	Region 3
R&D	-	Research and Development
SABAYBA	-	*Samahang Bayanihang Barangay*
SAF	-	Special Action Force
SAMAKALUGEN	-	*Samahang Magsasaka sa Kataasang Lupa ng* Gen. Lim, Inc.
SAMASAKA	-	*Samahang Magsasaka sa Kagubatan ng* Limay, Bataan, Inc.
SAMPAD	-	*Samahang Pamalakaya ng* Daang Pare, Inc.
SAPLAD	-	*SAgot sa Pag-unLAD*
SATAMAKABA	-	*Samahan ng Mga Taong May Kapansanan*
SB	-	*Sangguniang Bayan*
SBCMT	-	Special Basic Citizen Military Training
SBMA	-	Subic Bay Metropolitan Authority
SCRP	-	Safe Closure and Rehabilitation Plan
SCFAPI	-	Brgy. Small Coconut Farmers Association of Parang, Inc.
SDG	-	Sustainable Development Goal
SDO	-	Schools Division Office
SDS-SEA	-	Sustainable Development Strategy for the Seas of East Asia
SEP	-	Socio-Economic Profile
SESAM	-	School of Environmental Science and Management
SETUP	-	Small Enterprise Technology Upgrading Program
SFC	-	Singles for Christ
SI	-	Silt
SIFMA	-	Socialized Industrial Forest Management Agreement
SIUFI	-	*Samahang* Ibis Upland Farmers Association, Inc.
SK	-	*Sangguniang Kabataan*

SKKKP	-	*Samahan ng Kababaihan Nag Kakaisa Tungo sa Kaunlaran sa Pulo*
SLF	-	Sanitary Landfill
SLP	-	Sustainable Livelihood Program
SLUP	-	Special Land Use Permit
SMC	-	San Miguel Corporation
SO_2	-	Sulfur dioxide
SOC	-	State of the Coasts
SP	-	*Sangguniang Panlalawigan*
SPZ	-	Strict Protection Zone
SSG	-	Supreme Student Government
STP	-	Sewage Treatment Plant
SUC	-	State Universities and Colleges
SvEMS	-	Supervising Environmental Management Specialist
SWMP	-	Solid Waste Management Plan
S&T	-	Science and Technology
S.Y.	-	School Year
TABALAN	-	Tama Bacong Legua at Nazareno
TBI	-	Toyota Bataan, Inc.
TDS	-	Total Dissolved Solids
TESDA	-	Technical Education and Skills Development Authority
TGP	-	Techno *Gabay* Program
TNMHC	-	Total non-methane hydrocarbon
TPD	-	Tons per Day
TRANSFORM	-	Transdisciplinary Approach for Resilient and Sustainable Communities Through Multistakeholder Engagement
TRO	-	Temporary Restraining Order
TSD	-	Treatment, Storage, and Disposal
TSP	-	Total Suspended Particulates
TUPAD	-	*Tulong Panghanapbuhay sa Ating* Disadvantaged /
TWG	-	Technical Working Group
UN	-	United Nations
UNEP-WCMC	-	UN Environmental Programme World Conservation Monitoring Centre
UNESCO	-	United Nations Educational, Scientific and Cultural Organization
UNICEF	-	United Nations Children's Fund
UNITAR	-	United Nations for Training and Research Unit
UP	-	University of the Philippines
VIP	-	Ventilated Improved Pit Latrine
VMM	-	Vessel Monitoring Measures
VRA	-	Vulnerability and Risk Assessment
WACS	-	Waste Analysis and Characterization Study
WASAR	-	Water Search and Rescue
WASH	-	Water, Sanitation, and Hygiene
WHO	-	World Health Organization
WRI	-	World Resources Institute
WRPLOT	-	Wind Rose Plots for Meteorological Data
YFC	-	Youth for Christ
YDP	-	Youth Development Programme
ZFF	-	Zuellig Family Foundation
ZOD	-	Zero Open Defecation
1M41B	-	1 Million Trees for 1Bataan
1PawiCAN	-	1Bataan *Pawikan* Conservation Alliance Network
3P3C	-	Pag-asa *Pawikan* Protection and Conservation Center Corp.
4Ps	-	*Pantawid Pamilyang Pilipino* Program

Acknowledgements

The crafting of the Second State of the Coasts Report of Bataan Province was facilitated by the Partnerships in Environmental Management for the Seas of East Asia Resource Facility (PRF) in partnership with the Integrated Coastal Management (ICM) section of the Provincial Government Environment and Natural Resources Office (PG-ENRO) and in collaboration with the following local governments, government agencies, the private sector, academe, and other stakeholders:

Provincial Government of Bataan
- Provincial Planning and Development Office
- Office of the Provincial Agriculturist
- Provincial Disaster Risk Reduction and Management Office
- Provincial Health Office
- Provincial Cooperative and Enterprise Development Office
- Provincial Veterinary Office
- Provincial Tourism Office
- Provincial Employment Service Office
- Provincial Social Welfare and Development Office
- Provincial Budget Office
- Provincial Information Office
- Public-Private Partnership and Investment Center
- Bataan Human Settlement Office
- *Sangguniang Panlalawigan*

Department of Environment and Natural Resources-Provincial Environment and Natural Resources Office

City and Municipal Local Government Units (LGUs):
- Abucay
- Bagac
- Balanga City
- Dinalupihan
- Hermosa
- Limay
- Mariveles
- Morong
- Orani
- Orion
- Pilar
- Samal

Department of Science and Technology

Department of Labor and Employment

Authority of the Freeport Area of Bataan

Private sector:
- Petron Foundation, Inc.
- Limay Power Inc. (Formerly SMC Consolidated Power Corp.)
- Philippine Resins Industries, Inc.
- Philippine National Oil Company
- Bataan 2020, Inc.
- Toyota Bataan, Inc.

Bataan Peninsula State University

The final output benefitted from the technical refinements of Ms. Daisy Padayao of the PRF.

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Sources of other photos include the following:

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Philippine Information Agency
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Wetlands International Philippines

The development and publication of this report were supported by the GNPower Mariveles Energy Center Ltd. Co. and GNPower Dinginin Ltd. Co.

Introduction

What is Integrated Coastal Management?

Integrated Coastal Management (ICM) is a natural resource and environmental management framework which employs an integrative, holistic approach and an interactive planning process in addressing the complex management issues in the coastal area. The ultimate purpose of ICM is to increase the efficiency and effectiveness of coastal governance in terms of its ability to achieve the sustainable use of coastal resources and of the services generated by the ecosystems in the coastal areas. It aims to do this by protecting the functional integrity of these natural resource systems while allowing economic development to proceed. Through integrated planning, ICM aims to address conflicts arising from multiple uses of limited space and resources (Chua, 2006).

What is a State of the Coasts Report?

The State of the Coasts (SOC) is a reporting system developed primarily to assess the progress and impacts of ICM implementation by local governments. Specifically, it aims to:

a. Define the scope of issues addressed in ICM;

b. Delineate the governance mechanisms and implementing arrangements that have been put in place;

c. Assess the extent and effectiveness of ICM program implementation;

d. Identify trends or changes in the social, economic and environmental status of the area;

e. Determine the driving force for change;

f. Assess the implications of the trends; and

g. Promote adaptive management in ICM program implementation in response to changing conditions.

Who is the SOC target audience?

The State of the Coasts Report is intended for:

a. Chief Executives of local governments;

b. ICM managers;

c. ICM practitioners; and

d. Coastal communities and other stakeholders.

What are the main elements of the SOC Report?

The SOC report contains the following:

a. An Executive Summary featuring a fact sheet of the area, and a summary of key findings, implications and recommendations;

b. A description of the relevance of various indicators of governance and sustainable development aspects of ICM programs based on a common framework for sustainable coastal development;

c. The results and analysis of each indicator, including the implications of changing conditions and recommendations for mitigating measures, as agreed to by concerned stakeholders; and

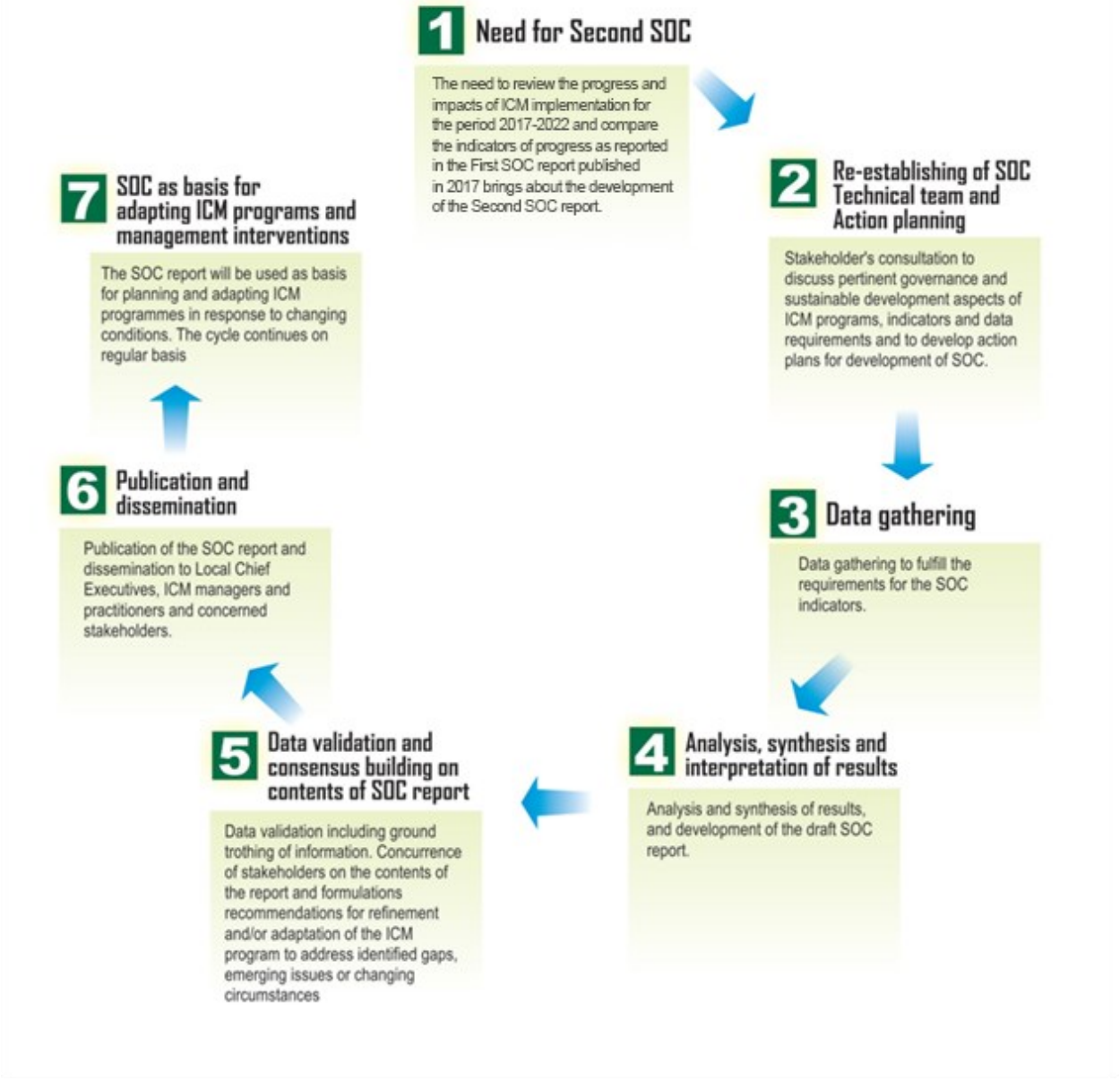
d. A description of the SOC methodology and process, the framework for sustainable coastal development, and the accomplished SOC reporting templates.

Reference

Chua, T.E. 2006. *The Dynamics of Integrated Coastal Management: Practical Applications in the Sustainable Coastal Development in East Asia*. 468 pp. Global Environment Facility/United Nations Development Programme/ International Maritime Organization Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Quezon City, Philippines.

Guide to SOC Development

Development of the Second State of the Coasts of Bataan Province



Core Indicators for the Second State of the Coasts Report of Bataan Province

Category	SOC Code	Indicator	Trend * (2017-2022)
Governance			
Policy, strategies and plans	001	Coastal profile and environmental risk assessment	
	002	Coastal strategy and action plans	
	003	Local government development plan, including coastal and marine areas	
Institutional arrangements	004	Coordinating mechanism	
	005	Participation of stakeholders in the coordinating mechanism	
Legislation	006	ICM enabling legislation	
	007	Administration and monitoring of compliance to legislation	
	008	Environmental cases filed/resolved	
Information and public awareness	009	Public education and awareness	
	010	Stakeholder participation and mobilization	
Capacity development	011	Availability/accessibility	
	012	Human resource capacity	
Financing mechanisms	013	Budget for ICM	
	014	Sustainable financing mechanisms	
Sustainable Development Aspects			
Natural and man-made hazard prevention and management	015	Level of preparedness for disasters	
	016	Degree of vulnerability to disasters	
	017	Social and economic losses due to disasters	

Category	SOC Code	Indicator	Trend * (2017-2022)
Sustainable Development Aspects			
Habitat protection, restoration and management	018	Habitat management plan and implementation	
	019	Areal extent of habitats	
	020	Protected areas for coastal habitats and heritage	
	021	Reclamation and conversion	
Water use and supply management	022	Water conservation and management	
	023	Access to improved water source	
	024	Incidences/deaths due to waterborne diseases	
Food security and livelihood management	025	Fishery management plan and implementation	
	026	Fisheries production	
	027	Malnutrition rate	
	028	Poverty, education and employment	
	029	Livelihood programs	
Pollution reduction and waste management	030	Pollution management plans	
	031	Water quality	
	032	Air quality	
	033	Sanitation and domestic sewerage	
	034	Municipal solid waste	
	035	Industrial, agricultural and hazardous waste	

***Legend:** Improving; Improvements discernible; Needs further improvement; Deteriorating

Mariveles, Bataan.

Executive Summary

The implementation of the Integrated Coastal Management (ICM) program commenced in the Province of Bataan in 2000. The first State of the Coasts (SOC) Report was published in 2017, covering the period 2000-2015. This provided a baseline for evaluating the impacts of management interventions and solutions to issues related to the socioeconomic and environmental status of Bataan. The Second SOC Report is tailored to identify discernible trends and changes taking place in the coastal areas of the province as a result of the implemented policies and programs, projects, and activities (PPAs) to respond to governance and sustainable development aspect issues, in partnership with other local governments, agencies, organizations, and stakeholders.

The Second SOC Report covers the period 2017-2022. This Report is the consolidated output of the collaborative efforts of the following stakeholders: provincial government, city and municipal governments, national government agencies (NGAs), the private sector, and academe. Following the publication of the first SOC Report, semi-annual progress reports on the status of indicators were consistently prepared by the ICM personnel of the PG-ENRO, which facilitated the consolidation of data and information for the preparation of this 2nd iteration of the SOC report. A data validation and consensus building workshop involving the relevant stakeholders was held in March 2023 to validate the results and gather inputs and feedback for the refinement of the report. Following the workshop, a write shop and a series of focus group discussions were held among stakeholders for the purposes of initial validation and further data collection. On November 30, 2023, the final data validation and consensus building workshop among relevant stakeholders was conducted and facilitated by ICM Bataan and PRF. The report was finalized based on the results of the workshop.

Overall, the Second SOC Report was able to showcase evidence and documentation of significant improvements in terms of environmental governance and management practices in the province. Of the 14 governance indicators, 12 displayed positive progress, i.e., shift from baseline status to improving status, while two (2) indicators showed discernible changes. For the 21 indicators on sustainable development aspects, 14 indicators showed positive progress; improvements in two (2) indicators are discernible but are not quite eligible to be shifted to improving status; one (1) indicator shifted from an improving status to having discernible improvements while three (3) indicators need further improvement. Only one (1) of the 35 indicators showed deteriorating status.

The major findings and recommendations are summarized below:

Governance of Marine and Coastal Resources in the Province of Bataan

Policies, Strategies, and Plans

In the Province of Bataan, coastal environmental profile and environmental risk assessments were conducted by relevant agencies and organizations to serve as basis in planning and developing management interventions responsive to identified areas of concern.

The Bataan Coastal Strategy was updated into the Bataan Sustainable Development Strategy (BSDS), which serves as the long-term environmental management framework for the implementation of various programs to achieve the sustainable development targets of the province and its component municipalities and city. These programs ranged from awareness raising activities to development and implementation of plans, policies, and projects as guided by the BSDS. The status of these programs was monitored based on their respective outcomes.

In an effort to mainstream the ICM program at

the municipal and city levels, an orientation on ICM Institutionalization was held among municipalities, with the exception of Dinalupihan, and city of Balanga in 2018 in order to update their Coastal Resource Management Plans (CRMPs). In December 2020, the province was awarded the ICM System Level 2 Certification, which recognized that significant progress and some positive impacts from ICM program implementation in the province were observed.

The ICM program including the Coastal Land and Sea Use Zoning Plan (CLSUZP) is mainstreamed into the local government's development and planning process through their integration into the Provincial Development and Physical Framework Plan (PDPFP) 2019-2025. In line with the CLSUZP, the city of Balanga and municipality of Abucay have been implementing their Comprehensive Land and Water-Use Plan of the City of Balanga 2012-2020 and Abucay Integrated Land and Water-Use Zoning Scheme and Development Plan 2009-2019. Plans related to the sustainable development aspects that were developed by the city and municipal local government units (LGUs) include the Comprehensive Land Use Plans (CLUPs), Comprehensive Development Plans (CDPs), Ten-Year Solid Waste Management Plans (SWMPs), Enhanced Local Climate Change Action Plans (ELCCAP), Local Disaster Risk Reduction and Management Plans (LDRRMPs), and Forest Land Use Plans (FLUPs). At the provincial level, a Tourism Development Plan was formulated for the period 2020-2025.

With the institutionalization of the ICM program in the province and its component municipalities and city, new developments at the local, national, and international levels including the recent priorities and emerging issues in the sustainable development and management of the coastal and marine areas should be considered in reviewing and updating the BSDS and its Implementation Plan (IP).

Institutional Arrangements

The signing of Executive Order (E.O.) No. 85, series of 2016, lodged the Bataan ICM program in the Provincial Government-Environment and Natural Resources Office (PG-ENRO), which in turn created an ICM section, that became the focal unit for coastal resource management in the province, closely coordinating with the municipal and city environment and natural resources offices.

As a mechanism to operationalize the BSDS, the Project Coordinating Committee (PCC) was transformed into the Bataan Sustainable Development Coordinating Council (BSDCC) in 2015. The BSDCC, however, has not been operational since its last meeting in December 2016. Nevertheless, sectoral councils and committees overseeing the sustainable development aspects are in place in the province, with the Provincial Development Council (PDC) leading the direction of economic and social development in the province. The sectoral councils and committees on sustainable development aspects that serve as alternative mechanisms to discuss ICM-related issues include the Manila Bay Provincial Technical Working Group, Provincial Solid Waste Management Board, Provincial Disaster Risk Reduction and Management Council, Provincial Council of Leaders, Provincial Agricultural and Fisheries Council, and Micro, Small, and Medium Enterprise Development Council.

Despite the operational alternative mechanisms, the BSDCC needs to be reorganized in order to have a governing body that will set guidelines and administer the implementation of projects and activities mainly for the ICM program.

Legislation and Enforcement of Laws

Section 38 of landmark legislation, Provincial Ordinance No. 03, Series of 2019, known as the Bataan Environment Code provides for the adoption and implementation of the ICM System in the province, in accordance with E.O. No. 533 and consistent with the provisions of the Local Government Code and the BSDS IP. The Code contains salient provisions covering sustainable development aspects including wildlife and biodiversity conservation, watershed management and protection, sustainable agricultural development, and pollution and solid waste management. There are also environment related ordinances enacted at the provincial, city, and municipal levels.

Monitoring schemes are employed in the province to ensure environmental compliance especially in the fishery and forestry sectors. For instance, the Department of the Interior and Local Government (DILG) leads the Fisheries Compliance Audit (FishCA), which covers the enforcement of fishery and coastal laws at the municipal and city levels through the *Bantay Dagat*. Seaborne patrol operation activities are also held by the Philippine National Police-

Maritime Group (PNP-Maritime) while inspections for pre-departure and vessel marine pollution and land-based marine pollution as well as maritime and coastal security patrols are made by the Philippine Coast Guard (PCG). Joint on-the-spot seaborne patrol takes place through the collaboration of the PNP-Maritime, PCG, *Bantay Dagat*, and Bureau of Fisheries and Aquatic Resources (BFAR). Meanwhile, the Department of Environment and Natural Resources (DENR) uses the LAWIN Forest and Biodiversity Protection System to monitor and protect forests and biodiversity with the aid of satellite imagery and ground-based sensors.

The Environmental Management Bureau (EMB) of the DENR performs compliance monitoring of commercial and industrial establishments in the province with the DENR General Effluent Standards. The same type of monitoring of the registered enterprises in the Freeport Area of Bataan (FAB) is led by the FAB's Facilities Department-Environment and Utilities Division. The city of Balanga and municipality of Pilar have a *Bantay Kalinisan* Task Force and *Bantay Kalikasan* Task Force, respectively and at the provincial level, a Talisay River Task Force was established, deputizing consolidated manpower from the Provincial Government of Bataan (PGB) and LGUs of Pilar and Balanga City.

While records show a decreasing number of violations related to fisheries and forestry, monitoring and other surveillance systems should be further strengthened considering that incidents of unreported and unregulated activities might still exist in the province.

Information and Public Awareness

The province through the PG-ENRO and other agencies like the DENR continues to lead impactful public awareness campaign that highlights crucial environmental issues and engages various sectors and stakeholders. Information, education, and communication (IEC) activities are also being conducted by the municipal and city LGUs. In addition, there are numerous environment-related programs, projects, and activities (PPAs) being spearheaded not only by the government, but also by the private sector.

The ultimate objective of these endeavors is to translate environmental awareness into changed behavior. To measure the effectiveness of these efforts in instilling a pro-environmental behavior among the stakeholders, a perception survey should be conducted. Aside from that, a communication plan could be drafted to consolidate and harmonize IEC activities that will reach the target stakeholder audience. More importantly, effective strategies should be pursued to sustain community involvement and forge meaningful partnerships in the conduct of environment-related PPAs.

Capacity Development

Trainings, seminars, and study tours related to coastal management were made accessible to employees through regular budget allocation as well as sponsorship by organizations and the private sector. These capacity building activities centered mostly on ICM program implementation, marine turtle and biodiversity conservation, air and water quality monitoring, and greenhouse gas emissions inventory.

University students taking up courses related to coastal and environmental management at the Bataan Peninsula State University (BPSU) are also accepted as on-the-job trainees at the PG-ENRO to take part in ICM-related work. To further institutionalize ICM in Bataan Province, the municipal and city governments, as well as higher education institutions like the BPSU should invest in their own human resources for ICM, through hiring of additional staff and provision of training opportunities for their personnel working on ICM. The BPSU becoming part of the PEMSEA Network of Learning Centers (PNLC) will be beneficial in ICM capacity development not only for the university, but also for the local governments in Bataan Province.

Financing Mechanisms

The PGB, DENR, and municipal and city LGUs have regular budget allocation for coastal management. The province should regularly review and monitor the annual budgets and implementation of ICM-related PPAs to ensure wise utilization of financial resources.

Legislations are also in effect for the collection of fees intended for the implementation of environment-related PPAs.

Apart from external funding support from agencies and organizations such as the Korea International Cooperation Agency (KOICA) and World Bank, the private sector continues to provide technical and financial support in environment-related PPAs of the province through corporate social responsibility (CSR) initiatives and multi-stakeholder collaboration projects. The PGB also institutionalized its public-private partnership (PPP) projects through the creation of its own PPP and Investment Center in 2013.

Despite the strong partnership between the public and private sectors, the revitalization of the Bataan Coastal Care Foundation, Inc. (BCCFI) is seen as the best strategy to maintain good relations and engagement of the private sector, as well as optimize the pooling of resources for the sustainable management of Bataan's coastal environment and resources.

Sustainable Development Aspects of Marine and Coastal Management in the Province of Bataan

Natural and Man-made Hazard Prevention and Management

The Provincial Disaster Risk Reduction and Management Office (PDRRMO) updated the PDRRM Plan covering the period 2020-2024. The PDRRM Council, which serves as the body for overseeing the implementation of the PDRRM Plan is chaired by the Provincial Governor and meets quarterly. Hazard-specific contingency plans were also prepared for the province.

The provincial, municipal, and city governments have installed Early Warning Systems (EWS) for rainfall, flood, and tsunami in hazard-prone areas. Other physical resources for disaster response are available in the province and annual budget allocation for disaster risk reduction and management is sourced from the Local DRRM Fund.

The province incurred social and economic losses as a result of natural and man-made disasters through the years. Systematic monitoring and reporting on the impacts of disasters are therefore important. The LDRRMPs should be regularly reviewed and updated to ensure that interventions for proper disaster risk management are responsive and adaptive.

Habitat Protection, Restoration and Management

Except Dinalupihan, all the municipalities and city are implementing their respective CRMPs. Similarly, all LGUs have formulated their FLUPs, with the exception of Hermosa. The DENR has updated the Management Plans of the two protected areas, the Bataan Natural Park (BNP) and Roosevelt Protected Landscape (RPLS) as well as formulated the Foreshore Development and Management Plan of Bataan Province 2018 -2027. In terms of areal extent of coastal resources/habitat, data on corals, seagrass/ seaweeds, and mangrove forest were generated and assessed by the National Mapping and Resource Information Authority (NAMRIA) from 2012-2016. The areal extent of coastal habitats in the province totals 29.22 km^2. Meanwhile, the 2020 Rapid Resource Inventory for the Manila Bay Sustainable Development Master Plan (MBSDMP) showed that the mangrove forests in Manila Bay have been severely degraded in the last few decades.

The province allocated annual budget for habitat management, which includes the greening program, campaign against illegal fishing and logging, *pawikan* conservation, establishment of marine protected area (MPA), coastal resource assessment, support for community-based forest management, and maintenance of provincial plant nursery.

To sustain the continued protection and proper management of the upland and coastal resources and habitats, regular monitoring and evaluation of the implementation of habitat management plans should be instituted.

Reclamation activities and foreshore development are regulated by the Philippine Reclamation Authority (PRA), DENR, and PGB. Regular assessment and evaluation of these activities at the provincial and municipal/city levels are recommended to mitigate potential environmental impacts.

Water Use and Supply Management

The Province of Bataan has approximately

97,109 hectares of total watershed area. While it has abundant groundwater and surface water, overextraction and depletion of groundwater reserves are a foreseen challenge due to the dependence of the people on groundwater for domestic and agricultural purposes. With this premise, the review, adoption and implementation of the draft Groundwater Resources Management Plan are crucial.

Albeit the increase in the number of households with access to basic safe water supply from 2015 to 2022, the number of households without access to basic safe water supply also increased. During the same period, more households were able to upgrade to Level 3 water supply. Aside from expanding its water supply coverage, the province should continue exploring alternative sources of water supply.

Incidences of waterborne diseases such as typhoid and paratyphoid fevers, acute watery diarrhea, acute bloody diarrhea, and cholera imply potential contamination of water sources like the groundwater. The government in partnership with local water utilities and the private sector should prioritize the establishment of sewage treatment facilities, implementation of a septage management program, and the strict enforcement of relevant laws and ordinances to ensure clean and safe water supply.

Food Security and Livelihood Management

While the declining trend in fisheries production may be attributed to different factors, effective interventions should be undertaken immediately including the strengthening of monitoring and surveillance mechanisms, establishment of fish sanctuaries and marine protected areas, and formulation of fisheries management plans that will complement the CRMPs.

In terms of malnutrition, data from 2016-2017 showed a general improvement in the nutritional status of preschoolers except for the percentage of those who were overweight. Apart from the continuing Operation *Timbang* (OPT) Plus program, the government should be more aggressive in rolling out programs to significantly reduce the number of malnourished preschoolers.

Even with the poverty incidence of the province increasing from 2015-2021, Bataan remains to be one of the least poor provinces in the country. The province continues to make impressive strides in attracting businesses and investments, and hence the increase in registered enterprises in the freeport zone. This continual pursuit of economic development should, however, always ensure inclusivity and sustainability.

There has been a continual increase in enrollment in public elementary and secondary schools in the recent years. This highlights the importance of subsidy for public education including the tertiary level, which the government should continue to prioritize.

Livelihood programs are also being consistently implemented by the national and local governments. To ensure their positive impacts in improving the living conditions of the beneficiaries, the sustainability of these livelihood programs should be evaluated.

Pollution Reduction and Waste Management

Bataan Province has formulated and adopted a number of plans related to pollution and waste management, such as the Ten-Year Solid Waste Management Plan (SWMP) of the LGUs; the Area-Based Management Plan (ABMP) for Talisay River System of the DENR Bataan; and the Manila Bay Sustainable Development Master Plan (MBSDMP) of the National Economic and Development Authority (NEDA). Environmental quality and compliance monitoring programs are also in place in Bataan Province and are conducted by the provincial government, DENR, and the DILG. Human, financial, and physical resources for solid waste management are allocated by the LGUs every year. These include staff under the Environment and Natural Resources Office or Mayor's Office; budgets under General Fund or 20% Development Fund; and facilities and equipment, such as Materials Recovery Facility (MRF), sanitary landfill (SLF), and garbage trucks. For liquid waste, the FAB in Mariveles, Bataan has a sewage treatment plant (STP) catering to its locators; and biogas digesters can be found in large-scale piggery farms for pig manure. While significant improvements were observed since the first SOC Report, enhancing monitoring capabilities and updating of plans are needed to sustain and continually improve pollution reduction and waste management in the province.

In general, air and water quality in Bataan Province needs improvement. Monitoring results

of the PG-ENRO and the DENR-EMB Region 3 show physicochemical parameters in selected rivers and coastal waters are still within DENR Class C (i.e., fit for agricultural purposes) and Class SB (i.e., suitable for swimming and other contact recreation) standards, respectively. However, an increase in fecal coliform count has been observed, exceeding water quality standards. Meanwhile, short-term air-quality monitoring shows that Bataan still has good to moderate ambient air quality, with criteria pollutant levels within the national standards. However, long-term air quality monitoring in the municipalities of Limay and Mariveles shows an increasing trend for $PM_{2.5}$, PM_{10}, and sulfur dioxide (SO_2). It is therefore recommended for Bataan Province to make use of its air and water quality monitoring data to address pollution incidents and hotspots. There is also a need to enhance the data ecosystem for pollution reduction by continuing the monitoring programs and conducting additional studies, such as source apportionment and emissions inventory.

Waste management in Bataan Province has generally improved over the past years. First, data from the Department of Health (DOH) show an increase in number of households with access to basic sanitation facilities, with septic tank as the most common facility. However, despite increasingly available desludging services from local water districts and private service providers, household septic tanks are seldom desludged or siphoned due to economical and logistical constraints. Next, results of Waste Analysis and Characterization Study (WACS) show that Bataan Province has an increasing waste diversion and decreasing waste disposal, due to different solid waste management initiatives in the municipalities and city. These include implementation of “No Segregation, No Collection” Policy; operationalization of MRFs; backyard composting; and selling of recyclables to junkshops and private recyclers. Last, information from the DENR-EMB Region 3 shows that industries in Bataan Province are able to manage their hazardous and industrial waste by having designated storage areas and contracting out the treatment and disposal of said wastes. Meanwhile, LGUs in the province had greater participation in the management of infectious wastes ever since the onset of the COVID-19 pandemic in 2020. While discernible improvements in waste management are present in Bataan Province, waste treatment and disposal can still be improved, especially for septage, wastewater, and domestic hazardous wastes.

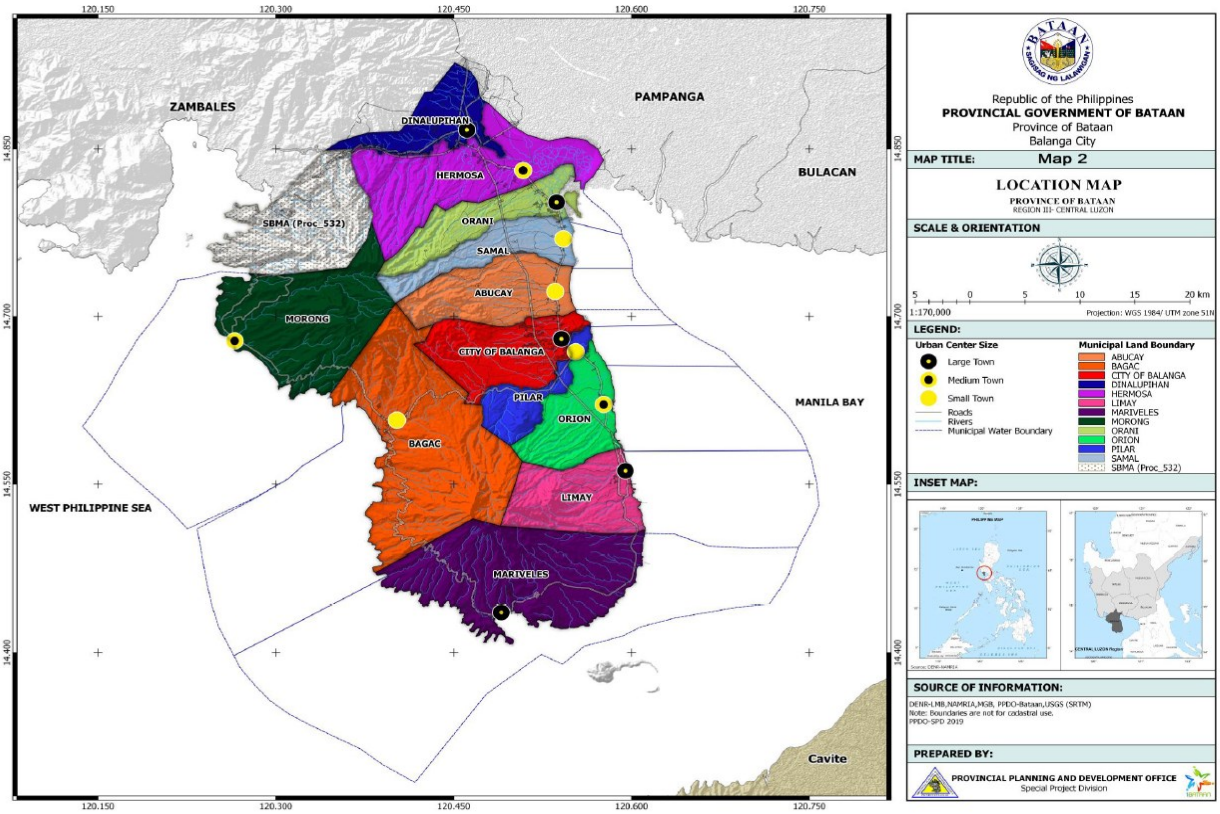
Bataan Province

The Province of Bataan enjoys a reputation worldwide as the bastion of heroism and gallantry during World War II, having been the last military stronghold to defy a vastly superior invading force.

Geographically, Bataan is a peninsula bounded in the north by the Provinces of Zambales and Pampanga, in the east by Manila Bay and in the west by the West Philippine Sea. Bataan has a land area of 137,296 hectares and 188.663 km of coastline. Eleven municipalities and one (1) city comprise the province. Hermosa and Dinalupihan are landlocked municipalities, with the latter connecting with the neighboring Provinces of Zambales and Pampanga (**Figure 1**).

The province extends out of the mouth of Manila Bay, the gateway to the Philippines' political, social and economic center.

Figure 1. Location map of Bataan Province.



Bataan serves as the industrial heartland of Central Luzon because of the presence of major industries in four (4) economic and two (2) freeport zones within the province. It is likewise seen as a prime business hub that serves as a major transshipment point for Central Luzon. Bataan boasts of an active commercial and industrial fishery, as well as robust agriculture and aquaculture industries. Beach resorts and a natural park, along with various historical markers provide the setting for a healthy investment for tourism.

Bataan offers a lot of potentials considering the productivity of its resources, from watersheds to coastal ecosystems. The coastline along Manila Bay is characterized by muddy tidal flats known for seafood production, such as mussels, *capiz*, mudcrabs, and prawns, among others. There are considerable areas covered by mangroves, seaweeds, and patches of seagrass, which offer opportunities for ecotourism and socioeconomic development.

Table 1 shows some key geographic, demographic, and socioeconomic data/information about Bataan Province.

Table 1. Key facts about Bataan Province.

Category of Information	Data/Information
Geographic, demographic, socioeconomic	
Land area (km^2)	1,373 km^2
Coastline (km)	188.66 km
Major river systems	Talisay River, Almacen River
Watershed areas (km^2 per river basin)	• Talisay River Watershed: 144 km^2 • Almacen (Pinulot-Caulaman) River: 194.08 km^2
Total number of coastal cities/municipalities	9 coastal municipalities • Abucay • Bagac • Limay • Mariveles • Morong • Orani • Orion • Pilar • Samal 1 coastal city • Balanga City
Population (2020 census)	853,373
Population growth rate (2020 census)	2.45%
Male/Female ratio (2015 census)	102 (males for every 100 females)
Average annual household income (2021 FIES)	PHP 372,430
Sectoral employment (percentage of total employment; latest census) Agriculture/fisheries Industry Services	• Agriculture, fisheries and forestry: 28% (2015) • Industry: 16.5% (2015) • Services: 55.5% (2015)

Indicators

What are indicators?

Indicators are quantitative/qualitative statements or measured/observed parameters that can be used to describe existing situations and to measure changes or trends overtime (Duda, 2002). Indicators are developed as tools to make monitoring and evaluation processes operational. To become powerful ICM management tools, indicators must demonstrate the measure of effectiveness of a project, program or policy. They become effective tools when they are used to reflect changes in the coastal and marine environments, trends in socioeconomic pressures and conditions in coastal areas and corresponding links among anthropogenic activities and ecological health. Finally, when used to evaluate ICM program performance, indicators offer feedback on action plans and provide parameters for subsequent actions that may prove useful in justifying further investments in ICM (Chua, 2006).

What are the indicators for the State of the Coasts?

Indicators for the State of the Coasts were determined based on PEMSEA's Framework for Sustainable Development of Coastal Areas thru ICM to indicate current status, management responses, targets and impacts of management actions in each of the governance elements (policy strategies and plans; institutional arrangements; legislation; information and public awareness; capacity development; and financing mechanisms) and the five sustainable development aspects (natural and man-made hazard prevention and management; habitat protection, restoration and management, water use and supply management, food security and livelihood management; and pollution reduction and waste management). The indicators were chosen based on the following criteria: (a) simple and meaningful; (b) easy applicability in the region; and (c) complementary to the indicators identified in relevant international instruments, including the Sustainable Development Goals (SDGs), the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA), and relevant international conventions such as Convention on Biological Diversity and UN Framework Convention on Climate Change.

What are the core indicators for SOC included in this report?

From a total of 160 indicators based on the Framework for Sustainable Development of Coastal Areas through ICM, a set of 35 core indicators were identified for the development of the 2nd SOC report. These 35 core indicators are considered to be a basic set of indicators for evaluating changes that have occurred in the Province over time as a consequence of ICM implementation. As the SOC becomes operational, more indicators will be considered in the succeeding SOC reports (PEMSEA, 2011).

How are the indicators presented in this report?

Each of the indicators is presented in the following format:

a. Category, which identifies the particular governance element or sustainable development aspect in the Framework for Sustainable Development of Coastal Areas

b. Name of the indicator

c. Description of the indicator

d. Rationale for using the indicator in the SOC

e. Data requirements

f. Results which describe the current status, management actions and impacts of management interventions in the area relating to the particular indicator

g. Implications of results and recommendations to respond to changing conditions

Bagac, Bataan.

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Policy, Strategies and Plans

001 Coastal profile and environmental risk assessment

Description

This indicator measures the percentage of the coastline that has undergone environmental risk assessment, coastal profiling or similar science-based evaluation in order to identify priority issues/threats to sustainable development of coastal and marine resources.

Rationale

Effective coastal management relies on planning that takes into account strategic and scientific assessment of the area, including social, cultural, political, economic, environmental, and policy issues, and the identification of policy concerns for coastal managers and policy makers. This strategic assessment should be the basis for developing strategies and action plans for coastal management.

Data Requirements

- Total length of coastline
- Coastal environmental profile/environmental risk assessment/other similar assessments
- Length of coastline covered by environmental assessment

Results

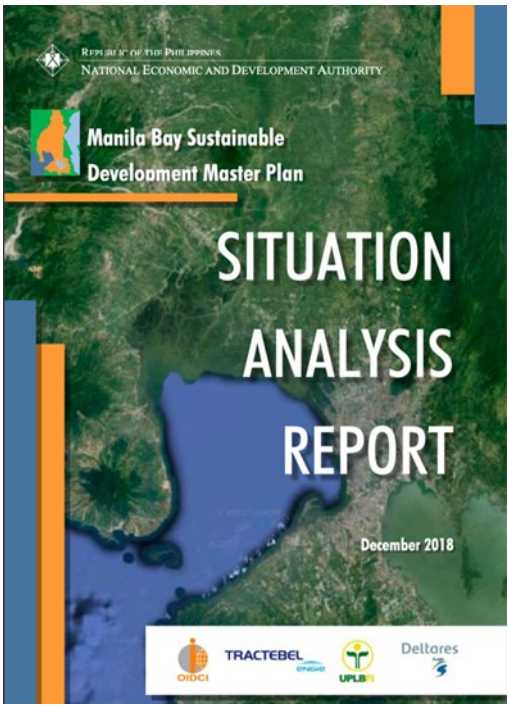
The total length of coastline of Bataan Province is 188.66 km (**Table 2**). The municipality of Mariveles has the longest coastline, i.e., 60.303 km, spanning both portions of Manila Bay and the West Philippine Sea while the coastal city of Balanga has the shortest coastline of 3.182 km.

Table 2. Length of coastline of the coastal city and municipalities in Bataan.

LGU	Length of Coastline (km)
Abucay	4.702
Bagac	29.254
Balanga City	3.182
Limay	10.091
Mariveles	60.303
Morong	35.121
Orani	23.697
Orion	11.345
Pilar	5.419
Samal	5.549
Total	188.663

In December 2018, the National Economic and Development Authority (NEDA) released the Situation Analysis Report for the preparation of the Manila Bay Sustainable Development Master Plan (MBSDMP). It aimed to describe and assess all key features of the Manila Bay Area, including Bataan Province, in order to develop a locally specific understanding of the problems that adversely impact its resiliency and sustainability of the Bay. In order to formulate solutions to the deteriorating ecosystems and water quality in Manila Bay, a comprehensive scoping of the entire Manila Bay Region was conducted.

The whole Situation Analysis Report consists of five (5) Focal Theme Reports, namely 1) Climate Change Adaptation and Disaster Risk Reduction, 2) Ecosystem Protection, 3) Upgrading Informal Settlements, 4) Water Quality Improvements, and 5) Inclusive Growth. The first and second Focal Theme Reports (i.e., disaster risk reduction and climate change adaptation and ecosystem protection and management) present an analysis on the past and current situation and its implications on the future state of Manila Bay.



At the provincial level, the Bataan Province Risk Profile, a climate and disaster risk assessment (CDRA), was developed by the Manila Observatory in 2022 under the province's partnership with the National Resilience Council (NRC). The CDRA results feature an integrated risk analysis, identifying flooding as the top risk affecting lowland and coastal areas in the province, where development is concentrated (**Figures 2-4**).

Figure 2. Flood and Waste Management Facilities Map of Bataan.

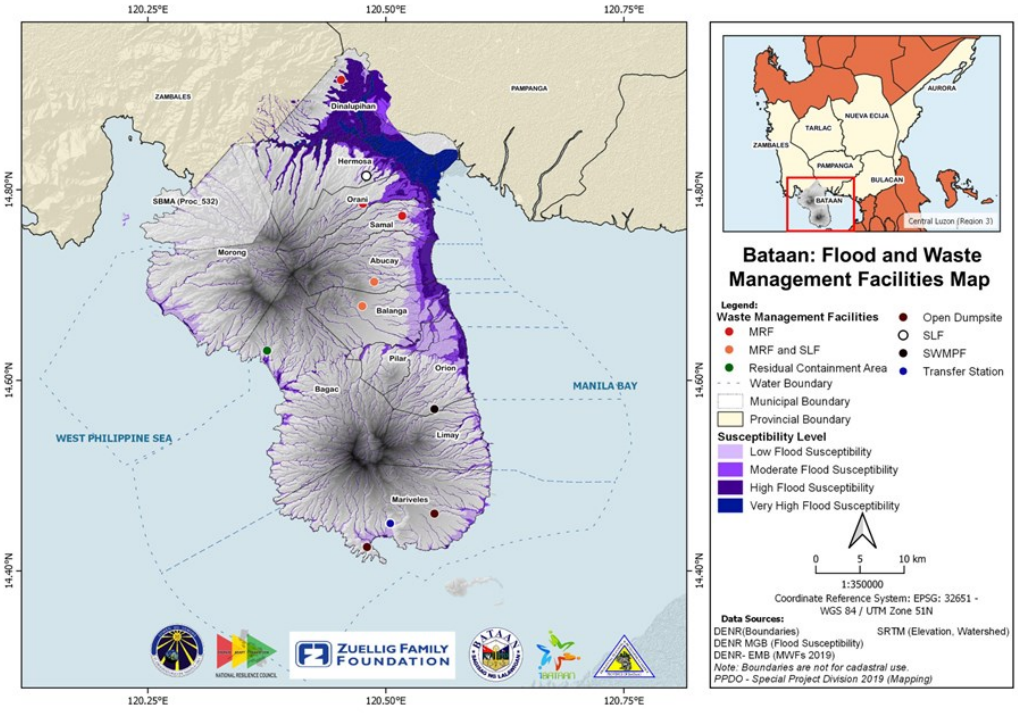


Figure 3. Flood and Land Cover Map of Bataan.

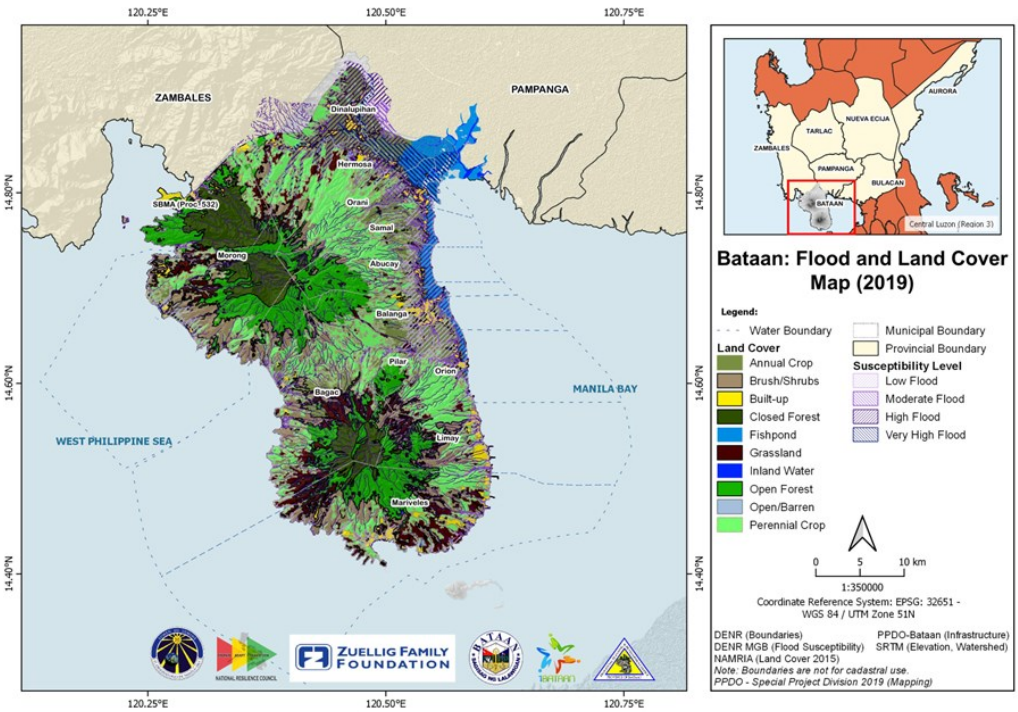
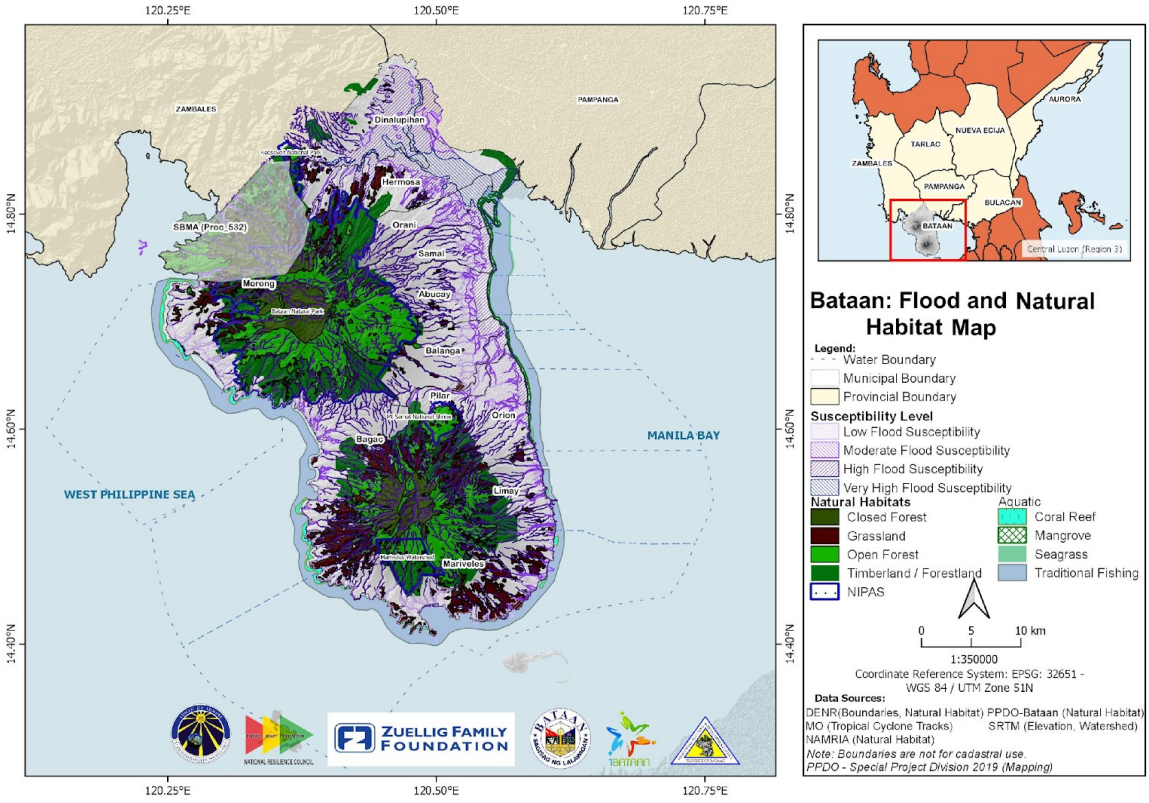


Figure 4. Flood and Natural Habitat Map of Bataan.



Site-specific assessments were done in the municipalities of Orion and Samal. In June and July 2023, the Mines and Geosciences Bureau (MGB) Region 3 conducted Coastal Hazards Vulnerability Assessment and Mapping in ten *barangays* of Orion on the physical vulnerability to coastal hazards including coastal erosion/ accretion, relative sea level rise, tidal incursion, coastal subsidence, storm surge, and tsunami brought about by dynamic variations of coastal conditions. The study also integrated expert analysis and qualitative and quantitative data from a set of coastal physical vulnerability parameters, namely rocks/substrate, coastal slope (degrees), mean tidal range (meters), natural buffers (coastal vegetation and/or coral reefs), and coastline alignment relative to dominant wave direction. **Table 3** shows a summary of the assessment results.

Table 3. Results Summary of the Coastal Hazards Vulnerability Assessment and Mapping in Orion, Bataan.

Barangay	Coastal Hazards Vulnerability
Puting Buhangin	Moderate to High
Santa Elena	Moderate
Daan Pare	Moderate to Very High
Capunitan	High to Very High
Lusungan	Moderate
Daan Bago	Moderate to High
Wawa	Moderate to High
Balut	Moderate
Camachile	Moderate to High
Bantan	Moderate to High

As a component of the Vulnerability and Risk Assessment (VRA)/Risk Exposure Mapping Activity of the MGB Region 3, a Geohazards and Vulnerability Assessment of Disaster Affected Areas, including the updating of the 1:10,000 Scale Geohazards Maps was conducted in the municipality of Samal during the mapping period in October 2023. This entailed an analysis of the vulnerability of 14 *barangays* to landslide and flood hazards using the VRA Framework as analytical lens, considering the geohazards (landslide and flood) susceptibility rating, *barangay* boundaries, built-up areas, and demographic profile. A summary of the assessment results is presented in **Table 4**. In the city of Balanga, a research project called LiDAR Surveys and Flood Mapping of Balanga River and Critical Facilities Hazard Hunter Assessment of Government Buildings, particularly on seismic, volcanic, and hydro-meteorological hazard were undertaken.

Table 4. Results Summary of the Geohazards and Vulnerability Assessment of Disaster Affected Areas in Samal, Bataan.

Barangay/Zone/Other Locations	Landslide Susceptibility		Flood Susceptibility
	Rating	Remarks	Rating
Barangay East Calaguiman			
Sitio San Vicente	Not Susceptible	Barangay is located on flat topography.	Low Susceptibility
Sitio San Vicente Paroba			
Sitio North Paroba			Low to Moderate Susceptibility
Sitio South Paroba			
Lopez St.			
Cortez St.			
Sitio Nibong Loob			Moderate Susceptibility
Sitio Nibong Labas			
Sitio Looban 1			
Sitio Looban 2			
Sitio San Rafael			High to Very High

Barangay East Daang Bago			
A. Kabuhayan St.	Not Susceptible	Barangay is located on flat topography.	Low Susceptibility
National Road			
Lopez Jaena St.			
Poblacion			
A. Bonifacio St.			Moderate Susceptibility
Looban St.			Moderate to High Susceptibility
Barangay Gugo			
Sitio Welcome	Low Susceptibility	Barangay is located on a gently rolling topography.	High to Very High
Sitio Adamson			Low to Moderate
Sitio Gugo Proper			
Sitio Highway			
Sitio Hacienda	Generally Low Susceptibility, Very High Susceptibility	These Sitios are located on flat to gently sloping terrain. Riverbank erosion was reported along local creeks and Calaguiman and San Juan Rivers.	Generally Not Susceptible, High to Very High Susceptible along rivers/creeks
Sitio Kasuyan			
Sitio Sibug			Generally Low Susceptibility, High to Very High Susceptibility along rivers/creeks
Sitio Caluangan			
Barangay Ibaba			
Sitio Elvira	Not Susceptible	Barangay is located on a generally flat topography.	Low Susceptibility
Sitio Bubuyog			Low to Moderate Susceptibility
Sitio Joson			Moderate Susceptibility
Sitio J.P. Rizal			
Sitio Valerio			High to Very High Susceptibility
Sitio Parang 1	Low Susceptibility	Barangay is located on a gently rolling topography.	Not Susceptible
Sitio Parang 2			
Sitio Parang 3			
Barangay Imelda			
Sitio Centro	Low	Barangay is located on a gently rolling topography.	Generally Not Susceptible; High to Very High Susceptible along rivers/ creeks
Sitio Taraw			
Sitio Turang			
Sitio Panyangatan			
Sitio Ibaba			Generally Low Susceptibility; High to Very High Susceptible along rivers/creeks
Sitio Tacla			
Sitio Batol			
Sitio Lower Batol			
Sitio Lakbangan			

Sitio Dela Fuente	Generally Low Susceptibility; Very High Susceptibility	The Sitio is located on flat to sloping terrain. However, riverbank erosion was reported along the outer bank of the meander of San Juan River within the Sitio.	Generally Not Susceptible; High to Very High Susceptible along rivers/ creeks
Barangay Lalawigan			
Centro St.	Not Susceptible	Barangay is located on a generally flat topography.	Low Susceptibility
Eskinita St.			
Gumitna St.			
Lorta St.			
Tindalo St.			
Kabilang Tulay St.			Moderate Susceptibility
Villa Esperanza			
Rich Town Subdivision			Moderate to High Susceptibility
Pag-asa Village			Moderate to Very High Susceptibility
Wakas St.			High Susceptibility
Barangay Palili			
Sitio Looban 1	Low to Moderate	Barangay is located on gently rolling to sloping terrain.	Generally, Not Susceptible; High to Very High Susceptible along rivers/ creeks
Sitio Looban 3			
Sitio Looban 2	Very High	The Sitios are located along the edge of the river terrace bank of the San Juan River. Recent landslides were reported along the cliff of the river terrace of San Juan River. Boulders were reported to have been brought by the river from upstream, indicating possible debris flow accumulation along Sitio Albun.	
Sitio Albun	Very High Susceptibility, Debris Flow Accumulation Zone		
Centro	Low	Barangay is located on a gently rolling terrain.	
Sitio Guizo	Low to Moderate	Barangay is located on gently rolling to sloping terrain.	
Sitio Barrio Site			
Sitio Bangkang Kumon	Very High Susceptibility, Debris Flow Accumulation Zone	The Sitio is located along the edge of the river terrace bank of the San Juan River. Recent landslides were reported along the cliff of the river terrace of San Juan River. Boulders were reported to have been brought by the river from upstream, indicating possible debris flow accumulation.	

Barangay San Juan			
Sitio Pugad Lawin	Low	Barangay is located on a generally sloping topography.	Not Susceptible
Sitio Binloc			
Sitio Torres	Not Susceptible	Barangay is located on a generally flat topography.	Moderate Susceptibility
Sitio Banlic			Low to Moderate Susceptibility
Sitio J. P. Laurel			
Sitio M. Roxas			Moderate Susceptibility
Sitio A. Manini			
Sitio Dakong Hulo			Moderate to High Susceptibility
Sitio Lawasan			High Susceptibility
Sitio Bake			High to Very High Susceptibility
Sitio Ibayo 1			Very High Susceptibility
Sitio Ibayo 2			
Sitio Sunshine			
Barangay San Roque			
M. Saldaña St.	Not Susceptible	Barangay is located on a generally flat topography.	Low Susceptibility
Gacutan St.			
D. Consunji St.			Low to Moderate Susceptibility
National Road			
Gutierez St.			Moderate Susceptibility
Agricultural Areas			Moderate to High Susceptibility
Barangay Santa Lucia			
Sitio Kabyawan	Not Susceptible	Barangay is located on a generally flat topography.	Low Susceptibility
Sitio Kabyawan Extension 1			
Sitio Buenalyn			
Sitio Sentro			
Sitio Tumalad			
National Road			
Sitio Abella			
Sitio Kamandies			Moderate Susceptibility
Sitio Maube			Moderate to Very High Susceptibility
Benedict Homes Subdivisiom			
Barangay Sapa			
Welcome St.	Low	Sitio is located on gently rolling topography.	Generally Not Susceptible; High to Very High Susceptibility along rivers/ creeks
Peninsula Heights Subdivision	Generally Low Susceptibility; High to Very High Susceptibility along rivers/ creeks	The subdivision is located on gently rolling topography. There was reported riverbank erosion along the Calaguiman River, south of the Subdivision.	

San Fabian St.	Not Susceptible	Barangay is located on generally flat to gently rolling topography.	Generally Low Susceptibility; High to Very High Susceptibility along rivers/ creeks
Kamandies St.			
Santo Niño St.			Low to Moderate Flood Susceptibility
Santa Rita St.			Moderate Susceptibility
East St.			
West St.			
San Roque St.			Moderate to High Susceptibility; Very High Susceptibility along rivers/ creeks
Fatima Subdivision			
Lingal St.			High to Very High Susceptibility
Forbes St.			Very High Susceptibility
Barangay Tabing-Ilog			
Purok Balut 1	Not Susceptible	Barangay is located on generally flat topography.	Moderate to High Susceptibility
Purok Balut 2			
Purok A. Bonifacio			
Sitio Lote			Very High Susceptibility
Sitio Dugtong			
Sitio Tibag			
Sitio Calero			
Purok Isla Verde			
Purok Magsaysay			Moderate Susceptibility
National Road			
Santa Catalina Subdivision			High Susceptibility
Gutierez St.			Low Susceptibility
Barangay West Calaguiman			
Sitio Lote	Not Susceptible	Barangay is located on generally flat topography.	Low Susceptibility
Sitio Sinandigan			
Don Pedro Rich St.			
Magtanong St.			
Pizarro St.			
Lazarte St.			Low to Moderate Susceptibility
Guevarra St.			
Aquino St.			Moderate Susceptibility
Barangay West Daan Bago			
J.P. Laurel St.	Not Susceptible	Barangay is located on generally flat topography.	Low Susceptibility
A. Yazon St.			Low to High Susceptibility
A. Mabini St.			
A. Bonifacio St			Moderate Susceptibility
Lopez Jaena St.			High Susceptibility
A. Kabuhayan St.			

Implications and Recommendations

The conduct of various studies and assessments is instrumental in identifying key areas of concerns that the province and its component municipalities and city need to respond to. Using scientific evidence gathered through both qualitative and quantitative methods, more appropriate strategies will be crafted to address the determined primary issues. For instance, the Situational Analysis Report was made to get a full characterization of the key features of the Manila Bay Area prior to the development of the MBSDMP.

Disseminating the results of these studies and assessments to concerned stakeholders is vital for increased awareness. At the same time, it is a way to ensure that the results will be used as a basis for planning and implementing responsive programs and policies. In addition, since most studies focus on the Manila Bay portion of the province, future research can concentrate on the municipalities situated in the west coast, namely Bagac and Morong.

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Policy, Strategies and Plans

002 Coastal strategy and action plans

Description

This indicator measures the scope, coverage and objectives of coastal management, as delineated in coastal strategies and action plans. This indicator further looks into the specific roles and responsibilities for different stakeholders, proposed interventions to address existing or potential threats to sustainable development, including economic, biophysical and social aspects with specified targets and timeframes. Finally, the indicator determines the government's commitment to implement the coastal strategy or action plan through its adoption at the provincial/city/municipal level.

Rationale

A coastal strategy is a critical component of ICM, providing a framework for integrated planning and management. It not only serves as a platform for policy reform that promotes good governance, but facilitates inter-agency consultation, multi-sector cooperation and stakeholder participation. A coastal strategy identifies conflicts arising from multiple use of limited marine and coastal resources, establishes approaches and actions for protecting or enhancing environmental quality and biodiversity, while facilitating environment-friendly economic development and environmental investment opportunities. The strategy will not be useful if it is not adopted and translated into on-the-ground actions. Action plans define: a) the steps that are required in order to execute the strategies; b) the milestones or indicators that can be used to measure progress and changes; c) the timeframe for the actions; d) the roles of the various stakeholders; and e) the measures for monitoring the implementation of the strategy.

Data Requirements

- Coastal strategy and action plans
- Management boundary (geographic of the plan)
- Scope of management plans
- Multi-sectoral participation mechanisms
- Local government commitments to implementation
- Monitoring and evaluation program

Results

The Bataan Coastal Strategy (BCS), which was updated into the Bataan Sustainable Development Strategy (BSDS) in 2006, serves as the long-term environmental management framework towards achieving the vision and mission of Bataeños in pursuing a strategic use and management of the province's environmental resources. Founded on four (4) strategies identified by the stakeholders, namely "Inform," "Mitigate," "Protect and Preserve," and "Develop," the BSDS Implementation Plan covering the period 2014-2020 laid out action programs and activities with clear, measurable targets and responsible sectors and agencies, allowing the monitoring and reporting on the progress of implementing the BSDS towards achieving the sustainable development and management of the coastal and marine areas. **Table 5** lists some of the implemented and monitored programs and projects under the BSDS including their respective outcomes.

Table 5. Checklist of plans and programs implemented in the Bataan Sustainable Development Strategy.

Plans and Programs	Description	Outcome/s	Start/ Timetable Status	Responsible Institution/ Agency
INFORM	the stakeholders of their rights and responsibilities and make them highly aware of the issues and problems concerning the coastal environment of Bataan, for them to be mobilized towards a sustainable and active participation in environmental management programs.			
Publication and Reproduction of Bataan Sustainable Development Strategy (BSDS)	The BSDS was published, reproduced and distributed to stakeholders: LGUs, academe, civil society groups, and coastal communities. The document highlighted the importance of protecting and managing our coastal and marine environment.	Establishment of a guiding framework for the implementation of PPAs for the sustainable management of the province's environmental resources	December 2006	BICMP-PMO and BCCFI
Environmental Fair a.k.a. "PASIKLABAN SA BATAAN PARA SA KALIKASAN"	In lieu of the proposed environmental fair, the first Environmental Summit was held at the Bataan People's Center on June 28-29, 2018. Participants included students from different schools in the Province. The event was partially funded by some private industry partners of the Provincial Government.	Increased awareness of the target audience on the importance of environmental protection; Strengthened partnership with the private industry partners	June 28-29, 2018	PG-ENRO, DENR-PENRO, academe, private industry partners
Audio-visual/ video documentation of BICMP projects and activities	Various activities of the ICM were documented and made into an AVP for the 2009 PNLG Forum and EAS Congress. Selected programs were also documented by DENR through an AVP, which was launched during the 2018 EAS Congress in Iloilo, Philippines.	Best practices of ICM Bataan showcased	February 2009 - November 2018	MISO, PGO, BCCFI, OPA, PPDO, DENR, PG-ENRO
Involvement and participation of NSTP students in ICM projects	Coordinated with concerned schools regarding volunteer students of NSTP classes for their involvement in ICM projects	Increased awareness and mobilization of students in carrying out ICM projects	August 2017 - present	BPSU, PG-ENRO, PGO
Formulation of the Integrated Coastal Resource Management Plan of the Province of Bataan	Draft Integrated Coastal Resource Management Plan, which adopts the strategy of the BSDS, sets the policy framework and development direction of the province on coastal resource management.	Creation of a policy framework and development direction of the province on coastal resource management	April 2021 to present	PG-ENRO

MITIGATE	pollution and other damaging activities through integrated approaches and measures to lessen the ecological, economic and social impacts, and sustain the range of values found in Bataan.			
Review and evaluate existing coastal/marine laws and ordinances for revisions and amendments	In June 2019, Oceana Philippines through ICM Bataan conducted an Orientation and Writeshop on the Formulation of the Localized Fisheries Code in the Province of Bataan. PG-ENRO also reviewed and evaluated existing laws and ordinances for revisions and amendments.	Assessment of fisheries laws and ordinances	2018-2020	National agencies, Coast Guard, LGUs
Schedule Coastal Clean-Up Activities	As part of the Manila Bay Rehabilitation Program, LGUs at the barangay level within Manila Bay areas are mandated to conduct weekly clean-up activities. Conducted regular coastal clean-up in every municipality and city in line with the celebration of International Coastal Clean-Up. ICC Reports per municipality and city are consolidated by ICM into 1 report.	Waste reduction; Mobilized participation of various stakeholders	January 2019 - present Every 3rd Saturday of September	LGUs, DENR, PG-ENRO PGB through the lead of PG-ENRO, DENR, LGUs, academe, private sector, CSOs, local communities
PROTECT AND PRESERVE	the significant natural, cultural, historical and socio-economic values and features of Bataan's coastal environment for present and future generations through integrated planning and management.			
Mangrove reforestation	Conduct of mangrove rehabilitation and planting activities	Conservation of coastal ecosystem	2000 - present	POs, private sector, academe
Establishment of the Balanga Wetland and Nature Park as a responsible, community-based ecotourism zone through RA 11365	The enactment of the law entails the allocation of funds and creation of an Ecotourism Development and Management Plan for the BWNP.	Sustainable management and monitoring of the wetland park	2019 - present	
DEVELOP	opportunities within Bataan's coastal areas as well as directions for future uses of resources in partnership with various sectors and stakeholders.			
Establishment of Mangrove Eco-Tourism Park	A Mangrove Ecotourism Project was established in Brgy. Camachile, Orion, Bataan, which included the construction of a 100-meter bamboo boardwalk, watchpoints also made of bamboo and sasa, cages of mudcrab lying-in and aquasilviculture.	Establishment of site for recreation; Provision of livelihood to the community	September 2018 - present	Private sector, POs, PG-ENRO
Establishment of bird sanctuary	Bird watching areas were established in different parts of Balanga City.	Improvement of recreational areas	June 2008 - Present	LGUs, POs, PMO, Provincial Tourism Office, Wildbird Club of the Philippines

In an effort to institutionalize the implementation of ICM at the city and municipal levels, the province in partnership with the DENR-Manila Bay Coordinating Office (MBCO) of Bataan organized an Orientation on ICM Institutionalization involving the Municipal and City Agricultural Offices, which are responsible for coastal resource management, in 2018. The seminar focused on identifying the issues and challenges in coastal management and the necessary technical assistance in the evaluation and updating of the municipalities' and city's Coastal Resource Management (CRM) Plans. To date, the city of Balanga and all municipalities, excluding Dinalupihan, are implementing their updated CRM Plans.

In 2019, ICM Bataan, began its ICM System Level II Certification process through the facilitation of the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) Resource Facility (PRF). **Table 6** summarizes the list of activities undertaken for the certification together with representatives from the PGB, DENR-PENRO, and municipal and city LGUs.

Table 6. Summary of Activities for the ICM System Level II Certification of Bataan Province.

ICM System Level 2 Certification Activities	Participants	Date/s
Phase 1: Initial Status Review of the ICM Code and ICM Level II Planning Workshop	PG-ENRO, other PGB departments, DENR-PENRO, City and Municipal LGUs	March 21, 2019
Phase 2: Strategic Planning Workshop	PG-ENRO, other PGB departments, DENR-PENRO, City and Municipal LGUs	June 20-21, 2019
Phase 3: System Development, Documentation, and Implementation	PG-ENRO, other PGB departments, DENR-PENRO, City and Municipal LGUs	September 25-27, 2019
Phase 4: Implementation, Monitoring and Measurement, and Review and Improvement Workshop	PG-ENRO, other PGB departments, DENR-PENRO, City and Municipal LGUs	December 11-13, 2019
Internal Audit	PG-ENRO and other PGB departments including IAS	February 19, 2020
Finalization of ICM System Manual and Operating Procedures of the Province of Bataan	PG-ENRO	March-July 2020
Stage 1 Certification Audit	PG-ENRO	September 23-25, 2020
Stage 2 Certification Audit	PG-ENRO	October 22-23 and 26, 2020

After successfully complying with the requirements, the Province of Bataan was awarded the ICM System Level II Certification during the PEMSEA Network of Local Governments (PNLG) Annual Forum held via Zoom on November 24, 2020.

gef UNDP PEMSEA

ICM System Certification

This is to confirm that the

Province of Bataan

Provincial Capitol, Balanga City, Bataan, Philippines

implements an

INTEGRATED COASTAL MANAGEMENT (ICM) SYSTEM

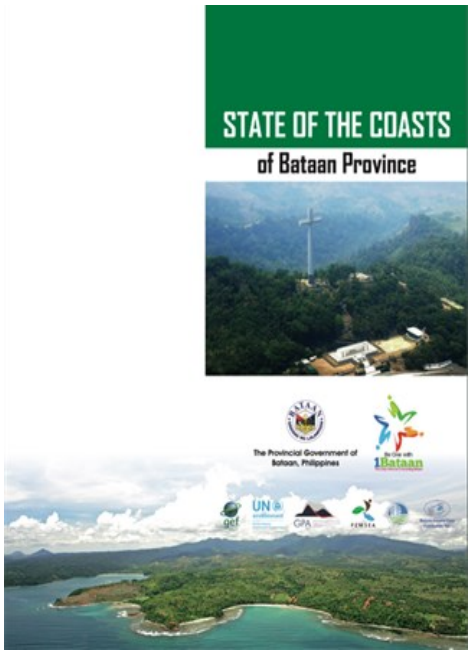
which conforms to the requirements of the

ICM CODE LEVEL-2 CERTIFICATION

Given this 24th of November 2020 at Manila, Philippines

Ms. Aimee Gonzales
Executive Director
Partnerships in Environmental Management
for the Seas of East Asia (PEMSEA)
Resource Facility

PEMSEA/201124ICM2003



Following the publication of the first State of the Coasts (SOC) Report of Bataan Province in 2017, the Province continues to monitor its progress and impacts in implementing the BSDS and ICM program in the Province through the SOC Reporting System, which is described in this 2nd SOC report.

Implications and Recommendations

The continuous implementation of various programs in the BSDS and its Implementation Plan has significantly contributed to the achievement of the sustainable development targets of the province and its component municipalities and city. Starting from raising awareness among stakeholders to implementation of plans, programs, and policies as guided by the BSDS, it allowed the strengthening of partnerships, increased participation of stakeholders, and enhanced protection of the coastal environment.

Nevertheless, it is recommended that the BSDS be reviewed and updated in order to be responsive to emerging environmental concerns including climate change. The updated BSDS should also consider programs in response to the current vision of the province of quality growth resulting in stable and empowered families—*matatag na pamilyang Bataeño*, as well as mission of excellent public service that encourages multi-sector engagement.

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Policy, Strategies and Plans

003 Local government development plan including coastal and marine areas

Description

This indicator reviews the local government units that have integrated coastal management issues and sustainable development of coastal and marine resources into their multi-year development plans.

Rationale

To determine an understanding of their commitment to coastal management, the development plans of local government units can be evaluated to ascertain whether the sustainable use of coasts and near the coastal areas and the associated resources have been recognized for their value and the role they play in the development process. The integration of ICM into the development plans of local government units reflects a local commitment to ensure the protection and development of coastal and marine areas in the broader context of the coastal development strategy/Strategic Environmental Management Plan, through a more integrated economic, social and environment policy and planning approach.

Data Requirements

- Local development plans

Results

The Bataan Integrated Coastal Management Program (BICMP) is integrated in the latest Provincial Development and Physical Framework Plan (PDPFP) covering the years 2019-2025. The PDPFP also integrates the Coastal Land and Sea Use Zoning Plan (CLSUZP), which addresses conflicting uses in the coastal and marine areas of Bataan. The PDPFP lays out the development issues, goals, and objectives for the environment and natural resources, including awareness on environmental issues, habitat and resource degradation, alternative source of income for the fisherfolk, solid and liquid waste management in coastal communities, environmental impact of operational industries, protective measures on exposed protected and tenurial areas on rain-induced landslides and soil erosion hazards, and detailed risk assessment at the barangay level including critical facilities and infrastructure.

Anchored in the CLSUZP, the Comprehensive Land and Water-Use Plan of the City of Balanga 2012-2020 and Abucay Integrated Land and Water-Use Zoning Scheme and Development Plan 2009-2019 are also integrated in the LGUs' Comprehensive Land Use Plans (CLUPs). Different plans for sustainable development

aspects have been developed by the municipal and city governments in line with the PDPFP (**Table 7**). All 11 municipalities and the City of Balanga are implementing their CLUPs, Comprehensive Development Plans (CDPs), and Ten-Year Solid Waste Management Plans (SWMPs). In terms of disaster risk reduction and climate change adaptation, two municipalities are yet to formulate their Enhanced Local Climate Change Action Plans (ELCCAPs) and Local Disaster Risk Reduction and Management Plans (LDRRMPs). Except Dinalupihan, a landlocked municipality, all ten (10) municipalities and the City of Balanga are implementing their Coastal Resource Management Plans (CRMPs). In addition, the city and 10 municipalities with the exception of Hermosa, which was recently declared a landlocked municipality, have developed their Forest Land Use Plans (FLUPs). At the provincial level, a Tourism Development Plan was created for the period 2020-2025.

Table 7. Plans of LGUs with year coverage.

Types of Plan	Abucay	Balanga City	Bagac	Dinalupihan	Hermosa	Limay	Mariveles
Comprehensive Land Use Plan (CLUP)	2009-2019 2023-2031*	2021-2030	2014-2028	2016-2025	2017-2030	2017-2025	2017-2026
Comprehensive Development Plan (CDP)	2017-2023 2023-2028*	2022-2027	2021-2026	2016-2022 2023-2028	2017-2023	2022-2027	2017-2026
Enhanced Local Climate Change Action Plan (E-LCCAP)	2023-2033	2022-2025	2021-2026	2016-2030	2017-2025	2016-2023	2018-2028
Local Disaster Risk Reduction Management Plan (LDRRMP)	2022-2024	2022-2025	2021-2025	2021-2025	2022-2024	2021-2023	2021-2025
Ten-Year Solid Waste Management Plan (SWMP)	2017-2027	2016-2025	2014-2024	2015-2025	2017-2027	2020-2030	2016-2025
Coastal Resource Management Plan (CRMP)	2016-2018	2017-2020	2013-2016	N/A	2021-2023	2016-2018	2017-2020
Forest Land Use Plan (FLUP)	2020-2024	2024-2028	2022-2026	2021-2026	N/A	2023-2027	2019-2023
Tourism Development Plan						2022-2024	

Types of Plan	Morong	Orani	Orion	Pilar	Samal	Province
Comprehensive Land Use Plan (CLUP)	2017-2027	2018-2027	2022-2025	2018-2027	2017-2027	
Comprehensive Development Plan (CDP)	2018-2024	2018-2024	2017-2023 *2024-2029	2018-2027	2018-2024	
Enhanced Local Climate Change Action Plan (E-LCCAP)		2022-2026	2017-2025	2023-2025	2016-2023	2023-2028
Local Disaster Risk Reduction Management Plan (LDRRMP)	2024-2029	2022-2026	2020-2025	2020-2025	2023-2025	2023-2027
Ten-Year Solid Waste Management Plan (SWMP)	2018-2028	2018-2028	2016-2025	2015-2025	2017-2027	2020-2030
Coastal Resource Management Plan (CRMP)	2013-2016	2016-2018	2016-2018	2016-2018	2023-2028	
Forest Land Use Plan (FLUP)	2019-2022	2018-2022	2020-2024	2020-2025	2020-2025	
Tourism Development Plan			2024-2029			2020-2025

**draft*

Source: Provincial Planning and Development Office (PPDO), Provincial Disaster Risk Reduction and Management Office (PDRRMO), Provincial Tourism Office, and City and Municipal Local Government Units (C/MLGUs).

Implications and Recommendations

The ultimate objective of ICM is to integrate its initiatives into the local development plans of the local government. This integration ensures that the development plans will go hand in hand with environmental protection and natural resources conservation. The ICM program has been integrated into the regular activities of the ICM section of the Provincial Government Environment and Natural Resources Office (PG-ENRO), ensuring the sustainability of support in the implementation of ICM-related activities. The BSDS and its Implementation Plan are likewise integrated in the PDPFP that will in turn be translated into Annual Investment Plans for the allocation of necessary resources for its continuing implementation.

It is important, however, that the local government and relevant stakeholders will embark on the review, evaluation, and updating of the BSDS and its Implementation Plan to ensure that it is responsive to new developments (e.g., latest national, regional, and international targets and commitments) including recent priorities and emerging issues in the sustainable development and management of the coastal and marine areas. Furthermore, it is recommended that the other ten (10) municipalities formulate and implement their own Comprehensive Land and Water-Use Plans in line with the CLSUZP to delineate the zones and uses of the coastal land and waters and ensure the proper management of ecosystems in the watersheds and coastal areas.

References

Provincial Planning and Development Office (PPDO). 2019. Provincial Development and Physical Framework Plan (PDPFP) 2019-2025.

Pilar, Bataan.

Institutional arrangements

004 Coordinating mechanism

Description

This indicator considers the presence of a functional interagency and multisectoral coordinating mechanism that oversees the development and implementation of the ICM program. This indicator further looks into the institutionalization of a local office with adequate administrative resources – staff, budget and equipment – to oversee, guide and coordinate the implementation of coastal strategies and action plans.

Rationale

A fully functional coordinating body consisting of the government agencies, nongovernment agencies, the private sector, civil society and other stakeholders, as appropriate, is a key component of ICM programs. The purpose of the coordinating mechanism is to harmonize any overlapping responsibilities of line agencies and other stakeholder interests, as well as to integrate policy and management interventions.

Moreover, the availability and allocation of adequate administrative resources for ICM is an expression of the capacity of the ICM management team to administer, coordinate and implement activities over time. In the implementation of ICM, there is a need for a local office to serve as a clearing house, central coordinating agency and focal point for multisectoral activities.

Data Requirements

- Coordinating mechanism established and legal basis
- Organizational structure of the coordinating mechanism
- Coordinating office established and legal basis
- Organizational structure of the coordinating office
- Staff and budget allocation of the coordinating office

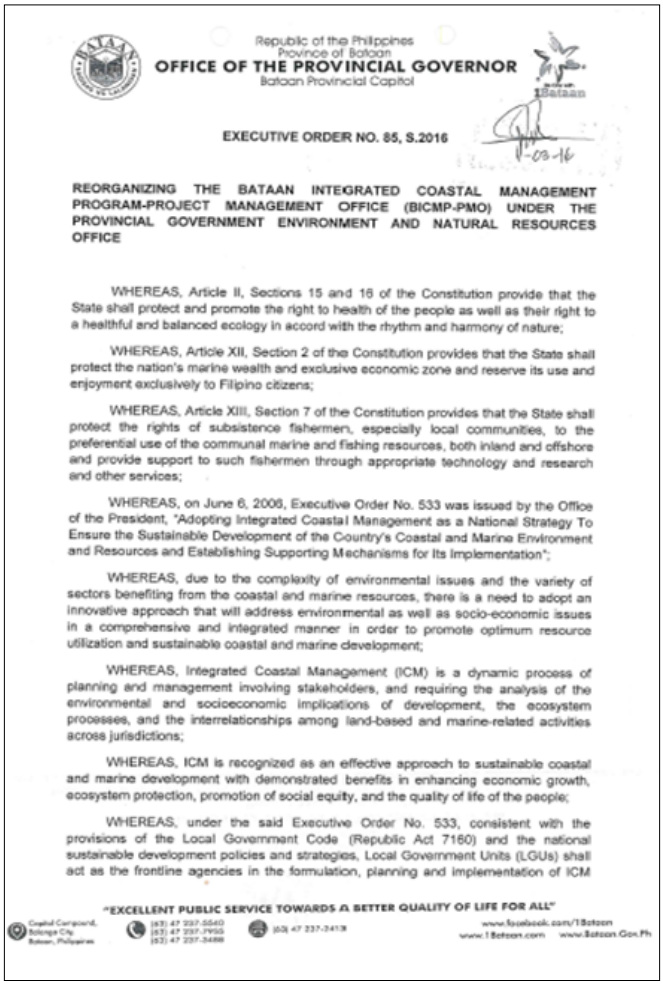
Results

To ensure the sustainable implementation of the ICM program, the signing of Executive Order (E.O.) No. 85, series of 2016, lodged the Bataan Integrated Coastal Management Program (BICMP) in the Provincial Government Environment and Natural Resources Office (PG-ENRO) (**Figure 5**). The Integrated Coastal Management (ICM) section under the PG-ENRO is responsible for coastal resource management in the province and closely coordinates with the municipal and city environment and natural resources offices for the effective implementation of the ICM program in Bataan.

The Project Coordinating Committee (PCC) was transformed into the Bataan Sustainable Development Coordinating Council (BSDCC) in 2015 through E.O. 18, which provides policy direction and guidance for the implementation of the Bataan Sustainable Development Strategy

(BSDS). The BSDCC was able to convene regular meetings to tackle issues and programs for the Bataan ICM program until December 2016. After which, it ceased to convene due to conflicting schedules and change in representatives of the member organizations. Despite this, several sectoral councils and committees working on sustainable development aspects are in place in the province, with the Provincial Development Council (PDC) leading the direction of economic and social development in the province. Issues in the coastal and marine areas can also be tackled during the quarterly meetings of the PDC.

The sectoral councils and committees on sustainable development aspects serve as alternative mechanisms to discuss ICM-related issues. These include the Manila Bay Provincial Technical Working Group, Provincial Solid Waste Management Board, Provincial Disaster Risk Reduction and Management Council, Provincial Council of Leaders, Provincial Agricultural and Fisheries Council, and Micro, Small, and Medium Enterprise Development Council.



Republic of the Philippines
Province of Bataan
OFFICE OF THE PROVINCIAL GOVERNOR
Bataan Provincial Capitol

EXECUTIVE ORDER NO. 85, S.2016

REORGANIZING THE BATAAN INTEGRATED COASTAL MANAGEMENT PROGRAM-PROJECT MANAGEMENT OFFICE (BICMP-PMO) UNDER THE PROVINCIAL GOVERNMENT ENVIRONMENT AND NATURAL RESOURCES OFFICE

WHEREAS, Article II, Sections 15 and 16 of the Constitution provide that the State shall protect and promote the right to health of the people as well as their right to a healthful and balanced ecology in accord with the rhythm and harmony of nature;

WHEREAS, Article XII, Section 2 of the Constitution provides that the State shall protect the nation's marine wealth and exclusive economic zone and reserve its use and enjoyment exclusively to Filipino citizens;

WHEREAS, Article XIII, Section 7 of the Constitution provides that the State shall protect the rights of subsistence fishermen, especially local communities, to the preferential use of the communal marine and fishing resources, both inland and offshore and provide support to such fishermen through appropriate technology and research and other services;

WHEREAS, on June 6, 2006, Executive Order No. 533 was issued by the Office of the President, "Adopting Integrated Coastal Management as a National Strategy To Ensure the Sustainable Development of the Country's Coastal and Marine Environment and Resources and Establishing Supporting Mechanisms for Its Implementation";

WHEREAS, due to the complexity of environmental issues and the variety of sectors benefiting from the coastal and marine resources, there is a need to adopt an innovative approach that will address environmental as well as socio-economic issues in a comprehensive and integrated manner in order to promote optimum resource utilization and sustainable coastal and marine development;

WHEREAS, Integrated Coastal Management (ICM) is a dynamic process of planning and management involving stakeholders, and requiring the analysis of the environmental and socioeconomic implications of development, the ecosystem processes, and the interrelationships among land-based and marine-related activities across jurisdictions;

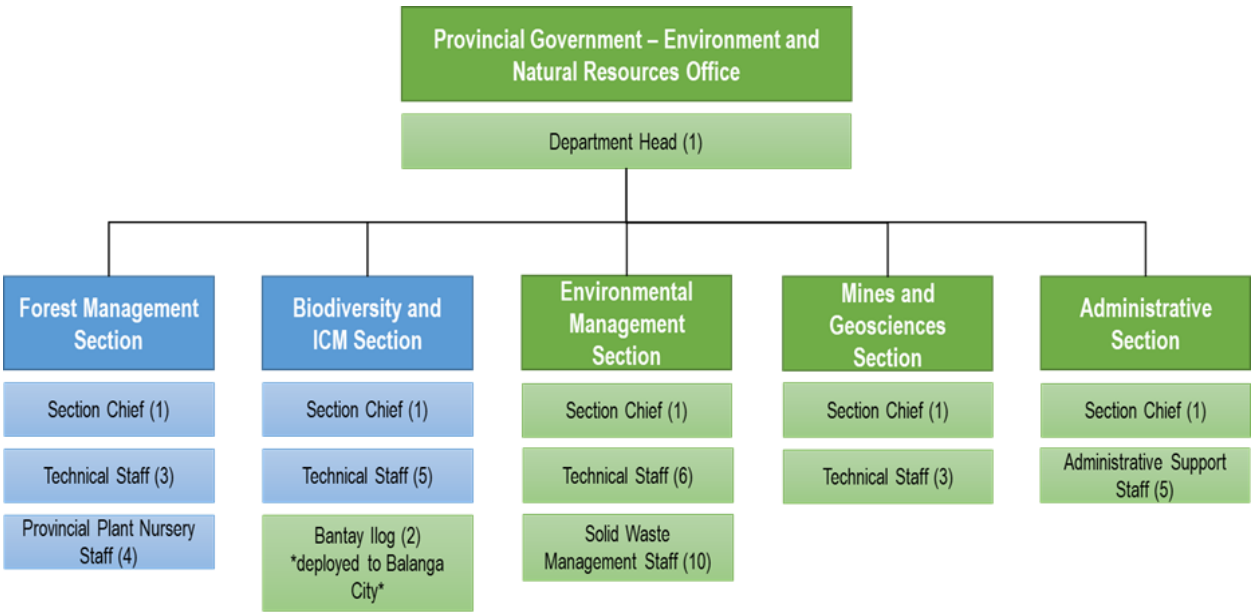
WHEREAS, ICM is recognized as an effective approach to sustainable coastal and marine development with demonstrated benefits in enhancing economic growth, ecosystem protection, promotion of social equity, and the quality of life of the people;

WHEREAS, under the said Executive Order No. 533, consistent with the provisions of the Local Government Code (Republic Act 7160) and the national sustainable development policies and strategies, Local Government Units (LGUs) shall act as the frontline agencies in the formulation, planning and implementation of ICM

"EXCELLENT PUBLIC SERVICE TOWARDS A BETTER QUALITY OF LIFE FOR ALL"

Executive Order No. 85, Series of 2016.

Figure 5. Organizational Chart of the PG-ENRO.



Implications and Recommendations

In the short-term and with the BSDCC being currently inactive, it is recommended that the province maximize the PDC as a platform to discuss the continual improvement of ICM program implementation for the sustainable development of the coastal and marine areas of the province, particularly the Environmental Development Committee under the PDC, which may be co-chaired by the PG-ENRO.

The various sectoral councils and committees are focused on specific areas of concern, and thus consolidating their efforts and outputs is important. In the long-term, the province should endeavor to re-organize and operationalize the BSDCC to serve as the governing body for the ICM program. The BSDCC as a multisectoral coordinating mechanism will allow the harmonization of any overlapping responsibilities of line agencies and stakeholder's interest, including policy and management interventions.

References

E.O. 18, Series of 2015.
Executive Order (E.O.) No. 85, Series of 2016.
Provincial Government Environment and Natural Resources Office (PG-ENRO). Organizational Structure.

Full Council Meeting of the Provincial Development Council in October 2022.

Institutional arrangements

005 Participation of stakeholders in the coordinating mechanisms

Description

This indicator reports the pertinent sectors (government, nongovernment, private, civil society, academe) that are represented in the coordinating mechanism for the ICM program and are part of the integrated decision-making process. It further reflects the commitment of government agencies and other stakeholders to implement, comply with and enforce ICM plans and activities. It also suggests the reality of the execution and performance of ICM initiatives, as well as the degree of acceptance on the part of users subject to the plan.

Rationale

Stakeholder participation is the key to coastal management. The ICM coordinating mechanism provides stakeholders (government and nongovernment) with access to decision-making process. The concerned sectors include those that exploit and use the natural resources for profit, communities that traditionally use natural resources for their food and livelihood, and the public sectors (local and central) that govern and manage the resources.

Likewise, in order to achieve the targets of sustainable use and development of the oceans and coasts, the commitment of national agencies, local governments and concerned government stakeholders is essential. Thus, their respective programs, projects and activities should be aligned with the action plans, programs and policies identified in the coastal management plans.

Data Requirements

- Representation of stakeholders in the coordinating mechanism
- Staff and budget allocation of agencies in the coordinating mechanism

Results

Currently functioning as the alternate ICM coordinating mechanism, the Provincial Development Council (PDC) is a multi-sectoral body chaired by the Governor and composed of a *Sangguniang Panlalawigan* Member, the 12 municipal and city mayors, three (3) congressional representatives and civil society organizations (CSOs).

The subcommittees under the Committee on Programs/Planning that were created as part of the BSDCC are no longer functional. Nonetheless, there are sectoral councils and committees in the province comprised of different stakeholders addressing specific issues and aspects of sustainable development (**Table 8**).

For Natural and Man-Made Hazard Prevention and Management, the Provincial Disaster Risk Reduction and Management Council (PDRRMC), which convenes quarterly, monitors and evaluates the implementation of the Provincial Disaster Risk Reduction and Management Plan. It also ensures the integration of disaster risk reduction and climate change adaptation into local development plans, programs, and budgets.

Covering three (3) sustainable development aspects, namely 1) Habitat Protection, Restoration, and Management, 2) Water Use and Supply Management, and 3) Pollution Reduction and Waste Management are the Manila Bay Provincial Technical Working Group (MAB PTWG) and Provincial Solid Waste Management Board (PSWMB), both of which hold quarterly meetings. The MAB PTWG is comprised of representatives of mandated agencies overseeing and implementing the directives of the Manila Bay Interagency Committee. Directed towards the proper management and preservation of Manila Bay, the initiatives of the MAB PTWG center on water quality improvement, pollution control, shoreline cleanup, and mangrove reforestation. Meanwhile, the PSWMB ensures the implementation of the Provincial Solid Waste Management Plan and provides the necessary logistical and operational support to the component city and municipalities as mandated by the Local Government Code.

The issues and programs on Food Security and Livelihood Management are discussed in three (3) councils, namely the Provincial Agricultural and Fisheries Council (PAFC), Provincial Council of Leaders (PCL), and Micro, Small, and Medium Enterprise Development Council (MSMEDC). While the PAFC monitors the programs of the Department of Agriculture for the improvement of the welfare of farmers and fisherfolk, the PCL is focused on the implementation of programs for the fisherfolk. Lastly, attached to the Department of Trade and Industry (DTI) is the Bataan MSMEDC, which is tasked to effectively cultivate the growth and development of MSMEs in the province while carrying out the policy declared in Republic Act No. 6977, as amended by R.A. 8289, also known as the Magna Carta for MSMEs.

Table 8. Representation of stakeholders in the sectoral committees and councils.

Sustainable Development Aspects	Sectoral Committees and Councils	Composition
Natural and Man-Made Hazard Prevention and Management	Provincial Disaster Risk Reduction and Management Council	PGB, DOST, DILG, 70th Infantry Battalion, BFP, PCG, Bataan Provincial Police Office, Philippine Army Reserve, PAF, DPWH, DepEd SDS, Red Cross Bataan Chapter, DTI, DOH, PIA, REACT Bataan, Lions Club, PICE, SATAMAKABA, Rotary Club, 1Bataan Truckers Association, BACCI, PENELCO, Diocesan Coordinator, Knights of Columbus, BPSU, SK Federated President, BYDO, AFAB, HEIP, PAFC Petrochemical Industrial Park
Habitat Protection, Restoration and Management	Manila Bay Provincial Technical Working Group	DENR-PENRO Bataan, CENRO Bagac, CENRO Dinalupihan, MBCO R3, EMB R3, DILG, DepEd SDO Bataan, DepEd SDO Balanga, PHO, OPA, PG-ENRO, DPWH 1st and 2nd DEOs, PCG Limay Substation, PNP-Maritime, PPA, Bataan Association of Water Districts, BPSU, BHSO
Water Use and Supply Management		
Pollution Reduction and Waste Management	Provincial Solid Waste Management Board	Governor, City and Municipal Mayors, SP Chairperson on Committee on Environment, PG-ENRO, PHO, PPDO, PEO, OPA, Congressional Representatives, DILG, DOST, DENR-PENRO, LAYAG, PIChE Bataan Chapter, BNHS, CFARMC, Amanda's Marine Products, KA Peleng Junkshop

Food Security and Livelihood Management	Provincial Agricultural and Fisheries Council	City and Municipal Agricultural Fisheries Councils
	Provincial Council of Leaders	City and Municipal Fisheries and Aquatic Resource Management Councils' Chairmen
	Micro, Small, and Medium Enterprise Development Council	DTI, DOST, PCCI-Bataan, DILG, PPDO, BYDO, BPSU, BAFNOMAI

Source: PG-ENRO, PDRRMO, DENR-PENRO, Provincial Cooperative and Enterprise Development Office (PCEDO), and Office of the Provincial Agriculturist (OPA).

Implications and Recommendations

In lieu of the subcommittees under the BSDCC, which are non-operational as of the preparation of this report, different sectoral committees and councils are serving as platforms to discuss various aspects of sustainable development of coastal and marine areas in the province. A wide range of stakeholders are represented in these committees including national government agencies (NGAs), local government units (LGUs), the academe, private sector, CSOs, people's organizations (POs), and other sectors. All of them are actively carrying out their functions according to their sectoral needs. These efforts, however, need to be consolidated, and thus the recommendation to reorganize the BSDCC and reactivate the subcommittees under the Committee on Programs/Planning. This will allow a more effective monitoring and evaluation of the development and execution of programs on various aspects of sustainable development, as part of the implementation of the Bataan ICM program.

References

Department of Environment and Natural Resources-Provincial Environment and Natural Resources Office (DENR-PENRO), Manila Bay Provincial Technical Working Group.

E.O. 05, Series of 2023.

E.O. 230, Series of 2022.

R.A. 8289

Republic Act (R.A.) No. 6977

2nd Quarter Manila Bay PTWG Meeting in 2023.

Legislation

006 ICM enabling legislation

Description

This indicator describes the existence and adequacy of legislation enabling the implementation of ICM interventions.

Rationale

The existence, adequacy, and effectiveness of legislation are important in order to determine if the goals and objectives of coastal management are supported by a clear and enforceable legal basis. The legislation defines what is required, permitted and prohibited in the coastal and marine area. Awareness and understanding of coastal management legislation promote compliance and therefore achievement of coastal management goals and objectives.

Data Requirements

- Legislation/local ordinances regarding the ICM institutional mechanism and management activities, including:
- Coastal use zoning;
- Fisheries, mining, and other extraction activities;
- Pollution-related activities;
- Building structures in the coastal environment, including aquaculture structures; and
- Access to rules and regulations

Results

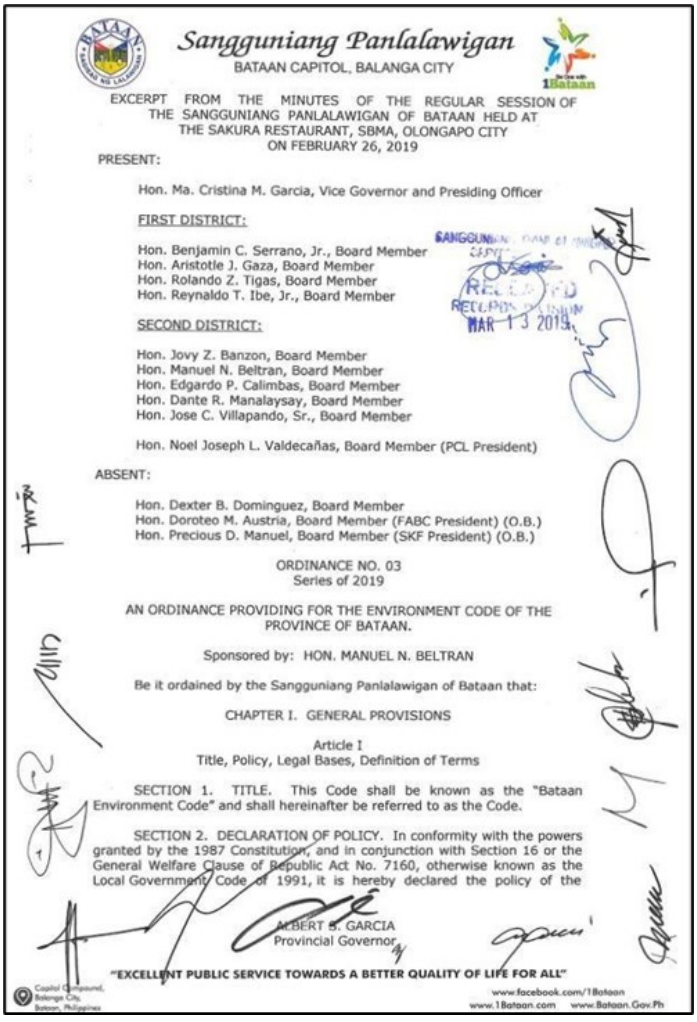
On February 26, 2019, the province adopted landmark legislation, Provincial Ordinance No. 03, Series of 2019, entitled “An Ordinance Providing for the Environment Code of the Province of Bataan.” The Bataan Environment Code was promulgated to provide policy direction in the planning and execution of programs that will: 1) ensure ecologically sound and sustainable development through collaborative efforts of concerned government agencies, NGOs, business communities, and other concerned sectors; 2) establish policies and mechanisms for the protection, preservation, and management of the province’s natural resources and environment; 3) ensure strict enforcement of pertinent environmental laws, regulations, policies, and issuances; and 4) consider socio-cultural interests and strengthen people’s participation.

Section 38 of the said Code provides for the adoption and implementation of the ICM System in the province, in accordance with Executive Order (E.O.) No. 533 and consistent with the provisions of the Local Government Code and the BSDS IP. Aiming to reinforce the institutionalization of the ICM System in Bataan, the Ordinance contains salient provisions that cover sustainable development aspects ranging from extraction of natural resources to wildlife and biodiversity conservation, watershed management and protection, sustainable

agricultural development, and pollution and solid waste management.

Table 9 shows environment related ordinances enacted at the provincial, municipal, and city levels from 2009 to 2023. Most of these ordinances are intended for the management of coastal and fisheries and aquatic resources, ecological solid waste, and septage and sewerage, and plastic use regulation. Other notable legislations include the Provincial Resolution approving the Local Climate Change Action Plan, the Municipal Ordinance for the establishment of water conservation programs in Pilar, the Municipal Ordinance prescribing an environmental fee in Morong, as well as the Wildlife Tourism Ordinance of Bagac.

Prior to the enactment of these ordinances, concerned stakeholders were engaged through a series of public hearings/consultations. Through this process, stakeholders were given the chance to raise issues and concerns that were addressed accordingly in a particular ordinance. Information on these legislations is disseminated through the distribution of publication materials and conduct of cascading activities.



Sangguniang Panlalawigan
BATAAN CAPITOL, BALANGA CITY

EXCERPT FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG PANLALAWIGAN OF BATAAN HELD AT THE SAKURA RESTAURANT, SBMA, OLONGAPO CITY ON FEBRUARY 26, 2019

PRESENT:

Hon. Ma. Cristina M. Garcia, Vice Governor and Presiding Officer

FIRST DISTRICT:

Hon. Benjamin C. Serrano, Jr., Board Member
Hon. Aristotle J. Gaza, Board Member
Hon. Rolando Z. Tigas, Board Member
Hon. Reynaldo T. Ibe, Jr., Board Member

SECOND DISTRICT:

Hon. Jovy Z. Banzon, Board Member
Hon. Manuel N. Beltran, Board Member
Hon. Edgardo P. Calimbas, Board Member
Hon. Dante R. Manalaysay, Board Member
Hon. Jose C. Villapando, Sr., Board Member

Hon. Noel Joseph L. Valdecañas, Board Member (PCL President)

ABSENT:

Hon. Dexter B. Dominguez, Board Member
Hon. Doroteo M. Austria, Board Member (FABC President) (O.B.)
Hon. Precious D. Manuel, Board Member (SKF President) (O.B.)

ORDINANCE NO. 03
Series of 2019

AN ORDINANCE PROVIDING FOR THE ENVIRONMENT CODE OF THE PROVINCE OF BATAAN.

Sponsored by: HON. MANUEL N. BELTRAN

Be it ordained by the Sangguniang Panlalawigan of Bataan that:

CHAPTER I. GENERAL PROVISIONS

Article I
Title, Policy, Legal Bases, Definition of Terms

SECTION 1. TITLE. This Code shall be known as the "Bataan Environment Code" and shall hereinafter be referred to as the Code.

SECTION 2. DECLARATION OF POLICY. In conformity with the powers granted by the 1987 Constitution, and in conjunction with Section 16 or the General Welfare Clause of Republic Act No. 7160, otherwise known as the Local Government Code of 1991, it is hereby declared the policy of the

ALBERT S. GARCIA
Provincial Governor

"EXCELLENT PUBLIC SERVICE TOWARDS A BETTER QUALITY OF LIFE FOR ALL"

Bataan Environment Code

Table 9. ICM-relevant legislations in the province, municipalities, and city.

Resolution / Ordinance / E.O. No.	Year	Title
		PROVINCE OF BATAAN
Resolution No. 250	2023	Resolution Approving the Terms and Conditions of the Memorandum of Agreement (MOA) Between the Provincial Government of Bataan (PGB) and the Alion Small Farmers Association, Inc. for the Establishment of the Forest Landscape Restoration (FLR) Demo-Site in Brgy. Alion, Mariveles, Bataan, and Authorizing the Provincial Governor to Enter Into and Sign the Same.
Executive Order No. 05	2023	An Order Amending and Updating the Composition of the Provincial Solid Waste Management Board (PSWMB) of the Province of Bataan.
Ordinance No. 24	2022	An Ordinance Prescribing the Rules and Regulations Governing Marine Turtles (*Pawikan*) Interaction During Nesting and Hatching Season and the Management of Threats on Nesting Habitats in the Province of Bataan and Providing Penalties for Violation Thereof.
Executive Order No. 110	2022	An Order Prescribing Guidelines on Waste Reduction within the Provincial Government of Bataan.
Executive Order No. 66	2022	Creating the Talisay River Provincial Task Force, Defining Its Composition, Powers, and Functions, and for Other Purposes, to Effectively Implement the Relevant Provisions of the Bataan Environment Code and the Talisay River Rehabilitation Ordinance of the City of Balanga and Municipality of Pilar, Bataan.
Ordinance No. 30	2021	An Ordinance Declaring the *Pawikan* Nesting Sites in the Municipality of Morong as Critical Habitat.
Ordinance No. 06	2021	An Ordinance Prescribing the Guidelines for the Utilization, Recirculation, Hauling and Final Disposal of Biomass Ash Generated by the Operation of Biomass Power Plants and Other Sources within the Province of Bataan and Prescribing Penalties for Violation Thereof.
Executive Order No. 136	2021	An Order Further Amending and Updating the Composition of the Provincial Solid Waste Management Board (PSWMB) of the Province of Bataan.
Executive Order No. 03	2021	An Order Amending and Updating the Composition of the Provincial Solid Waste Management Board (PSWMB) of the Province of Bataan.
Executive Order No. 21	2020	An Order Amending and Updating the Composition of the Provincial Solid Waste Management Board (PSWMB) of the Province of Bataan.
Resolution No. 377	2019	Interposing No Objection to the Cutting of Trees Affected by the Proposed Rehabilitation and Improvement of the BTPI-SBMA Road at Brgy. Mabayo, Morong, Bataan.
Resolution No. 351	2019	Authorizing the Provincial Governor to Enter Into and Sign a Memorandum of Agreement with the Bureau of Soils and Water Management; the Department of Agriculture – Regional Field Office III; the Municipal Government of Hermosa; and the Legua Up-Land Farmers Association Over the Establishment of Integrated Upland Conservation Guided Farms (IUCGF) in Sitio Nazareno, Brgy. Culis, Hermosa, Bataan.
Resolution No. 291	2019	Authorizing the Provincial Governor to Enter Into and Sign a Memorandum of Understanding with Global Green Growth Institute (GGGI) to Provide a Framework of Cooperation Between the Parties in Support of the 2030 Agenda for Sustainable Development and Paris Climate Agreement and Ratifying the Terms and Conditions Thereof.
Resolution No. 243	2019	Authorizing the Provincial Governor to Enter Into and Sign a Deed of Donation with the Municipalities of Dinalupihan, Orani, Mariveles and Samal, Bataan Involving One (1) Set of MRF Machineries and Equipment to Each of Aforementioned Local Government Units (LGUs).

Resolution No. 241	2019	Approving the Adoption of the Local Climate Change Action Plan (LCCAP) 2017-2022 of the Province of Bataan.
Resolution No. 130	2019	Authorizing the Provincial Governor to Enter Into and Sign the Deed of Usufruct Between the Provincial Government of Bataan and Department of Environment and Natural Resources for the Use, Possession and Enjoyment of Certain Parcel of Land Described as Portion of Lot No. 1252-B of the Subdivision Plan (LRC) PSD-217991 Which is Portion of Lot No. 12552 Covered by Transfer Certificate of Title No. T-246956 Located at Brgy. Tapulao (Now Brgy. Doña), Municipality of Orani Province Bataan for the Relocation and Construction of the New DENR-PENRO Bataan Building.
Resolution No. 52	2019	Authorizing the Provincial Governor to Enter Into a Memorandum of Agreement with the Municipality of Orion, PNOC Alternative Fuels Corporation and the *Samahang Magsasaka sa Kaatasang Lupa ng* General Lim on the Tree Planting Activity/Community Based Forestry Management in Line with the Let's Go Green Advocacy and the National Greening Program of the Department of Environment and Natural Resources (DENR).
Ordinance No. 03	2019	An Ordinance Providing for the Environment Code of the Province of Bataan.
Resolution No. 520	2018	Authorizing the Provincial Governor to Enter Into Memorandum of Partnership Agreement (MOPA) with the Department of Environment and Natural Resources (DENR)-Region III for the Adoption of the Provincial Foreshore Development and Management Plan (PFDMP) of Bataan as Required Prior to the Implementation of the Same.
Executive Order No. 26	2018	Reorganizing and Updating the Composition of the Provincial SWM Board of the Province.
Ordinance No. 01	2017	An Ordinance Establishing a Proper Sewage Treatment and Septage Management System in the Province of Bataan Prescribing Penalties for Violation Thereof and for Other Purposes.
Resolution No. 197	2014	Approving the Amendments of Provincial Ordinance No. 03, Series of 2009, Entitled "An Ordinance Banning Rice Straw Burning and Imposing Appropriate Penalties for Violations Thereof and Implementing the Mentioned Ordinance in Accordance with Its Implementing Rules and Regulations (IRR)."
Ordinance No. 03 / Resolution No. 219	2014	An Ordinance Regulating the Operation of Livestock and Poultry Raising.
Ordinance No. 03	2009	An Ordinance Banning Rice Straw Burning and Imposing Appropriate Penalties for Violations Thereof and Implementing the Mentioned Ordinance in Accordance with Its Implementing Rules and Regulations (IRR).
	MUNICIPALITY OF ABUCAY	
Ordinance No. 397	2023	An Ordinance Amending Sec. 9 of Municipal Ordinance No. 366 Series of 2021 (Comprehensive Fisheries and Management Ordinance of Abucay, Bataan)
Ordinance No. 384	2022	*Kautusang Nagtatakda ng Panuntunan sa Operasyon ng mga Manukan* (Broiler *at* Layer*) at Babuyan* (Piggery*) sa Bayan ng* Abucay, Bataan.
***Kapasiyahan Bilang* 36-D**	2022	*Kapasiyahan ng Pagsasabatas ng "Kautusang Pambayan sa Pagsasaayos at Pamamahala ng Tahungan, at Talabahan sa Nasasakupan ng Karagatan ng* Abucay, Bataan *at Paglalaan ng Kasunduan, Karampatang Parusa at Buwis."*

Ordinance No. 366	2021	The Comprehensive Fisheries and Aquatic Resource Management Ordinance of the Municipality of Abucay, Bataan, Institutionalizing an Implementation Mechanism, Providing Sanctions for Violations Thereof, and for Other Purposes.
Ordinance No. 354	2020	An Ordinance Enacting the Revised Revenue Code of the Municipality of Abucay.
Ordinance No. 351	2020	*Kautusan na Mahigpit na Pagbabawal sa Pagtapon, Pagkalat at Pagsiga o Pagsunog ng Anumang Basura at Pagpataw ng Kaukulang Kaparusahan ang mga Paglabag.*
Ordinance No. 286	2015	An Ordinance Enacting a Municipal Code Pursuing a Public-Private Partnership (PPP) Approach Towards Development, Providing for the Procedure for Selecting the Private Sector Proponent, Adopting a Contract Management Framework, and Providing Appropriations and for Other Purposes.
Ordinance No. 275	2014	An Ordinance Enacting the Ecological Solid Waste Management in the Municipality of Abucay.
MUNICIPALITY OF BAGAC		
Resolution No. 111	2022	Adopting the Forest Land Use Plan (FLUP) of the Municipality of Bagac, Province of Bataan.
Resolution No. 107	2022	Authorizing Hon. Rommel V. Del Rosario, Local Chief Executive of Bagac, Bataan, to Enter Into a Memorandum of Agreement with the Department of Environment and Natural Resources (DENR) Region 3 for the Joint Implementation of Forest Land Use Plan (FLUP) of the Municipality of Bagac, Province of Bataan.
Resolution No. 100	2022	Authorizing Hon. Rommel V. Del Rosario, Local Chief Executive of Bagac, Bataan, to Enter Into a Memorandum of Agreement with Planoteerism for the Formulation of the Local Climate Change Action Plan (LCCAP).
Resolution No. 16	2022	Adopting the Plans and Programs of the Philippine National Police - Bagac, Bataan for Anti-Illegal Fishing.
Resolution No. 10	2021	Authorizing Hon. Rommel V. Del Rosario, Local Chief Executive of Bagac, Bataan, to Enter Into a Memorandum of Agreement for and on Behalf of the Municipality of Bagac, Bataan with Metro Clark Waste Management Corporation for FY 2022 for the Disposal of Residual Solid Waste of the Municipality.
Resolution No. 2	2021	Adopting the Plans and Programs Under the Comprehensive Development Plan (CDP) for FY 2021-2026, and the Local Development Investment Plan (LDIP) for FY 2020-2022 of the Municipality of Bagac, Province of Bataan.
Ordinance No. 24	2021	An Ordinance Providing for the Rules and Regulations Governing the Conduct of Marine Wildlife Tourism Interactions, Otherwise Known as the "Marine Wildlife Tourism Ordinance of the Municipality of Bagac, Bataan."
Ordinance No. 6	2020	An Ordinance Providing the Rules and Regulations for Effective Administration and Supervision of the Community Fish Landing Center (CFLC) in the Municipality of Bagac and Imposing Regulatory Fees and Charges Thereof.
Ordinance No. 5	2020	An Ordinance Implementing the Zero Open Defecation (ZOD) in the Municipality of Bagac Imposing Fines and Penalties for Violations and Providing Funds Thereof.

Ordinance No. 7	2019	An Ordinance Regulating the Use of Plastics in Bagac, Bataan for Efficient Garbage Disposal and to Reduce Risk to Health, Environment, and Well-Being, Prescribing Socialized Environmental Fees, Imposing Penalties in Violation Thereof and for Other Purposes.
Resolution No. 57	2018	Adopting the Plans and Programs Under the Comprehensive Development Plan (CDP) of the Municipality of Bagac, Province of Bataan.
Ordinance No. 8	2018	An Ordinance Establishing the Management, Conservation, Utilization, and Protection of the Coastal and Marine Resources of the Municipality of Bagac, Province of Bataan, and Imposing Charges, Fees, and Penalties for the Violation Thereof
Resolution No. 49	2017	A Resolution Identifying the Area for the Construction of the Community Fish Landing Center (CFLC), Confirming Ownership or Legal Right of this Local Government Unit Over the Same, and Authorizing the Municipal Mayor to Enter Into a Memorandum of Agreement with the Bureau of Fisheries and Aquatic Resources (BFAR) and the Philippine Fisheries and Development Authority (PFDA).
Ordinance No. 7	2017	An Ordinance Adopting the Provincial Ordinance No. 3 Series of the Provincial Government of Bataan Entitled an Ordinance Providing for a Comprehensive Animal Regulation and Rabies Control and Eradication in Bataan Province, Providing Penalties for Violations Thereof, and Appropriating the Necessary Funds for the Purpose.
Ordinance No. 6	2017	An Ordinance Adopting the Provincial Ordinance No. 03 Series of 2009 of the Provincial Government of Bataan Entitled "An Ordinance Banning Rice Straw Burning and Imposing Appropriate Penalties for Violation Thereof and Implementing the Mentioned Ordinance in Accordance with its Implementing Rules and Regulations (IRR).
Resolution No. 91	2016	Authorizing Hon. Louise Gabriel Q. Del Rosario, Municipal Mayor, Bagac, Bataan to Enter Into a Memorandum of Agreement with the Bureau of Fisheries and Aquatic Resources (BFAR) Region III Represented by Its Regional Director Wilfredo M. Cruz for the Distribution of Fish Stalls to the Municipality of Bagac, Province of Bataan.
Ordinance No. 4	2016	An Ordinance Establishing a Proper Sewage Treatment and Septage Management System in the Municipality of Bagac, Province of Bataan and Prescribing Penalties for Violations Thereof.
Ordinance No. 2	2016	An Ordinance Enacting the Comprehensive Solid Waste Management Code of the Municipality of Bagac, Bataan.
Ordinance No. 4	2014	Declaring Every Second Friday of July as Arbor Day.
Ordinance No. 3	2014	An Ordinance Establishing the Marine Protected Area at *Barangay* Pag-Asa and *Barangay* Saysain Bagac, Bataan.
Ordinance No. 3	2013	*Pagtupad ng mga Alituntunin sa Kalinisan sa Bayan ng* Bagac, Bataan.
	CITY OF BALANGA	
Resolution No. 74	2023	Resolution Approving and Adopting the Creation of the Integrated Coastal Resource Management Committee (ICRMC) of the City of Balanga, Bataan.
Resolution No. 196	2021	Resolution Adopting the Technical Description of the Municipal Waters of the City of Balanga as Certified by the National Mapping and Resource Information Authority.
Resolution No. 13	2020	Resolution Approving the Three-Year (2020-2022) Peace and Order and Public Safety (POPS) Plan of the City of Balanga, Bataan.

Ordinance No. 35	2020	The Comprehensive Fisheries and Aquatic Resource Management Ordinance of the City of Balanga, Bataan, Institutionalizing an Implementation Mechanism, Providing Sanctions for Violations Thereof and for Other Purposes.
Resolution No. 113	2019	A Resolution Encouraging the Non-Use of Plastic Bags Everyday in Groceries, Supermarkets, Public Markets, Restaurants, Fast Food Chains, Department Stores, Retail Stores and Other Similar Establishments in the City of Balanga, Bataan and Endorsing the Use of Recyclable Paper Bags and/or Biodegradable Bags, Baskets and Other Reusable Bags Instead.
Resolution No. 22	2019	Resolution Adopting the Rivers for Life Project of the Department of Environment and Natural Resources (DENR).
Ordinance No. 39	2019	Ordinance Amending City Ordinance No. 11, S. 2016, Otherwise Known as "An Ordinance Establishing the Fees and Charges System for Tanato Picnic Grove and River Resort."
Ordinance No. 38	2019	Ordinance Amending City Ordinance No. 14, S. 2011, Otherwise Known as "An Ordinance Establishing the Fees and Charges System for Balanga Wetland and Nature Park."
Ordinance No. 24	2019	Ordinance Amending City Ordinance No. 184 S. 2006 Otherwise Known as An Ordinance Declaring the Coastal Areas of *Barangays* Sibacan, Pto. Rivas Ibaba and Tortugas, City of Balanga, Bataan as Birds and Fish Sanctuary.
Resolution No. 157	2018	Resolution Institutionalizing the *Ayusin, Buhayin, Kalingain… Daluyan ng Tubig Natin* (ABKD) Program in the City of Balanga.
Ordinance No. 13	2017	An Ordinance Establishing a Proper Septage Management System in the City of Balanga, Bataan Prescribing Penalties for Violation Thereof.
Resolution No. 78	2016	Resolution Approving the Ten Year (Period 2016 to 2025) Solid Waste Management Plan of the City of Balanga.
Ordinance No. 11	2016	An Ordinance Establishing the Fees and Charges System for Tanato Picnic Grove and River Resort.
Ordinance No. 14	2011	An Ordinance Establishing the Fees and Charges System for Balanga Wetland and Nature Park.
MUNICIPALITY OF HERMOSA		
Ordinance No. 33	2022	An Ordinance Promoting and Institutionalizing Organic Agriculture/ Farming in the Municipality of Hermosa.
Ordinance No. 18	2022	An Ordinance Specifying the Rates of Septage Fees in the Municipality of Hermosa.
Executive Order No. 32	2022	An Order Creating the *Bantay Ilog* Task Force of the Municipality of Hermosa.
Executive Order No. 40	2022	An Order Creating the Municipal Water Quality Monitoring Committee of the Municipality of Hermosa.
Ordinance No. 24	2021	An Ordinance Amending Certain Provisions of Municipal Ordinance No. 7, Series of 2015, Otherwise Known as the "Municipality of Hermosa Septage Management Ordinance."
Ordinance No. 52	2020	Reconstituting the Municipal Ecological Solid Waste Management Board of the Municipality of Hermosa.
Ordinance No. 19	2019	An Ordinance Strengthening the Management of Bataan Natural Park within the Municipality of Hermosa, Bataan Through the Creation of *Bantay Gubat/Kalikasan*.

Ordinance No. 04	2018	An Ordinance Prohibiting the Use of Certain Plastic Bags on Dry Goods and Regulating Its Utilization on Wet Goods within the Municipality of Hermosa and Prescribing Penalties for Its Violations.
Ordinance No. 02	2018	An Ordinance Amending the Penal Provisions of the Ordinance No. 7 Series of 2002 Otherwise Known as the "Ecological Solid Waste Management on Clean and Green Ordinance."
Executive Order No. 15	2018	Tobacco Free Generation End Game Strategy Ordinance of 2018.
Resolution No. 103	2016	Resolution Approving the Amendment of Section 14 Article VII of Municipal Ordinance No. 007, Series of 2002, Titled "Comprehensive Ecological Solid Waste Management on Clean and Green Ordinance of the Municipality of Hermosa."
MUNICIPALITY OF LIMAY		
Ordinance No. 30	2023	Reconstituting Municipal Fisheries and Aquatic Resources Management Council (MFARMC) in the Municipal of Limay, Their Composition and Functions.
Resolution No. 2019-106-A	2019	Resolution Adopting the Provincial Ordinance No. 01-Series of 2017 Also Known as "Sewage and Septage Ordinance of the Province of Bataan."
MUNICIPALITY OF MARIVELES		
Ordinance No. 213	2023	Adhering with the Maintenance of the Establishing Senior Citizen's Park and Kilometer-Zero Park Beside Jollibee by the Municipal Government of Mariveles Since Their Construction in Previous Years up to Present.
Executive Order No. 02	2021	An Order Providing for the Issuance of a Citation Ticket for the Enforcement of the Penalties in Municipal Ordinance No. 040 Series 2004 Otherwise Known as the "Comprehensive Ecological Solid Waste Management Ordinance of the Municipality of Mariveles" in Consonance with the Municipality's Implementation of the No Segregation, No Collection Policy.
Ordinance No. 146	2019	Regulating the Use of the Municipal Waters of Mariveles Used as Tourist Attraction and Regulating Activities for Tourist's Safety, Convenience and Security.
Resolution No. 483	2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Mariveles, Province of Bataan.
Ordinance No. 107	2015	Regulating the Mountaineering and Trekking Activities at the Mariveles Mountain Range to Include the Area via Tarak Ridge for Environmental Protection and Tourism Promotion Purposes and Providing Funds Therefor.
Ordinance No. 5-96	2011	Anti-Littering Ban in Public Places.
Ordinance No. 70	2009	An Ordinance Providing for the Establishment of a Marine Patrol Zone within the Vicinity of the Coastal Waters of Mariveles Bataan, Where Artificial Reefs Had Been Installed and Provides Penalty Thereof.
Ordinance No. 5-94	2007	An Ordinance on Maintaining Municipal Waters Free from Pollutants, Effluents and Other Prohibited or Dangerous Chemicals to Marine and Human Lives.
Ordinance No. 40	2004	Municipality of Mariveles Solid Waste Management Ordinance.
MUNICIPALITY OF MORONG		
Ordinance No. 151	2019	An Ordinance Prescribing Environmental Fee in the Municipality of Morong, Bataan Providing Penalties for Violation Thereof.

Ordinance No. 115	2017	*Kautusang Nag-Aamienda sa Seksyon 3, 5 at Seksyon 6 ng Pambayang Kautusan Blg. 53 Serye ng 2010 "Kautusang Nagbabawal sa Pagkakalat/Pagtatapon ng Basura/Dumi at Lahat ng Uri Nito, Pag-Ihi at Pagdura sa mga Bukas o Pampublikong Lugar Tulad ng Daan, Liwasan, Canal, Ilog, Dagat, Bakanteng Lote at Pagtakda ng Kaparusahan sa mga Lalabag Dito."*
Ordinance No. 44	2016	An Ordinance Directing All Beach Operators to Fabricate and Post an Emblem/Signage for *Pawikan* Protection at the Entranceway and Beach Area of their Resort or Establishment, Providing Penalties for Violation Hereof and for Other Purposes.
Ordinance No. 46	2009	An Ordinance Promulgating Rules and Regulations on Segregation and Proper Disposal of Garbage by Any Person, Commercial Establishments, Market Stalls and All Households in the Municipality of Morong and Prescribing Penalties for Violation Hereof and for Other Purposes.
MUNICIPALITY OF ORANI		
Ordinance No. 14	2023	An Ordinance Providing for the Sustainable Development, Management, Utilization and Conservation of the Coastal and Fisheries Resources, Otherwise Known as the 'Fisheries Ordinance of the Municipality of Orani.'
Ordinance No. 05	2023	An Ordinance Instituting and Implementing the Registration of Ownership of Agricultural and Fisheries Machinery and Equipment in Accordance with the Joint Memorandum Circular No. 2018-02 by the Department of Agriculture and Department of Interior and Local Government Relative to the National Guidelines for the Registration of Ownership of Agricultural and Fisheries Machinery and Equipment within the Territorial Jurisdiction of Orani, Bataan.
Ordinance No. 18	2021	An Ordinance Declaring Wednesday and Saturday as No Plastic Bag and Polystyrene Day in the Municipality of Orani, Bataan Prescribing Penalties Thereof.
Ordinance No. 03	2021	An Ordinance Providing for Policy Guidelines in the Registration of Municipal Fisherfolks, Fishing Vessels Three (3) Gross Tonnage and Below, Providing Penalties for Violation Thereof, and for Other Purposes.
Ordinance No. 100	2020	Resolution Adopting the Forest Land Use Plan (FLUP) for the Municipality of Orani, Bataan.
Ordinance No. 76	2019	Resolution Adopting the 10-year Comprehensive Land Use Plan of the Municipality of Orani, Bataan for 2018-2027.
Ordinance No. 17	2019	An Ordinance Establishing the Municipal Tourism Code of the Municipality of Orani, Province of Bataan.
Ordinance No. 10	2019	An Ordinance Adopting the Integrated Zoning Regulations of the Municipality of Orani, Province of Bataan and Providing for the Administration, Enforcement and Amendment Thereof and for the Repeal of All Ordinances in Conflict Therewith.
Ordinance No. 08	2019	An Ordinance Implementing the Zero Open Defecation (ZOD), Imposing Fines and Penalties for Violations and Providing Funds Thereof.
Ordinance No. 10	2018	An Ordinance Establishing a Proper Sewage Treatment Septage Management System for the Municipality of Orani, Bataan Prescribing Penalties for Violation Thereof and for Other Purposes.

MUNICIPALITY OF ORION		
Ordinance No. 152	2023	An Ordinance Establishing and Delineating the New Boundaries of the Municipal Waters of the Municipality of Orion, Bataan.
Ordinance No. 143	2022	An Ordinance Institutionalizing, Promoting and Developing Organic Agriculture in the Municipality of Orion, Bataan, Providing Funds Therefore, and for Other Purposes.
Ordinance No. 123	2020	An Ordinance Approving the Comprehensive Fisheries and Aquatic Resources Management Code of the Municipality of Orion, Bataan, Institutionalizing the Implementation Mechanism, Providing Sanctions for Violations Thereof and for Other Purposes.
Ordinance No. 121	2019	An Ordinance Implementing the Zero Open Defecation (ZOD) in the Municipality of Orion, Bataan Imposing Penalties for Violation Thereof and Providing Funds Therefor.
Ordinance No. 120	2019	An Ordinance Providing the Rules and Regulations for Effective Administration and Supervision of the Orion Community Fish Landing (CFLC) in the Municipality of Orion, Bataan.
Resolution No. 41	2018	A Resolution Concurring the Adoption and Approving the 10-Year Solid Waste Management Plan of the Municipality of Orion, Bataan for 2016-2025, Approved by the National Solid Waste Management Commission (NSWMC) Under Resolution No. 947 Series of 2017.
Ordinance No. 110	2018	An Ordinance Approving and Adopting the Integrated Zoning Regulations of the Municipality of Orion, Bataan and Providing for the Administration, Enforcement and Amendment Thereof and for the Repeal of All Ordinances in Conflict Therewith.
Ordinance No. 96	2017	An Ordinance Establishing a Proper Sewage Treatment and Septage Management System in the Municipality of Orion, Prescribing Penalties for Violation Thereof and for Other Purposes.
Ordinance No. 77	2012	An Ordinance Enacting the Revised Comprehensive Solid Waste Management Code of the Municipality of Orion, Bataan, Advocating Zero Plastic Wastes and Institutionalizing the Use of Biodegradable Containers in the Municipality.
MUNICIPALITY OF PILAR		
Ordinance No. 03	2023	An Ordinance Establishing the Manila Bay Task Force (MBTF) of the Local Government Unit of Pilar, Bataan.
Ordinance No. 11	2022	An Ordinance Lifting the Declaration of a "Danger/No Build Zone" in *Barangay* Pantingan as embodied in *Kautusang BLG*. 2, S. 2017, Entitled, "*Isang Pambayang Kautusan na Denedeklarang* "Danger/No Build Zone" *ang Purok* 4 (*Palayang Bayan*) *at Purok* 5 (Riverside) *ng Barangay* Pilar, Bataan *at Itinadhana ang Paglalagay ng* "Warning Signages" *sa Nasabing mga Lugar*."
Ordinance No. 10	2021	Addendum to Article G. SECTION 5G.01 of Ordinance No. 9, S. 2012 Entitled, "The Revised Revenue Code of the Municipality of Pilar, Bataan," Prescribing the Garbage Collection Fee Rate from the Operation of Junkshop Establishment Based on the Volume of Residual Wastes Collected from the Said Establishment.

Ordinance No. 17	2019	Addendum to Ordinance No. 1, S. 2015, Entitled, "An Ordinance Regulating the Operation of All Junkshops and Similar Establishments and Individuals Engaged in the Business of Buying and Selling of Metal Scraps and Other Materials Made of, or Containing Metals, Old Newspaper, Cardboards, Cartons, Plastic Materials Styrofoams, Discarded Household Wares, Appliances Old G.I. Sheet, Bottles, Tin Cans, and Similar Objects with Monetary Value, within the Territorial Jurisdiction of the Municipality of Pilar, Bataan and Penalizing Violations Thereof."
Resolution No. 46	2018	A Resolution Approving and Adopting the Daily Schedule of Wastes Collection from the Pick-Up Points of the Nineteen (19) *Barangays* within the Municipality of Pilar, Bataan.
Ordinance No. 04	2018	*Isang Kautusan Pambayan na Nagbabawal sa Sinumang Tao na Magtatapon ng Basura o Anumang Uri ng Dumi sa mga Ilog, Sapa, Kanal, Taguling, Irigasyon, Dagat, Bakanteng Lote o Gilid ng Hayagang Lansangan na Nasasakop ng Bayang Ito.*
Ordinance No. 03	2018	*Isang Pambayang Kautusan na Nagtatakda na ang Bawat Mamamayan sa Kanilang Tahanan at ang Lahat ng may Tindahan, Kompanya, Establisimiento, Kainan, Industriya Paaralan, Pamahalaan at Institusyon ng Mamamayan ng Bayan ng* Pilar *ay Nararapat sa Magbukod-Bukod ng Basura sa Kanilang Nasasakupang Lugar at Pagpapataw ng Basura sa mga Hindi Susunod Dito.*
Ordinance No. 06	2017	An Ordinance Ensuring the Quality of the Municipality's Drinking Water and Creating the Local Drinking Water Quality Monitoring Committee of the Municipality of Pilar, Bataan, Identifying the Membership, Their Duties and Responsibilities and Other Purposes.
Ordinance No. 02	2017	*Isang Pambayang Kautusan na Deneklarang* "Danger/ No Build Zone" *ang Purok* 4 (*Palayang Bayan*) at *Purok* 5 (Riverside) ng *Barangay* Pantingan Pilar, Bataan *at Itatadhana ang Paglalagay ng* "Warning Signages" *sa Sinabing mga Lugar*.
Ordinance No. 07	2016	An Ordinance Establishing a Proper Sewage Treatment and Septage Management System in the Municipality of Pilar in This Province, Prescribing Penalties for Violation Thereof and for Other Purposes.
Ordinance No. 01	2016	An Ordinance Establishing Water Conservation Programs in the Municipality of Pilar, Bataan.
MUNICIPALITY OF SAMAL		
Ordinance No. 28	2023	An Ordinance Delineating the Boundaries of Municipal Waters of Samal, Bataan.
Ordinance No. 14	2023	An Ordinance Implementing the Waste Diversion Project of the Municipality of Samal, Province of Bataan.
Ordinance No. 11	2023	The Comprehensive Fisheries and Aquatic Resources Management Ordinance of the Municipality of Samal, Province of Bataan, Institutionalizing an Implementation Mechanism, Providing Sanctions for Violations Thereof, and for Other Purposes.
Resolution No. 170	2022	Authorizing the Hon. Alexander C. Acuzar, Municipal Mayor to Enter Into a Memorandum of Agreement by and Between the Unified Hazwaste Expert Inc. Represented by Its President Ms. Karen Sherry Marnellie D. Liwanag and the Municipal Government of Samal, Bataan.
Resolution No. 117	2022	Resolution of Acceptance to the Offer of Hon. Alexander C. Acuzar, Municipal Mayor, to Use His Personal Construction Heavy Equipment for the Operation of Samal Ecological Park for Free.

Resolution No. 115	2022	Resolution Requesting for a Dredging Machine from the Department of Public Works and Highways (DPWH) Thru the Honorable Secretary Manuel M. Bonoan, for Dredging of Our Silted Rivers and Major Waterways.
Resolution No. 91	2022	Declaring *Barangay* Ordinance No. 2022 – 001 "An Ordinance Requiring All Residential and Commercial Establishments within the *Barangay* of East Calaguiman to Clean the Sidewalks Fronting Their Homes and/or Establishments, Otherwise Known as "*Tapat Ko Linis Ko* Ordinance" of the *Barangay* East Calaguiman, Samal, Bataan, Enacted within the Conferred Powers of the *Sangguniang Barangay*.
***Pambayang Kautusan Blg.* 18**	2022	*Kautusang Nag-Aamyenda sa Kautusan Blg.* 10-005 *na may Pamagat na, "Kautusan sa Pamamahala sa Tahungan at Talabahan sa Karagatan ng Bayan ng* Samal*, Lalawigan ng Bataan, Paglalaan ng Karampatang Bayarin at Pondo Para sa Mabisang Pagpapatupad."*
***Pambayang Kautusan Blg.* 19**	2021	*Kautusang Nagsususog sa Seksyon* 4*, Seksyon* 5 *at Seksyon* 6 *ng Kautusan Blg.* 00-003 *na may Pamagat na "Pagtatakda ng Panuntunan sa Pamamahala, Pangangalaga, Paggamit at Pagpapalago ng Yamang Dagat at sa Iba Pang Kaugnay na mga Bagay sa Nasasakupan ng Bayan ng* Samal*, Lalawigan ng* Bataan*."*
Resolution No. 132	2021	Resolution Declaring the Validity of *Barangay* Ordinance No. 004 – 2021, Entitled "An Ordinance Prohibiting Open Burning and Regulating Alternative Waste Disposal Methods within *Barangay* East Daan Bago, Samal, Bataan."
Resolution No. 131	2021	Resolution Declaring the Validity of *Barangay* Ordinance No. 003 – 2021, Entitled "An Ordinance Prohibiting "Illegal Dumping" within *Barangay* East Daan Bago, Samal, Bataan."
Resolution No. 130	2021	Resolution Declaring the Validity of *Barangay* Ordinance No. 002 – 2021, Entitled "An Ordinance Prohibiting Littering and Establishing Penalties for Violators within *Barangay* East Daan Bago, Samal, Bataan."
Resolution No. 116	2021	Resolution Authorizing the Honorable Aida D. Macalinao, Municipal Mayor to Enter Into a Memorandum of Agreement by and Between the Municipality of Samal, Bataan and Soliman E.C. Septic Tank Disposal Pertaining to Sanitation Alternative Technology, as Required by the DENR – EMB III in Compliance with the Requirements of RA 9275.
Resolution No. 111	2021	Resolution Requesting Funding Assistance from the Honorable Secretary Wendel E. Avisado for the Desilting of San Juan River (Tabing Ilog Section) at Samal, Bataan amounting to One Hundred Million (100,000,000.00) Pesos.
Resolution No. 110	2021	Resolution Requesting Funding Assistance from the Honorable Secretary Wendel E. Avisado for the Construction of Revetment and Desilting of Calaguiman River at Samal, Bataan Amounting to One Hundred Million (100,000,000.00) Pesos.
Resolution No. 103	2021	Authorizing the Local Chief Executive, Honorable Aida D. Macalinao, to Enter into a Memorandum of Agreement by and Between the Municipal Government of Samal, Bataan and the Department of Environment and Natural Resources – Environmental Management Bureau (DENR – EMB) Pertaining to the Implementation of Republic Act 9003, An Act Providing Environmental Provision Through Proper Solid Waste Management Practice.
Resolution No. 102	2021	Resolution Authorizing the Honorable Aida D. Macalinao, Municipal Mayor to Enter Into a Memorandum of Agreement by and Between the Municipality of Samal, Bataan and Environkonsult Equipment and Services Inc., Pertaining to Sanitation Alternative Technology, as Required by the DENR – EMB III in Compliance with the Requirements of RA 9275.

Resolution No. 57	2021	Resolution Authorizing the Honorable Aida D. Macalinao, Municipal Mayor to Enter Into a Memorandum of Agreement by and Between the Municipality of Samal, Bataan and Soliman E.C. Septic Tank Disposal Pertaining to Sanitation Alternative Technology as Required by the DENR – EMB III in Compliance with the Requirements of RA 9275.
Resolution No. 45	2021	Authorizing the Local Chief Executive, Honorable Aida D. Macalinao, to Enter into a Memorandum of Agreement by and Between the Municipal Government of Samal, Bataan and the Department of Environment and Natural Resources – Environmental Management Bureau (DENR – EMB) Pertaining to the Implementation of Republic Act 9003 Re: Supply, Delivery, Installation, Testing and Commissioning of Solid Waste Management Equipment Consisting of Biodegradable Waste Shredder and Composter to Support Our Local Government Unit.
Resoution No. 34	2021	Resolution Requesting Funding Assistance from the Department of Budget and Management (DBM) Thru Honorable Secretary Wendel E. Avisado for the Construction of Revetment and Desilting of San Juan River (Torres Section) at Samal, Bataan Amounting to Fifty Million (50,000,000.00) Pesos, Chargeable Against the Local Government Support Fund - Financial Assistance (LGSF – FA) to LGU.
Resolution No. 33	2021	Resolution Requesting Funding Assistance from the Department of Budget and Management (DBM) Thru Honorable Secretary Wendel E. Avisado for the Construction of Revetment and Desilting of San Juan River (Banlik Section) at Samal, Bataan Amounting to Fifty Million (50,000,000.00) Pesos, Chargeable Against the Local Government Support Fund - Financial Assistance (LGSF – FA) to LGU.
Resolution No. 21-032	2021	Resolution Requesting Funding Assistance from the Department of Budget and Management (DBM) Thru Honorable Secretary Wendel E. Avisado for the Construction of Revetment and Desilting of Calaguiman River at Samal, Bataan Amounting to Fifty Million (50,000,000.00) Pesos, Chargeable Against the Local Government Support Fund - Financial Assistance (LGSF – FA) to LGU.
***Pambayang Kautusan Blg.* 10**	2021	*Kautusang Nagbubuo ng mga Patakaran at Panuntunan sa Pamamahala sa Bakawan, Pagtatalaga ng Bantay-Bakawan sa Bayan ng* Samal*, Lalawigan ng* Bataan*, at Paglalaan ng Kaukulang Pondo.*
***Pambayang Kautusan Blg.* 09**	2021	*Kautusang Nagsususog sa Seksyon* 5*, Seksyon* 6*, at Seksyon* 7 *ng Kautusang Blg.* 14-032*, na may Pamagat na, "Kautusan sa Pagtatanim, Pagpaparami at Pangangalaga ng Bakawan sa mga Ilog, Sapa, Latian, Baybay Dagat at Nasasakupan ng Bayan ng* Samal*, Lalawigan ng* Bataan.
Ordinance No. 15	2021	Ordinance Implementing the Proper Disposal of Health Protective Equipment in the Municipality of Samal, Bataan, and Providing Penalties for Violation Thereof.
Resolution No. 164	2020	Resolution Adopting Provincial Ordinance No. 14 Series of 2020 Mandating the Preservation of Century and Heritage Trees in the Province of Bataan and Providing for the Creation of a Special Technical Committee.
Resolution No. 133	2020	Granting Authority to Hon. Aida D. Macalinao, Municipal Mayor to Enter Into Memorandum of Agreement by and Between the Municipality of Samal, Bataan and the Metro Clark Waste Management Corporation Pertaining to the Disposal of Residual Wastes of the Municipality of Samal, Bataan.

Resolution No. 22	2020	Resolution Requesting Funding Assistance from the Department of Budget and Management (DBM) Thru Honorable Secretary Wendel E. Avisado for the Construction of Revetment/Desilting of Lalawigan Creek at Lalawigan, Samal, Bataan Amounting to Twenty-Five Million (25,000,000.00) Pesos.
Resolution No. 16	2020	Granting Authority to the Local Chief Executive to Negotiate and Enter Into Memorandum of Agreement with Any Authorized Waste Management Corporation Pertaining to the Disposal of Residual Wastes of the Municipality of Samal, Bataan.
Resolution No. 14	2020	Resolution Authorizing the Local Chief Executive, Hon. Aida D. Macalinao to Enter Into Renewal of Memorandum of Agreement with Econest Waste Management Corporation Pertaining to the Disposal of Residual Waste of Municipality of Samal, Bataan.
***Pambayang Kautusan Blg.* 07**	2020	*Pagtatalaga ng Bantay-Dagat sa Bayan ng* Samal, *Lalawigan ng* Bataan, *Pagbubuo ng Patakaran sa Pamamahala, Paglalaan ng Sapat na Pondo, Teknikal at Iba Pang Suporta, at Iba Pang Kaugnay na Layunin.*
***Pambayang Kautusan Blg.* 06**	2020	*Pagbabago sa Nilalaman ng Seksyon* 11, *Seksyon* 31 *at Seksyon* 39 *ng Pambayang Kautusan Blg.* 19-013, "*Kautusang Nagtatakda ng Panuntunan sa Operasyon ng mga Manukan, Babuyan at Pag Aalaga ng Iba Pang mga Hayop sa Bayan ng* Samal, Bataan," *Upang Magkaroon ng Bisa sa Pagpapatupad ng Nasabing Kautusan.*
Ordinance No. 13	2020	An Ordinance Regulating the Use of Plastic Cellophane and Sando Bags as Packaging Materials and the Utilization of Styrofoam, for Food and Beverages Containers, in the Municipality of Samal, Province of Bataan, and Prescribing Penalties Thereof.
Resolution No. 135	2019	Resolution Requesting Funding Assistance from the Honorable Senator Ronald M. Dela Rosa for the Construction of Revetment and Desilting of Sta. Lucia Creek at Samal, Bataan Amounting to One Hundred Fifty Million (150,000,000.00) Pesos.
Resolution No. 134	2019	Resolution Requesting Funding Assistance from the Honorable Senator Ronald M. Dela Rosa for the Construction of Revetment and Desilting of San Juan River at Samal, Bataan Amounting to One Hundred Million (100,000,000.00) Pesos.
Resolution No. 133	2019	Resolution Requesting Funding Assistance from the Honorable Senator Ronald M. Dela Rosa for the Construction of Revetment and Desilting of Lalawigan Creek at Samal, Bataan Amounting to One Hundred Fifty Million (150,000,000.00) Pesos.
Resolution No. 132	2019	Resolution Requesting Funding Assistance from the Honorable Senator Ronald M. Dela Rosa for the Construction of Revetment and Desilting of Calaguiman River at Samal, Bataan Amounting to One Hundred Million (100,000,000.00) Pesos.
Resolution No. 125	2019	Resolution Requesting Funding Assistance from the Honorable Senator Christopher Lawrence "Bong" Tesoro Go for the Desilting of Calaguiman River, Samal, Bataan Amounting to Thirty-Five Million (35,000,000.00) Pesos.
Resolution No. 113	2019	Resolution Requesting Funding Assistance from the Honorable Senator Christopher Lawrence "Bong" Tesoro Go for the Construction of Revetment/Desilting of San Juan River, (Tabing Ilog Section) at Tabing Ilog, Samal, Bataan Amounting to Fifteen Million (15,000,000.00) Pesos.
Resolution No. 112	2019	Resolution Requesting Funding Assistance from the Honorable Senator Christopher Lawrence "Bong" Tesoro Go for the Construction of Revetment/Desilting of San Juan River, (Ibayo Section) at San Juan, Samal, Bataan Amounting to Fifteen Million (15,000,000.00) Pesos.

Resolution No. 111	2019	Resolution Requesting Funding Assistance from the Honorable Senator Christopher Lawrence "Bong" Tesoro Go for the Construction of Revetment/Desilting of Sta. Lucia, (Ibaba Section) at Ibaba, San Juan, Samal, Bataan Amounting to Fifteen Million (15,000,000.00) Pesos.
Resolution No. 110	2019	Resolution Requesting Funding Assistance from the Honorable Senator Christopher Lawrence "Bong" Tesoro Go for the Construction of Revetment/Desilting of San Juan River, (Torres Section) at Sitio Torres, San Juan, Samal, Bataan Amounting to Fifteen Million (15,000,000.00) Pesos.
Resolution No. 109	2019	Resolution Requesting Funding Assistance from the Honorable Senator Christopher Lawrence "Bong" Tesoro Go for the Construction of Revetment/Desilting of San Juan River, (Banlik Section) at Sitio Banlik, San Juan, Samal, Bataan Amounting to Fifteen Million (15,000,000.00) Pesos.
Resolution No. 108	2019	Resolution Requesting Funding Assistance from the Honorable Senator Christopher Lawrence "Bong" Tesoro Go for the Construction of Revetment/Desilting of Lalawigan Creek at Lalawigan, Samal, Bataan Amounting to Fifteen Million (15,000,000.00) Pesos.
Resolution No. 08	2019	Approving the Comprehensive Development Plan (CDP).
Resolution No. 04	2019	Authorizing the Local Chief Executive, Hon. Generosa M. Dela Fuente, to Enter Into a Contract of Service by and Between the LGU of Samal, Bataan and Atty. Raymond M. Cajucom as Environment Consultant.
Ordinance No. 12	2019	Amending Certain Provisions of Municipal Ordinance No. 06-003, Entitled, "An Ordinance Establishing an Integrated Solid Waste Management in the Municipality of Samal, Bataan."
Resolution No. 44	2018	Recognizing the Commendable Performance of the Samal Municipal Police Station, Philippine National Police, Thru the Able Leadership of PCI Emelito M. Dela Cruz, in Pursuit of Their Duties and as Effective Partners of the Local Government of Samal, Bataan, in Curbing the Incidence of Criminality and in Maintaining the Peace and Order Situation.
Resolution No. 06	2018	Resolution Authorizing the Local Chief Executive, Hon. Generosa M. Dela Fuente, to Enter Into MOA with Econest Waste Management Corporation Pertaining to the Disposal of Residual Waste of Municipality of Samal, Bataan.
Resolution No. 48	2017	Resolution Adopting the Local Climate Change Adaptation Plan for the Years 2016 - 2022 of the Municipality of Samal, Province of Bataan.
Resolution No. 46	2017	Resolution Adopting the Vulnerability and Adaptation Assessment Report for Calendar Year 2016 of the Municipality of Samal, Province of Bataan.
Resolution No. 44	2017	Ratification of the Memorandum of Agreement by and Between the Municipality of Samal, Bataan and the Metro Clark Waste Management Corporation Pertaining to the Proposed Disposal of Residual Wastes of the Municipality of Samal, Bataan."
Resolution No. 41	2017	Respectfully Requesting for Funding Assistance Amounting to Two Hundred Million (200,000,000.00) Pesos from the Department of Budget and Management Thru the Honorable Secretary Benjamin E. Diokno for the Dredging of Mouth of Calaguiman River, Samal, Bataan.
Resolution No. 29	2017	Respectfully Requesting for Funding Assistance from His Excellency President Rodrigo R. Duterte Thru PBA Party List Representative Hon. Jericho Jonas B. Nograles in the Amount of Two Hundred Million (200,000,000.00) Pesos for the Development of Pilis Falls at *Barangay* Palili, Samal, Bataan.
Resolution No. 18	2017	Resolution Declaring Pilis Falls in *Barangay* Palili, Samal, Bataan as an Eco Tourism Site.
Resolution No. 05	2017	Granting Authority to the Local Chief Executive to Enter Into a Renewal of Lease Agreement by and Between the Municipality of Samal, Province of Bataan, and Mr. Daniel Roy R. Quintana, Land Owner, for the Continued Use of a Parcel of Land as Municipal Garbage Dumpsite with a Provision of Pre-Termination of Contract Every End of the Month.

Ordinance No. 05	2017	An Ordinance Establishing Septage and Sewerage Management System in the Municipality of Samal, Province of Bataan.
Resolution No. 63	2016	Granting Authority to the Local Chief Executive to Enter Into a Renewal of Lease Agreement by and Between the Municipality of Samal, Province of Bataan, and Mr. Daniel Roy R. Quintana, Land Owner, for the Continued Use of a Parcel of Land as Municipal Garbage Dumpsite with a Provision of Pre-Termination of Contract Every End of the Month.
Resolution No. 20	2016	Respectfully Requesting the Department of Public Works and Highways (DPWH), Thru Hon. Rogelio L. Singzon, Secretary, for Funding Assistance, in the Amount of One Hundred Fifty Million Pesos (150,000,000.00) for Dredging of Major Rivers.
Resolution No. 05	2016	Granting Authority to the Local Chief Executive to Enter Into the Renewal of Lease Agreement by and Between the Municipality of Samal, Province of Bataan, and Mr. Daniel Roy R. Quintana, Land Owner, for the Continued Use of a Parcel of Land as Municipal Garbage Dumpsite with a Provision of Pre-Termination of Contract Every End of the Month.
***Pambayang Kautusan Blg.* 22**	2015	*Kautusan na Nag-Aatas sa Lahat ng May-Ari ng Anumang Klase ng Bangka na Magpatala o Magparehistro sa Pamahalaang Bayan ng* Samal.
***Pambayang Kautusan Blg.* 23**	2015	*Pagtatakda ng Araw ng mga Magsasaka at mga Mangingisda.*
Resolution No. 107	2014	Approving Municipal Ordinance No. 14-017.
Ordinance No. 17	2014	An Ordinance Enacting the Municipal Environment Code of the Municipality of Samal, Province of Bataan.
Ordinance No. 06	2010	Coastal Land and Sea Use Zoning Plan Ordinance of the Municipality of Samal, Province of Bataan.

Implications and Recommendations

The enactment of the Bataan Environment Code was a crucial step in mainstreaming the ICM System in the local government's process of the province. It serves as an umbrella legislation, covering all aspects of the ICM program, from coastal resource to waste management. While the Bataan Environment Code is comprehensive in nature, it does not include the operationalization of a multisectoral coordinating mechanism for the sustainable development of the coastal and marine areas such as the BSDCC. The operationalization of such mechanism should be considered in the review and evaluation of the implementation of the Code.

A number of environment-related ordinances supporting the ICM program at the provincial, municipal, and city levels have been enacted. Apart from ensuring their implementation, it is important to review these separate ordinances to achieve harmonization and avoid duplications and overlapping provisions for a more effective implementation and enforcement of these laws. In addition, some policies may need to be updated in response to recent developments at the national and provincial levels.

References

Provincial Government of Bataan (PGB) and City and Municipal Local Government Units (LGUs). ICM Relevant Legislations

Provincial Ordinance No. 03, Series of 2019

Legislation

007 Administration and monitoring compliance to legislation

Description

This indicator reports the various types and frequency of inspections conducted in the area to determine compliance with coastal policies and legislation. It further looks into the effectiveness of enforcement of legislations.

Rationale

The available capacity within the government to enforce laws and ensure compliance with coastal policy and regulations is paramount to the successful implementation of ICM programs.

The effective management of illegal and uncontrolled activities taking place along the coast and in coastal waters is an important step in addressing and minimizing unsustainable practices.

Data Requirements

- Types of environmental compliance monitoring/ inspection (i.e., market inspections for fishery violations; aquaculture; manufacturing; coastal polluting and coastal tourism establishments, ports and water transportation)
- Frequency of environmental compliance monitoring/inspection including coastal patrols

Results

To ensure compliance with environmental legislations, monitoring schemes in the province vary according to the type of activity.

The fishery and forestry sectors remain as two of the most important industries in the province, requiring strict enforcement of laws against illegal activities. Under the Manila Bay Clean-up, Rehabilitation, and Preservation Program, the Department of the Interior and Local Government (DILG) released the Fisheries Compliance Audit (FishCA) Guidelines. The FishCA was designed as a monitoring tool to assess the compliance of LGUs to Republic Act (R.A.) No. 8550, or the Philippines Fisheries Code, as amended by R.A. 10654. It assesses the performance of LGUs in the implementation of the Code, and in determining assistance needed to enhance capacities of LGUs in carrying out their mandated responsibilities. The Manila Bay Regional Validation Team composed of DILG, Department of Environment and Natural Resources (DENR), and Bureau of Fisheries and Aquatic Resources (BFAR), evaluates coastal LGUs for the FishCA through table assessments and on-site inspections. **Table 10** summarizes the list of indicators covered by the FishCA and **Table 11** shows the FishCA results from 2020 to 2022. In 2022, the municipalities of Abucay, Bagac, Mariveles, Morong, Orani, Orion, Pilar, and Samal were declared Regional Passers while the city of Balanga on its third streak was hailed as the Regional Top Performer based on the results of the FishCA. This shows that the coastal LGUs are exemplarily undertaking their responsibility in nurturing and safeguarding their marine and coastal resources.

At the city and municipal levels, the enforcement of fishery and coastal laws is undertaken by the *Bantay Dagat*, a team of fisherfolk in coastal *barangays* that voluntarily assists in patrolling the coastal waters and deterring illegal fishing on a daily basis. These fisherfolks from the City of Balanga and Municipalities of Hermosa, Orani, Samal, Abucay, Pilar, Orion, Limay, Mariveles, Bagac, and Morong are deputized fish wardens and underwent Fisheries Law Enforcement Training (FLET) led by BFAR Region 3 through the assistance of the Office of the Provincial Agriculturist (OPA). Weekly and quarterly reports of the *Bantay Dagat* are submitted to the city and municipal LGUs.

In addition, the Philippine National Police-Maritime Group (PNP-Maritime) holds seaborne patrol operation activities while the Philippine Coast Guard (PCG) conducts 1) pre-departure and vessel marine pollution inspection, 2) land-based marine pollution inspection, 3) maritime/ seaborne patrol, and 4) coastal security patrol in the province. Joint on-the-spot seaborne patrol is also conducted by the PNP-Maritime and PCG together with the *Bantay Dagat* and BFAR as the need arises. The Environmental Management Bureau (EMB) of DENR Region 3 enforces the DENR General Effluent Standards and performs compliance monitoring of commercial and industrial establishments in the province. Similarly, the Freeport Facilities Department-Environment and Utilities Division of the Authority of the Freeport Area of Bataan (AFAB) monitors the compliance of FAB registered enterprises (FREs) by virtue of R.A. 9728, otherwise known as the “Freeport Area of Bataan Act of 2009,” as amended by R.A. 11453.

Initiated by the DENR, the LAWIN Forest and Biodiversity Protection System is a combination of technology and community involvement in monitoring and protecting forests and biodiversity. It uses satellite imagery and ground-based sensors to detect changes in forest cover and biodiversity levels. Analysis of data is made using machine learning algorithms to identify areas at risk of deforestation or biodiversity loss. In the Province of Bataan, the LAWIN Forest and Biodiversity Protection System is used by the Provincial Environment and Natural Resources Office (PENRO) to detect threats include cutting of trees, use of charcoal, fire, slash and burn farming, presence of garbage, hunting and traps, logging trail, hut or house, typhoon-related threats, livestock poultry and farming, mining and quarrying, and invasive species. Apart from this monitoring system, DENR forest rangers and forest guards patrol the protected areas in Hermosa and Limay.

In the City of Balanga, a *Bantay Kalinisan* Task Force was created to conduct information, education, and communication (IEC) activities and apprehend violators of city ordinances on solid waste management (littering, illegal dumping, waste burning), smoking, quarry operations, and coastal management. Meanwhile, in the municipality of Pilar, a *Bantay Kalikasan* Task Force is operational, focusing on solid waste management and forest protection. At the provincial level, the Talisay River Task Force was established through E.O. 66, Series of 2022, deputizing consolidated manpower from the PGB and LGUs of Pilar and Balanga City to penalize violators caught littering near and along Talisay River.

As part of the implementation of the Philippine Mining Act of 1995 (R.A. 7942), the PG-ENRO conducts monthly field inspection of small-scale quarry permittees (**Table 12**) while the Mines and Geosciences Bureau (MGB) of DENR Region 3 conducts the quarterly monitoring inspection of large-scale permittees.

Table 10. List of Indicators for the FishCA Validation.

FishCA Indicators			
M/C Fisheries Ordinance	Fish Catch Monitoring	Limiting Entry Into MW	Fishing in Overexploited FMA
Ordinance on MCS	Livelihood	Establishment of Area for Aquaculture	Use of Active Gear in MW
Allow Entry of CFV	Training	Determine Migratory Paths	Coral Exploitation/ Exportation
Existence of Ordinance	Marketing	Establishment of Post-Harvest Facility	Muro-ami
CRM Plan	Production	Declaration of Fishery Reserves	Super Lights/Light Attractors
ICM Plan	Credit	Establishment of Fishery Sanctuaries	Fishing During Closed Season
CWUP	Research	Assist in Preparation of MFDP	Fishing in MPA
Water Delineation	Technology Mngt	Recommend Enactment of MFO	Fishing of Taking of Rare/ Threatened Species
Registration of Fisherfolk	Collaboration on Coastal Mngt	Assist in Enforcement	Capture of Sabalo
List of Org/Coop/NGOs	Assessment for Overfishing	Advise SB	Import/Export of Fishery Species
Registration of Boats	Limiting Fishery Activities	Perform Other Functions	Violation of Harvest Control Rules
Licensing of Boats	Closed Season	M/C PDO	Aquatic Pollution
Fees for Use of Boats	Fishing Efforts	Chairperson, Agri/Fishery Committee	Falsifying of Vessel Markings
Licensing of Gears	Migratory Species	Rep M/C Dev Council	Concealing of Investigation of Violation
Fees for Use of Gears	Migratory Paths	Rep Accredited NGO	Gathering of Regulated Aquatic Species
Auxiliary Invoices	Structures Along Migratory Path	Rep Private Sector	Obstruction to Navigation of Flow
Monthly Summary Report	Fishery Reserves	Rep DA	Non-compliance of VMM
Fish Landing Site	15% Area for Fishery Reserves	Rep 11 Fisherfolk	
Fish Ports	Existence of M/C FARMCs	Rep Youth/Women Sector	
Ice Plants	LGU Assistance on FARMC Formation	Fish Warden	
Cold Storage	Mngt of Municipal Waters	Unauthorized Fishing	
Licensing of Fishery Structures	Enactment of Ordinances	Unauthorized Fisheries Activities	
Fees for Fishery Structures	Determination of License Fees	Unreported Fishing	
Registry of Fishery Structures	Establishment of Catch Ceiling Limitation	Unregulated Fishing	
Area of Aquaculture	Establishment of Closed Season	Fishing Through Explosives	
10% Area Limit of Aquaculture	Entry of Small/Medium CFV	Use of Fine Mesh Net	

Table 11. FishCA Results in the Province of Bataan, 2020 to 2022.

LGU	2020	2021	2022
Abucay	Regional Passer	Regional Passer	Regional Passer
Bagac	Regional Passer	Regional Passer	Regional Passer
Balanga City	Regional Top Performer National Top Performer	Regional Top Performer	Regional Top Performer
Mariveles	Regional Passer	Regional Passer	Regional Passer
Morong			Regional Passer
Orani	Regional Passer	Regional Passer	Regional Second Placer
Orion	Regional Passer National Second Placer	Regional Fourth Placer	Regional Passer
Pilar	Regional Passer	Regional Passer	Regional Third Placer
Samal	Regional Third Placer National Fourth Placer	Regional Third Placer	Regional Passer

Source: DILG.

Table 12. No. of small scale quarry permit holders in the Province of Bataan, 2015-2022.

Year	Issued Permit	Renewed Permit	Expired Permit	Valid Permit	Total Issued Permit (Cumulative)
2022	1		4	7	15
2021	4			10	14
2020		2	2	6	10
2019			2	7	10
2018	3			9	10
2017	2	3	3	6	7
2016				4	5
2015	1			4	5

Source: PG-ENRO.

Implications and Recommendations

Albeit the existing mechanisms for law enforcement and environmental monitoring in the province, the effectiveness of their implementation should be further strengthened. Led by DILG and BFAR, the FishCA is a good mechanism to ensure that LGUs in the Manila Bay Region including Bataan enforce the provisions of the Fisheries Code. LGUs should continually improve their regulatory systems not only to pass FishCA but also to effectively manage their coastal areas and municipal waters. While the *Bantay Dagat* in coastal LGUs are actively performing their duties together with the PNP-Maritime and PCG, it is highly recommended that the Provincial Anti-Illegal Fishing Task Force be reactivated to consolidate information, plans, and efforts against illegal fishing activities.

Another strategy to reinforce law enforcement is to combine efforts of concerned agencies and offices. A task force composed of the DENR-EMB Region 3, DENR-PENRO, PG-ENRO, MENRO, and Municipal and Provincial Tourism Offices can be created for compliance monitoring of beach resorts and establishments for sustainable coastal tourism. Data generated from the LAWIN Forest and Biodiversity Protection System can be shared to more stakeholders to raise awareness and enhance collaboration in safeguarding the forests and wildlife. In order to intensify efforts against illegal quarry activities, the PG-ENRO should push for the creation of a Provincial Anti-Illegal Quarry Task Force, which can also be considered in the review of the Bataan Environment Code.

References

DENR-PENRO. LAWIN Forest and Biodiversity Protection System.

Department of the Interior and Local Government (DILG). 2018. Manila Bay Clean-up, Rehabilitation, and Preservation Program: Fisheries Compliance Audit (FishCA) C.Y. 2018.

DILG. FishCA Results in Bataan Province.

DILG. List of Indicators for FishCA Validation.

PG-ENRO. Small-Scale Quarry Permit Holders in the Province of Bataan.

R.A. 10654.

R.A. 11453.

R.A. 8550.

R.A. 9728.

2021 Fisheries Compliance Audit in the City Government of Balanga.

Legislation

008 Environmental cases filed/resolved

Description

This indicator reports the total number of cases filed and resolved, and the total value of fines issued for non-compliance of relevant coastal legislations.

Rationale

Effective enforcement of environmental legislation taking place in the marine and coastal areas can be reflected by the number of cases filed and resolved and fines collected resulting thereof. The strict enforcement of relevant legislation is an important step in addressing and minimizing unsustainable practices in coastal areas.

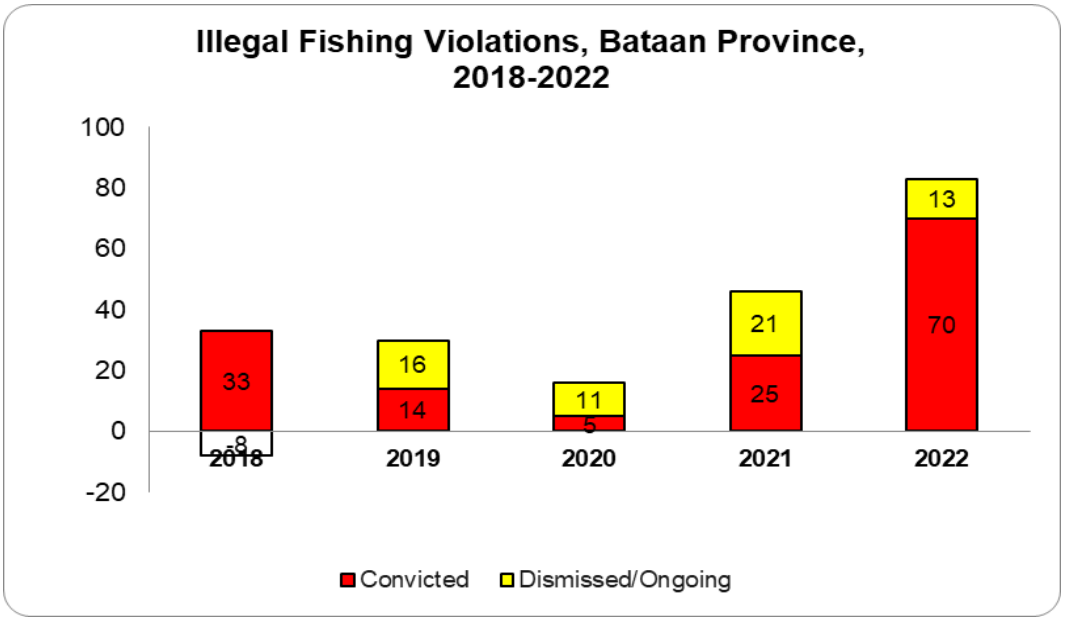
Data Requirements

- Total number of reported complaints
- Total number of violations where violators were arrested
- Total number of violations penalized
- Total value of fines collected for non-compliance with relevant legislation

Results

Data from the Office of the Provincial Agriculturist (OPA) showed a decrease in illegal fishing violations (R.A. 8550 as amended by 10654) from 2018 to 2022 (**Figure 6**). Majority of violators were convicted while some illegal fishing cases were dismissed (**Figure 6**). In 2018, only 25 cases were filed but 33 cases were convicted. Hence, the negative number (-8) in **Figure 6** is accounted for by eight (8) cases that were filed in the previous years but only convicted during 2018. In addition, the coastal LGUs of Bataan recorded violations relative to their respective city/municipal fishery ordinances. In the Municipality of Orani, nine (9) illegal fishing and 16 with no fishing vessel registration/permit violations were recorded in 2020-2021. A total of 25 illegal fishing violators from 2020-2022 were reported in the Municipality of Samal.

Figure 6. Number of illegal fishing violations per year in Bataan Province.

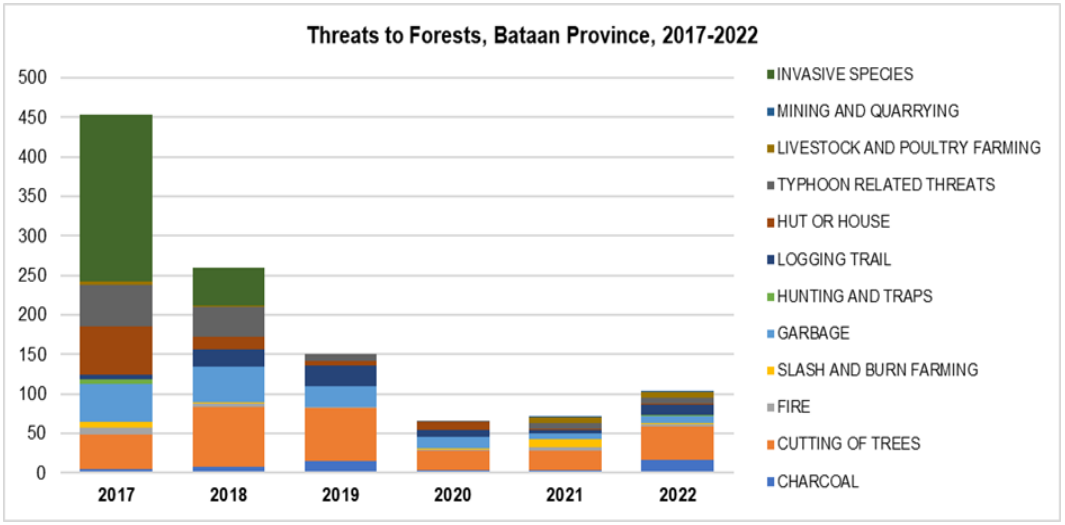


Source: OPA and C/MLGUs.

Results of the LAWIN Forest and Biodiversity Protection System showed that threats to forests significantly declined from 2017-2020. However, as shown in **Figure 7**, the threats started to increase when restrictions to human mobility and crowding were gradually eased during the COVID-19 pandemic.

Cutting of trees, logging trail, and garbage were the top anthropogenic threats monitored by the DENR. However, no data were available as of this writing to corroborate the LAWIN results with actual illegal-logging violations apprehended by the DENR and other law enforcement agencies.

Figure 7. Number of threats to forests per year in Bataan Province.



Source: DENR-PENRO Bataan.

Implications and Recommendations

The compliance monitoring and enforcement systems for coastal/fishery and upland/forestry activities appeared to be effective in deterring violators, as shown in the decreasing number of documented violations. Unreported and unregulated activities, however, might still exist in the province, and thus further strengthening of monitoring or surveillance systems, including more frequent patrolling and use of technological interventions (e.g., areal and/or satellite imagery and closed-circuit television cameras installed in strategic places or hotspots) is recommended. Reactivation and deputation of force multipliers such as the *Bantay Gubat* could also supplement the existing manpower of local governments in monitoring and apprehending violators. Close coordination of the LGUs with the coastal and upland communities, as well as with the DENR and BFAR, is important.

References

DENR-PENRO. LAWIN Forest and Biodiversity Protection System.

Office of the Provincial Agriculturist (OPA) and City and Municipal LGUs. Illegal Fishing Violations.

R.A. 10654.

R.A. 8550.

Dismantling of illegal structures by the Bantay Dagat and Phillipine National Police of Municipality of Samal, Bataan Province.

Information and public awareness

009 Public education and awareness

Description

This indicator reports on communication plans, staff and budget allocations, and public awareness programs initiated by various sectors, and the different communication channels used to promote public awareness.

Rationale

The development and implementation of a well-conceived communication plan promote increased awareness and education of the general public regarding the value and benefits of coastal and marine resources, the issues affecting the environment, and the need for coastal management to protect and conserve these resources.

Data Requirements

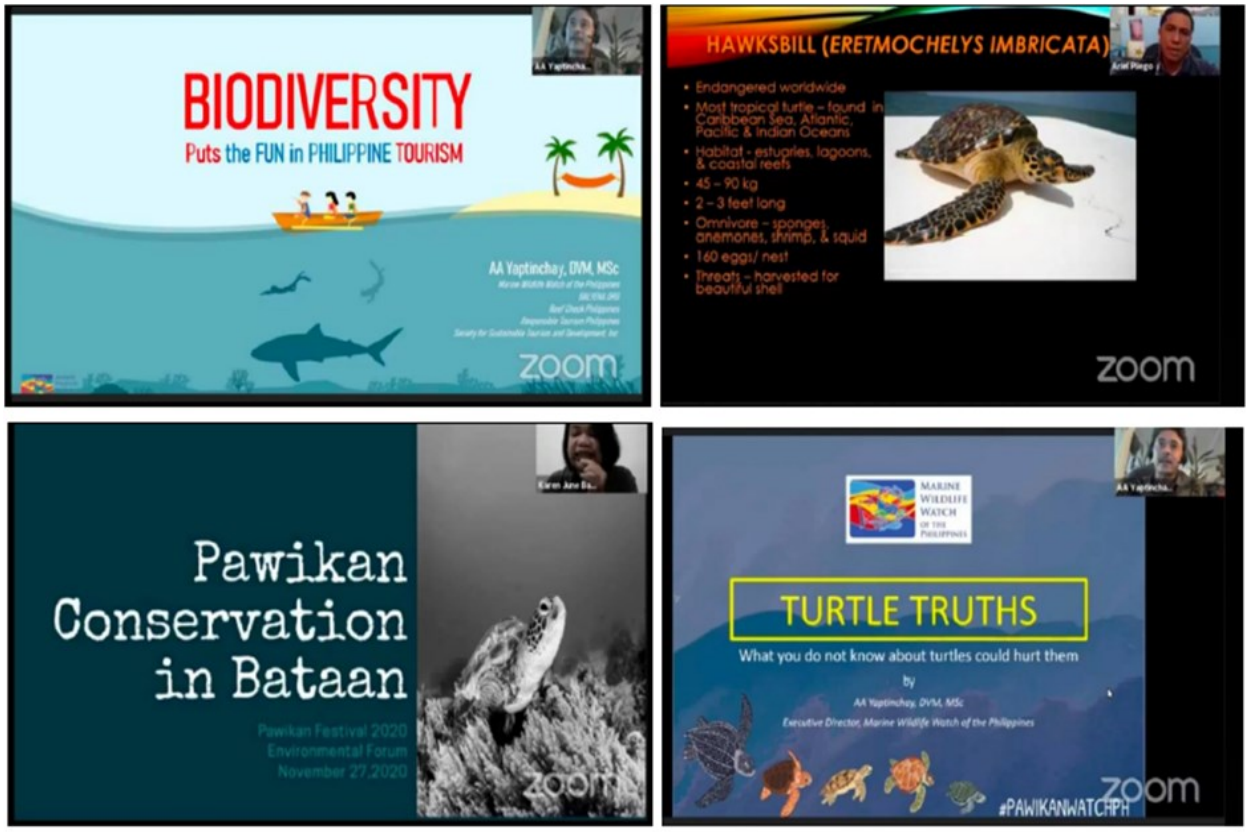
- Communication plan
- Budget and staff allocation for implementation of communication plan
- Local government's facilities for public access to information
- Local awareness programs
- Frequency of community participation activities
- Number of participants in community participation activities

Results

The province through the PG-ENRO consistently leads impactful public awareness campaigns on crucial environmental issues, engaging various sectors and stakeholders, particularly the youth.

In 2018, the PG-ENRO, in collaboration with DENR-PENRO and the private sector, organized the inaugural Bataan Environment Summit, with the theme "Beat Plastic Pollution! If you can't reuse it, refuse it." The Summit aimed to educate and instill a sense of responsibility on use of plastics, as well as intensify the advocacy for better environmental management practices. The event successfully engaged 500 high school students from different schools in the province to raise awareness and encourage proactive measures among the youth in mitigating plastic pollution and fostering a more environmentally conscious community.

The PG-ENRO also holds IEC activities in regular events like the Environmental Protection Awareness Seminar of the National Service Training Program (NSTP) of the Bataan Peninsula State University (BPSU), Environmental Forum of the Annual *Pawikan* Festival, and Training of the *Bantay Dagat* organized by BFAR Region 3 and OPA.



1st Virtual Environmental Forum in Celebration of the 2020 Pawikan Festival.

During the pandemic, Bataan also organized impactful webinars on different environmental issues. The *Pawikan* Festival expanded its reach in 2020 with its first Virtual Environmental Forum, emphasizing *pawikan* conservation, youth involvement in marine preservation, and biodiversity protection. In 2021, the province collaborated with Anvaya Cove Beach and Nature Club in hosting the "Ocean of Trash and the Coasts of Bataan" Webinar. The webinar tackled the harmful effects of marine debris and was attended by over 1,170 participants. In celebration of the Philippines' Environment Month in 2022, PG-ENRO led a webinar series among students, covering diverse topics such as climate change, biodiversity conservation, and forest protection practices.

The city and municipal LGUs also undertook IEC activities in their respective areas (**Table 13**). Orani focused on ecological solid waste management, conducting sessions in the *barangays*. The City Government of Balanga promoted climate change and environmental awareness through programs like "*Kahit Bata, May Magagawa*" and "*Lakbay Kalikasan*," involving students from elementary to college. The LGU of Bagac held barangay-level IEC activities on solid waste management, marine and wildlife conservation, particularly fisheries and *pawikan* preservation, as well as managing COVID-19 related healthcare waste. Meanwhile, the LGU of Abucay prioritized climate change and disaster risk reduction management in their IEC endeavors.

Table 13. Environment-related IEC activities of city and municipal LGUs.

LGU	Year	Topic	Participants	Date Conducted
Abucay	2022	Climate Change and Global Warming	Farmers and Fisherfolk	August 16, 2022
Balanga City	2019	*Kahit Bata May Magagawa* (Waste Management and Environmental Awareness)	Elementary Students	2019
	2022	*Kahit Bata May Magagawa*	Elementary Students	Weekly from June & September-October 2022
			Highschool Students	Weekly in November 2022
		Climate Change	BPSU Students	November 12 & 19, 2022
		Lakbay Kalikasan	Elementary Students	November 14-18 & 21-25, 2022
Bagac	2016	Solid Waste IEC	*Barangay* Captains	April 19 & May 23, 2016
			4Ps	July 18, 2016
	2017	Solid Waste	Bagumbayan Residence	January 2017
		Segregation at Source	Community of Brgy. Banawang	February 2017
	2019	Solid Waste	Community of Brgy. Binukawan	March 2019
		Orientation and Workshop on the Formulation of Localized Fisheries Code	Brgy. Pag-Asa	September 29, 2019
	2020	Undergo Seminars on Composting, Fertilizer Production. All 14 *barangays* have derived income from SWM operations.	Atilano, Bagumbayan, Binukawan, Ibaba, Ibis, Pag-asa, Parang, Paysawan, San Antonio, Saysain and Tabing Ilog	2020
		Training of Enumerators/ Volunteers to Conduct IEC (e.g., distribution, house to house dialogue etc.)	-	2020
	2021	Brgy. Pag-asa's Marine Turtles Hatchery Program	Pag-Asa Residence	January 2021
		Assisted Bagac Municipal Police Station in IEC Campaign Materials for Public Distribution	Police Department	January 19, 2021
		House-To-House Public Advisory Activities re: COVID-19 Related Healthcare Waste Management	All 14 *Barangays*	2021
	2022	IEC and Seminar During *Barangay* Assemblies: Ecological Solid Waste Management and Other Environmental Ordinances of the Municipality of Bagac, Bataan	All *Barangays*	May 2022
		Launched Municipal Ordinance No. 7, Series of 2019, also known as 1Bagac for Zero Plastic	Bagac Community	November 2022
		IEC on 1Bagac for Zero Plastic	Commercial Establishments	November 2022

Dinalupihan	2017	Climate Change Adaptation and Mitigation (CCAM)	The *Pantawid Pamilyang Pilipino* Program (4Ps) Beneficiaries	June 2017
	2022		Upland Farmers	September 27-October 8, 2022
Hermosa	2022	Orientation on Solid Waste Management	Brgy. A. Rivera, Brgy. Almacen, & Brgy. Daungan Officials	August 4, 2022
			Brgy. Burgos Soliman, Brgy. Mabuco, & Brgy. San Pedro Officials	August 5, 2022
			Culis National High School Students	August 17, 2022
Morong	2021-2022	Solid Waste Management	All *Barangays*, 4Ps, NGOs	2021-2022
Orani	2021	Solid Waste Management	*Barangay* Officials	2021

Webinar in celebration of the 2021 International Coastal Clean-Up (ICC) Day.

Table 14 summarizes the awareness raising campaigns conducted by DENR-PENRO since 2015, covering topics on restoring Manila Bay, biodiversity, climate change, environmental protection, environmental laws, solid waste management, among others and targeting various stakeholder groups including *barangay* (community) leaders, people's organizations (POs), elementary and secondary students, and the general public.

Table 14. Environmental education lectures/ Awareness campaign by DENR-PENRO Bataan, 2015-2022.

YEAR	NO./ QTY	TOPIC	PARTICIPANTS/LOCATION	DATE
2015	1	Dialogue: Manila Bay Restoration	SABAYBA Members	March 5, 2015
2015	1	Dialogue: Manila Bay and Earth Day	Clean-up Volunteers at Buloc River, Mariveles	April 24, 2015
2015	4	Manila Bayanihan Roadshow	Punong *Barangays* of: City of Balanga, Bataan Municipality of Pilar Municipality of Abucay Municipality of Mariveles	March 24, 2015 August 19, 2015 September 9, 2015 September 29, 2015

2015	1	Poster Making Contest	Secondary Schools in the Province of Bataan	December 17, 2015
2016	1	Dialogue/Forum: Flora and Fauna Species and Their Importance	General Public at Samal, Bataan	
2017	1	Air Pollution	Students from Morong National High School (Mabayo, Morong, Bataan)	January 30, 2017
2017	1	Anti-illegal Logging Campaign of the DENR Anchored on Revised Forestry Code of the Philippines (P.D. 705 as amended) and the Chainsaw Act of 2002 (R.A. 9175)	Participants of the Disaster Emergency Assistance Rescue and Relief Training (DEARRT) and Special Basic Citizen Military Training (SBCMT) about Environmental Protection Training (EPT), 38 Volunteers from the City of Balanga, Municipality of Orion, Orani, Limay, Abucay and Bagac, Bataan and 20 Officers of Army Reserve Command stationed at *Barangay* Camacho, Balanga City	February 4, 2017
2017	1	Environmental Protection for Special Basic Citizen Military	Residents from different *barangays* in Bagac, Bataan	February 23, 2017
2017	1	Forest Protection: DENR Laws, Rules and Regulations Pertaining to Illegal Cutting of Trees and Its Illegal Transporting	*Barangay* Captains of Municipality of Bagac	February 25, 2017
2017	1	Biodiversity, Climate Change and Solid Waste Management	Grades 7 & 8 Students of Mabatang National High School (Samal, Bataan)	June 22, 2017
2017	2	Solid Waste Management and Disaster Preparedness	Grade 3 & 4 Students of Pantingan Elementary School (Pantingan, Pilar, Bataan)	June 28-29, 2017
2018	3	R.A. 9003 or the Ecological Solid Waste Management, Manila Bay Rehabilitation	Bataan School of Fisheries, Orion Tuyo Elementary School, Balanga City Capitangan Elementary School, Abucay	March 6 & 15, 2018
2018	1	Forest Fire Control and Management	PO Tama Bacong Legua at Nazareno (TABALAN) at So. Nazareno, Brgy. Culis, Hermosa, Bataan Greenland Plantation & Wood Industry Inc. at Parang, Bagac, Bataan	March 23, 2018
2018	3	R.A. 9003, Manila Bay Rehabilitation	Magsaysay National High School Mariveles National High School (2)	May 31 & June 20, 2018
2018	6	R.A. 9003, Manila Bay Rehabilitation	Roosevelt Elementary School Roosevelt National High School Hermosa National High School Orani National High School Mariveles National High School	August 8 & September 6, 2018
2018	4	Global Warming/Climate Change, Biodiversity, Solid Waste Management and Manila Bay Rehabilitation Project	Lamao National Highschool Orion Elementary School Bagac National High School (Parang) Mariveles National High School (Cabcaben)	March 2, 16, 20 & 22, 2018
2018	3	Global Warming/Climate Change, Biodiversity, Solid Waste Management and Manila Bay Rehabilitation Project	Students from: Orion Elementary School (2) Brgy. Nagwaling, Pilar, Bataan	June 1 & October, 2018

2019	6	R.A. 9003, Manila Bay Rehabilitation	Students from: Batangas II, Elementary School Lucanin Elementary School Cabcaben Elementary School and Residents from: Batangas II, Mariveles Lucanin, Mariveles	March 7-8, 20 & 25, 2019
2019	6	R.A. 9003, Manila Bay Rehabilitation	Residents from: Alangan, Limay, Bataan Landing, Pilar, Bataan Wawa, Pilar, Bataan Sisiman, Mariveles, Bataan Alauli, Pilar, Bataan	March 7-8, 20 & 25, 2019
2019	4	R.A. 9003, Manila Bay Rehabilitation	Residents from: Tortugas, Balanga City, Bataan Bagumbayan, Balanga City, Bataan Puerto Rivas Ibaba, Balanga City, Bataan Mabatang, Abucay, Bataan	Aug 13-14, & September 20, 2019
2019	2	R.A. 9003, Manila Bay Rehabilitation	Residents from East Calaguiman, Samal, Bataan Students from Mabatang National High School, Abucay, Bataan	October 2 & November 5, 2019
2019	4	R.A. 9003, Biodiversity Conservation and Manila Bay Rehabilitation	Brgy. Cabcaben Officials, Staff and Residents	November 13 & 20, 2019
2020	6	Ten (10) Priority Programs of DENR as POs are currently engaged in one of the priorities on Forest Development, Rehabilitation and Maintenance Program P.D. 705, Land Disposition and Tenurial Instruments R.A. 9003; R.A. 9275 (The Philippine Clean Water Act of 2004); R.A. 6969 (Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990); R.A. 8749 (The Philippine Clean Air Act); R.A. 7942 (The Philippine Mining Act of 1995); and P.D. 705.	People's Organizations (DUFAI, DUBAGENFAI, NASAMACA, AFPAI and SAMASAKA) *Barangay* Officials and residents of General Lim, Orion Selected representatives from the *Barangays* within the Municipality of Bagac	May 29, 2020 August 7, 2020 September 14, 2020 September 18, 2020
2020	1	Environmental Laws (R.A. 9003, R.A. 9275, R.A. 6969, and R.A. 8749) Including Its Sanctions and Penalties	Morong Task Force *Kalikasan*, Inc. (MTFKI)	October 27, 2020
2021	5	Solid Waste Management & Manila Bay Rehab	Residents of: Brgy. Almacen, Hermosa, Bataan Brgy. Daan Pare, Orion, Bataan Brgy. Alangan, Limay, Bataan Brgy. Landing, Pilar, Bataan Brgy. Lalawigan, Samal, Bataan	February 16, 2021 February 18, 2021 February 18, 2021 February 24, 2021 February 24, 2021
2021	3	Forest Fire Prevention	Brgy. Parang, Bagac, Brgys. Mabayo & Nagbalayong, Morong, Bataan	March 5 & 11, November 10, 2021

2021	1	Executive Order No. 23 Dated February 1, 2011 (Emphasis on Illegal Logging, Permitting and Processing of Documents in Applying for a Tree Cutting Permit in Private Lands) E.O. 26 or the Enhanced National Greening Program	*Barangay* Officials and Stakeholders at So. Nazareno, Brgy. Culis, Hermosa, Bataan	March 17, 2021
2021	1	Biodiversity Forum: ENIPAS Act (R.A.11038)	Residents of Roosevelt, Dinalupihan, Bataan	May 12, 2021
2021	1	E.O. 23 Dated February 1, 2011 E.O. 26 or the Enhanced National Greening Program	*Barangay* Officials and Stakeholders at So. Nazareno, Brgy. Culis, Hermosa, Bataan	March 17, 2021
2021	6	Climate Change, Global Warming, Solid Waste Management, Agricultural Free Patent Act, Residential Free Patent Act and Certificate of Stewardship Contract and Manila Bay Rehabilitation Project	Faculty Staff, PTA Officers of Parang Elementary School and NGO	August 18 & 27, 2021
2021	1	Understanding on Geologic Hazard Environment Laws such as R.A. 9003, R.A. 9275, R.A. 8749, R.A. 11038, and Sections 77-78 of P.D. 705, as Amended.	High School Teachers of Morong, Bataan	September 17, 2021
2022	6	Climate Change and Biodiversity Conservation and Protection, National Greening Program (NGP), Global Warming and Climate Change, Manila Bay Rehabilitation Project and Solid Waste Management	Members of Lions Club International (Bagac), Youth for Christ (YFC), Singles for Christ (SFC) Parang Chapter, Supreme Student Government (SSG), Faculty and Staff of Bagac National High School, Students of BPSU Bagac Campus, Members of League of Advocates & Young Ambassadors of Goodwill (LAYAG) *Pantawid Pamilyang Pilipino* Program (4Ps) of Brgy. Daan Pare, Orion, Bataan Students of Pantingan Elementary School, Pantingan, Pilar, Bataan, Teachers and Students from Grades 7 to 11 of Hermosa National High School	July 18 & 19, 2022 August 22 & 25, 2022 September 14, 2022
2022	6	Forest Fire Prevention and Suppression	People's Organization of Alion Upland Farmers (AUF) situated at Brgy. Alion, Mariveles; Association of Mt. Farmers of So. Kinainisan, Inc. (AMFSKI) located at Brgy. Parang, Bagac, Bataan and Morong Task Force *Kalikasan,* Inc. (MTFKI) at Brgy. Nagbalayong, Morong, Bataan while CENRO Dinalupihan also conducted three (3) IEC participated by Brgy. Officials of Brgy. Gabon, Abucay, Brgy. Roosevelt, Dinalupihan and Brgy. General Lim, Orion, Bataan.	October 20, 2022 November 3, 2022 September 15, 2022

2022	4	Orientation of Estero Rangers, World Wetlands Day, World Wildlife Day (Release of *Pawikan* Hatchlings)	Residents and Volunteers	
2022	10	Series of Radio Broadcast on "Bataan and *Kalikasan"* 2022 Activities - Manila Bay Environment Month Celebration (Answer Queries from Listeners) Lands - Application for Free Patent Solid Waste Management Program Intensified Forest Protection & Anti-Illegal Logging Our Rivers and Manila Bay Arbor Day (NGP) Tenurial Instruments Forestry Permit DENR Highlights of Accomplishment as of June 2022	General Public	May to June 2022
2022	4	R.A. 9003, Manila Bay Rehabilitation	Students from Mabatang Elementary School ISFs along rivers of Brgy. Townsite, Mariveles, Bataan Relocated ISF at Brgy. Cabcaben, Mariveles, Bataan Residents of Brgy. Alangan, Limay	Quarter 3 2022
2022	6	R.A. 9003, Manila Bay Rehabilitation	Students from Mariveles Senior High School Students from Mariveles Senior High School (Annex 2) Students from Lucanin Elementary School, Mariveles Residents of Brgy. Pantalan Luma and Bago, Orani Residents of Brgy. Daan Pare, Orion	Quarter 4 2022
2022	1	Photo Exhibit at The Bunker, Balanga City, Bataan	General Public	Quarter 4 2022

Implications and Recommendations

The proactive IEC efforts reflect the different agencies' commitment to continually foster environmental consciousness among stakeholders. In order to adapt with the restrictions brought about by the COVID-19 pandemic, the government maximized the use of digital media platform in its awareness raising campaigns. Considering the number of activities being conducted by different agencies, consolidating and harmonizing the IEC efforts should be considered to further enhance the effectiveness of awareness raising efforts and create larger impacts among intended stakeholder audience.

The ultimate objective of IEC activities is to translate environmental awareness into changed behavior. The conduct of a perception survey is highly recommended to measure the effectiveness of IEC efforts in instilling a pro-environmental behavior among the stakeholders in the province.

References

PG-ENRO and City and Municipal LGUs. Environment-related IEC activities.
DENR-PENRO. Environmental Education Lectures/Awareness Raising Campaign.

2018 Bataan Environment Summit held on June 28-29, 2018.

Information and public awareness

010 Stakeholder participation and mobilization

Description

This indicator reports the number of nongovernmental organizations, civil society groups and other stakeholder organizations that are contributors to the sustainable development of the coastal and marine areas.

Rationale

The active involvement of stakeholders reflects their understanding on the value of implementing coastal management and mobilizing activities related to it.

Data Requirements

- Non-governmental organizations, civil society groups, and other stakeholder organizations with environment-related programs and activities
- Types of environment-related programs and activities
- Number of members

Results

The participation of non-government, civil society, and people's organizations in environment-related activities is essential in carrying out the activities of the ICM program.

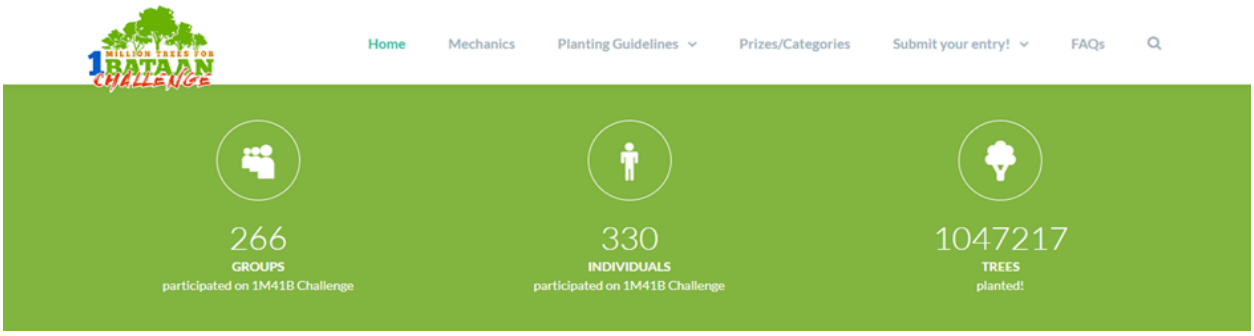
In 2016, the Provincial Government of Bataan, in collaboration with various stakeholders, achieved a Guinness World Record for the "Most Number of Trees Planted in One Hour by a Team of Unlimited Size in a Single Location." This remarkable achievement involved 16,080 individuals from diverse sectors who collectively planted 223,390 trees, surpassing the former record holder by 14,639 trees. This accomplishment showcased the collaborative effort and commitment of the PG-ENRO, city and municipal LGUs, NGAs, NGOs, the private sector, academe, youth, and local community in fostering environmental conservation and community involvement.

The province continued its greening program initiatives with the launching of the One Million Trees for One Bataan Challenge (1M41B) in 2018. The ambitious goal of planting one (1) million trees, including mangroves, forest trees, fruit-bearing trees, ornamental trees, and bamboo species, was successfully achieved in 2021. The initiative garnered participation from 266 groups and 330 individuals, resulting in the planting of 1,047,217 seedlings. This milestone reflects the dedication and collective action of the community towards enhancing the province's green cover and fostering sustainable environmental practices.

The International Coastal Clean-up (ICC) Day is a global event that unites people from diverse sectors to clean the country's respective coastlines and gather data on the volume and occurrence of trash at seas. Since 1999, Bataan Province has been actively participating in the

international clean-up, which also promotes increased awareness on the extent of marine litter pollution and its impacts on the community and the environment. The coastal cleanup activity has grown into a community movement in Bataan, as part of the broader ICM program and supported by various stakeholders.

The ICC data in Bataan showed varying number of participation and volume of wastes collected over the years (**Figures 8-10**). Starting in 2001, nearly 15,000 volunteers joined the clean-up and about 319,120 kilograms of trash were collected. Succeeding years showed fluctuations in the number of volunteers and volume of trash collected. The highest number of participation was recorded in 2019 (43,461 volunteers), collecting about 124,493 kilograms of debris and covering a 258.849-kilometer length of coastline. In recent years, although the number of volunteers fluctuated, the amount of trash collected remained notable. In 2023, 19,756 volunteers managed to collect 55,629.57 kilograms of trash in a 290.5114-kilometer of coastline. Results of the ICC are documented by the PG-ENRO through the preparation of the Annual ICC Report which is submitted to ICC Philippines. The PG-ENRO also assisted in the conduct of coastal cleanup activities led by partners from NGAs, LGUs, CSOs, and the private sector (**Table 15**).



One Million Trees for 1Bataan (1M41B) Challenge.

Figure 8. No. of ICC Day volunteers in Bataan from 2001 to 2023.

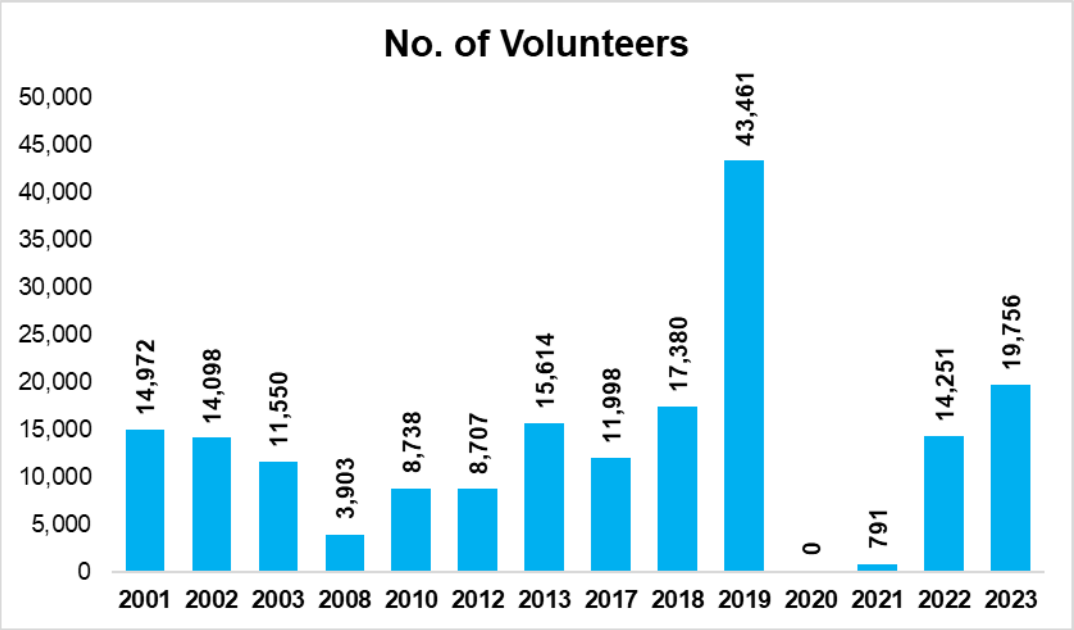


Figure 9. Estimated weight of trash collected during ICC Day in Bataan from 2001 to 2023.

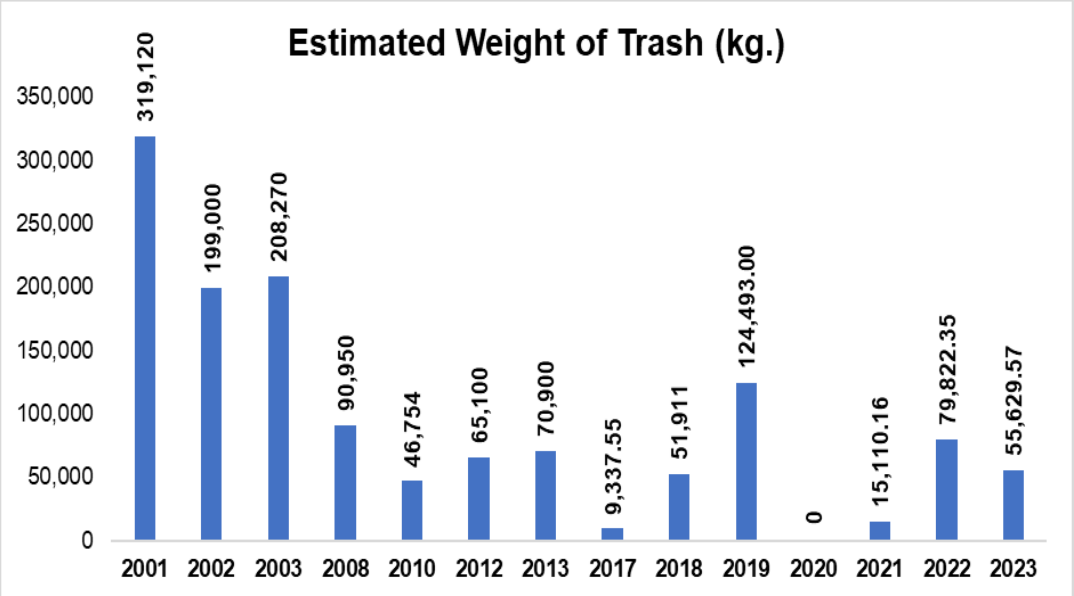


Figure 10. Estimated distance cleaned during ICC Day in Bataan from 2001 to 2023.

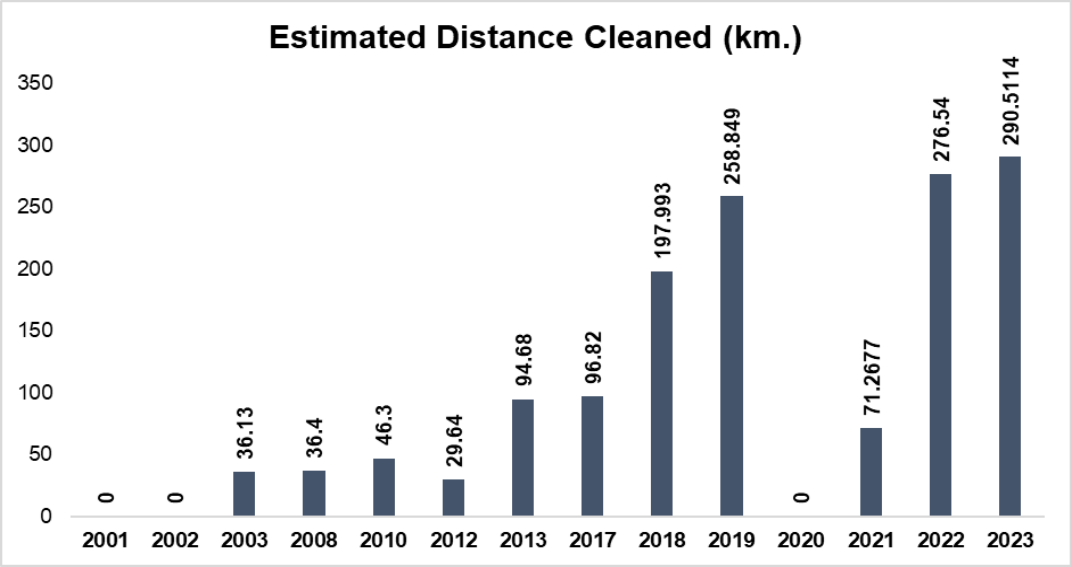


Table 15. List of coastal clean-up activities assisted by the PG-ENRO.

Date	Coastal Cleanup Activity	Location	Agencies Involved	Role
January 27, 2019	Manila Bay Cleanup and Rehabilitation – Region 3 Launching	Lucanin, Mariveles	LGUs, NGAs, private sector and other individual volunteers	Technical Support
March 22, 2019	Coastal Cleanup	PNOC Industrial Park, Batangas II, Mariveles, Bataan	Philippine National Oil Company, NPC Alliance Corporation, Orica Philippines, PRII, Team Energy, NRD Corporation, BLGU- Batangas II, PGB	Technical Support
July 19, 2019	Travelbook.ph Team Building (Coastal Cleanup Activity)	Verde Azul, Morong	Travelbook.ph	Technical Support
September 21, 2019	International Coastal Cleanup (ICC) Day	Abucay, Bagac, Hermosa, Limay, Mariveles, Morong, Orani, Orion, Samal	LGUs, NGAs, private sector and other individual volunteers	Technical Support/Facilitation
January 26, 2020	Battle for Manila Bay (Simultaneous Cleanup Activities)	Aguawan, Mariveles Villa Carmen, Mariveles Cabcaben, Mariveles Alangan, Limay Landing, Pilar Almacen, Hermosa	LGUs, NGAs, private sector and other individual volunteers	Technical Support
September 25, 2021	Coastal Clean Up Activity	Wawa, Orion	DepEd, LGU-Orion, Toyota Bataan, Brgy. Officials	Technical Support/Facilitation
June 17, 2022	Environment Month Celebration: Coastal Cleanup Activity	Sabang, Morong	LGU-Morong, Anvaya Cove Beach and Nature Club, BJMP, BPSU-ICHTHUS Society, Coast Guard, SAF, PNP, POs, and other volunteers	Facilitation
October 4, 2022	Launching of Smoke-Free Beaches in Bataan (Coastal Cleanup)	Pag-asa, Bagac	Government Officials, Provincial Tourism Office, LGU Bagac, Brgy. Pag-asa volunteers, 1PawiCAN, Tobacco-Free Generation, Action on Smoking and Health, Locolokals Surf Club and Skim Batan	Technical Support
January 25, 2023	Bisita Bayan sa Hermosa "Coastal Cleanup Activity"	Almacen, Hermosa	MENRO-Hermosa personnel and the Brgy. Officials of Almacen	Technical Support

Table 16 outlines the environmental engagement of various organizations in Bataan including coastal clean-up drives, tree and mangrove planting activities, and seminars.

Table 16. List of environment-related PPAs led by the private sector and other organizations.

Year	Company/ Organization	Corporate Social Responsibility Activities and/ or Programs Funded by the Private Sector and Other Organizations	Estimated No. of Participants	Location
2014-2022	GNPower Mariveles Energy Center Ltd. Co. (GMEC)	GMEC Sitio Karagatan Reforestation Program	-	Sitio Karagatan, Mariveles, Bataan
2016	Bataan 2020, Inc.	Tree Planting	50	Bataan 2020 Compound, Brgy. Gugo, Samal, Bataan
		Tree Planting/Adopt a River	25	Samal River, Brgy. Gugo, Samal, Bataan
	Philippine Resins Industries, Inc. (PRII)	Coastal Clean-up Activity	36	Foreshore of PAFC Industrial Park
		Mangrove Planting Activity	39	Brgy. Bantan, Orion Bataan
		1Bataan Green Legacy Comprehensive Tree Planting	50	Brgy. General Lim, Orion, Bataan
2017	Philippine National Oil Company (PNOC)	Park-wide Coastal Clean-up	200	PNOC Construction Jetty, Mariveles, Bataan
		International Coastal Clean-up (ICC)	30	PPDC Housing, Batangas Dos, Mariveles, Bataan
		Pawikan Festival	30	Morong, Bataan
	PRII	Coastal Clean-up Activity	47	Foreshore of PAFC Industrial Park
		Mangrove Planting	39	Brgy. Alangan, Limay, Bataan
		Urban Gardening and Wellness Seminar	40	Batangas Dos Municipal Highschool, Mariveles, Bataan
		Mangrove Planting	34	Brgy. Camachile, Orion, Bataan
		ICC	60	Shorelines of Brgy. Batangas Dos, Mariveles, Bataan
		Pawikan Festival	15	Pawikan Conservation Center Morong, Bataan
2018	PNOC	Park-wide Coastal Clean-up	255	PNOC Construction Jetty, Mariveles, Bataan
		Tree Planting	115	Gen. Lim, Orion, Bataan
		ICC	30	PPDC Housing, Batangas Dos, Mariveles, Bataan
		Pawikan Festival	32	Morong, Bataan
	PRII	Coastal Clean-up	22	Foreshore of PAFC Industrial Park
		Tree Planting (in support to Let's Go Green Advocacy of Bataan and the National Greening Program of DENR, promoting carbon neutrality by enhancing carbon sequestration through tree planting)	38	Brgy. Gen. Lim, Orion, Bataan (PRII agrees to adopt approximately two (2) hectares of CBFM Area)

2018	PRII	ICC	48	Shorelines of Bayview Village, Brgy. Batangas Dos, Mariveles, Bataan
		Mangrove Planting (1,000 seedlings)	56	Brgy. Camachile Orion, Bataan
2018- present	Limay Power Inc. (LPI) (Formerly SMC Consolidated Power Corp. or SCPC)	Project H2O (Hydro-conservation 2wards Optimization) – Plant-wide water conservation initiatives resulting in 46.16% savings as of September	-	LPI
2019	Bataan 2020, Inc.	Tree Planting	55	Bataan 2020 Compound, Brgy. Gugo, Samal,
	GMEC	GMEC & GN Power Dinginin Ltd. Co. (GNPD) Joint	50	Sitio Dinginin, Mariveles, Bataan
		Annual Tree	50	GMEC Buffer Zone,
	PNOC	Manila Bay Coastal Clean-up	20	PNOC Construction Jetty, Mariveles, Bataan
		Park-wide Coastal Clean-up	150	PNOC Construction Jetty, Mariveles, Bataan
		Coastal Clean-up (Manila Bay	20	PNOC Construction Jetty, Mariveles, Bataan
		ICC	49	PPDC Housing, Batangas Dos, Mariveles, Bataan
		Tree Planting	129	Balon Anito, Mariveles, Bataan
	PRII	Coastal Clean-up	49	Foreshore of PAFC
		ICC	40	Shorelines of Bayview Village, Brgy. Batangas Dos, Mariveles, Bataan
2020	Petron Foundation, Inc.	Tree Planting	40	Brgy. Lucanin, Mariveles, Bataan
2021	Pag-asa Pawikan Protection and Conservation Center	Marine Turtle Release	-	Brgy. Pag-Asa, Bagac, Bataan
	PNOC	Park-wide Coastal Clean-up	75	PNOC Construction Jetty, Mariveles, Bataan
2021-present	GMEC	GMEC Riverbank Stabilization Program	-	GNPD 130-Hectare ENGP Site, 109-31-Hectare Riverbank System in Mt. Mariveles Watershed Area
2022	3P3C	Marine Turtle Release	-	Brgy. Pag-Asa, Bagac, Bataan
	Anvaya Cove Beach	Marine Turtle	-	Morong, Bataan
	Bataan 2020, Inc.	ICC	20	Brgy. Sapa, Samal, Bataan
	Bounty Fresh Food, Inc.	Tree Planting	-	Brgy. Maite, Hermosa, Bataan
	GMEC	Oktreeberfest (GMEC & GNPD Annual Tree	82	I heart Mariveles Standee Zigzag Road, Roman Superhighway, Bataan

	La Jolla Luxury Beach Resort	Marine Turtle Release	-	Brgy. Banawang, Bagac, Bataan
	Montemar Beach Club	Marine Turtle Release	-	Brgy. Pag-Asa, Bagac, Bataan
	Petron Corporation	Mangrove Planting/Earth Month Celebration	-	Brgy. Alangan, Limay, Bataan
	PNOC	Park-wide Coastal Clean-up	86	PNOC Construction Jetty, Mariveles, Bataan
		Tree Planting	146	Brgy. Alion, Mariveles, Bataan
	PRII	Coastal Clean-Up	-	PNOC shorelines
		Tree Planting	30	Brgy. Alion, Mariveles, Bataan
	Toyota Bataan, Inc. (TBI)	Earth Hour 2022	15	TBI, Abucay, Bataan
		Tree Planting	15	Brgy. Mabatang, Abucay, Bataan
		Coastal Clean-up	24	Balanga Wetland and Nature Park, Brgy. Tortugas, Balanga City, Bataan
	Yokowo Manufacturing of the Philippines	Tree Planting	-	Brgy. Maite, Hermosa, Bataan
2023	Bataan 2020, Inc.	Sitio Adamson Creek Clean-up	15	Brgy. Gugo, Samal, Bataan
		Tree Planting/Arbor Day Celebration	15	Brgy. Mabayo, Morong, Bataan
		ICC	13	Brgy. Sapa, Samal, Bataan
	GMEC	Oktreeberfest (GMEC & GNPD Annual Tree Planting)	40	Mt. Tarak, Brgy. Alasasin, Mariveles Bataan
		Coastal Clean-up Activity	44	Sitio Aguawan, Brgy. Sisiman, Mariveles, Bataan
		Mangrove Planting	35	Sitio Pulo, Brgy. Kabalutan, Orani, Bataan
	GNPD	Coastal Clean-up	70	Sitio Dinginin, Brgy. Alas-Asin, Mariveles, Bataan
	Limay Power Inc. (LPI) (Formerly SMC Consolidated Power Corp. or SCPC)	Arbor Day Tree-planting Activity	38	Sitio Kinaragan, Brgy. Duale, Limay, Bataan
		Trees for Tomorrow: Environment Month Tree-planting Activity	68	LPI Ash Storage Facility, Brgy. Alangan, Limay, Bataan
		ICC	127	Ayam Beach (Behind the LPI Plant), Brgy. Lamao, Limay, Bataan
		Continuous Ambient Air Quality Monitoring Station – a 24/7 air quality monitoring of the host community to support Airshed Action Plan	-	Brgy. Lamao, Limay, Bataan

	PNOC	Park-wide Coastal Clean-Up	105	PNOC Construction Jetty, Mariveles, Bataan
		Tree Planting	140	Brgy. Alion, Mariveles, Bataan
		ICC	51	PNOC Construction Jetty, Mariveles, Bataan
	PRII	Coastal Clean-up	16	PNOC Shorelines
		Tree Planting	25	Brgy. Alion, Mariveles, Bataan
	TBI	Earth Hour 2023	20	TBI, Abucay, Bataan
		Tree Planting	15	Brgy. Mabayo, Morong, Bataan
		Coastal Clean-up	15	Balanga Wetland and Nature Park, Brgy. Tortugas, Balanga City, Bataan

Implications and Recommendations

The strong collaboration and mobilization of various stakeholders including the government, CSOs, NGOs, private sector, youth, and local community play a pivotal role in the successful implementation of environmental initiatives including the promotion of sustainable environmental practices. Started as an activity to raise awareness on marine litter pollution, the ICC transformed into an annual program involving the widest range of stakeholders. The results of the ICC should be utilized as basis in planning and implementing more responsive plans and policies with regard to pollution reduction.

Aside from the ICC, environment-related programs and activities are being implemented by the private sector and CSOs in partnership with the local government, and participated mostly by the local community. Environmental initiatives led by other organizations may not be documented. It is therefore recommended that a mechanism be established for the proper consolidation and reporting of environment-related PPAs undertaken by the different stakeholders.

With the goal to make Bataan a sustainable province, effective strategies should be identified to sustain community involvement and forge meaningful partnerships among stakeholders.

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Capacity development

011 Availability/accessibility

Description

This indicator reports access to facilities and training programs, staff and budget allocation, and technical resources available for coastal management. It also measures the extent to which local personnel can impart their knowledge and experiences in coastal management as well as the presence of universities, research institutions and local experts in the area.

Rationale

Building local capacity to plan and manage their own resources is essential in ICM programs. Similarly, access to facilities and training programs and budget allocation are essential in building local capacity. Local capacity is also enhanced by the availability of institutions such as universities, research institutions and local experts which can be tapped in implementing coastal management activities and training and education programs. Local personnel with the appropriate skills must be able to impart their knowledge and experiences in coastal management to other coastal and natural resource managers.

Data Requirements

- Access to facilities and training programs
- Staff and budget allocation
- List of experts
- Universities and research institutions in the area with related courses /research activities
- Local capacity to conduct training

Results

At the city, municipal, and provincial LGUs, budget is allocated annually for capacity building activities. This allows employees to take part in ICM-related trainings, seminars, and study tours, which are usually conducted by NGAs, e.g., Environmental Management Bureau (EMB) and Biodiversity Management Bureau (BMB) of the DENR, Climate Change Commission (CCC), Department of Science and Technology (DOST), etc., organizations such as PEMSEA, Global Green Growth Institute (GGGI), Oceana Philippines, etc., and the private sector. **Table 17** lists the ICM-related capacity-building activities and trainings attended by PG-ENRO personnel from 2017-2022. While LGUs have regular budget for capacity-building activities, some trainings are offered for free and sponsored by partner organizations or the private sector. Trainings attended by PG-ENRO personnel include ICM program implementation, marine turtle and biodiversity conservation, air and water quality monitoring, and greenhouse gas (GHG) emissions inventory.

Table 17. ICM-related trainings and seminars attended by PG-ENRO personnel, 2017-2022.

Year	Training	Organization that conducted the training	No. of personnel trained
February 20-21, 2017	Global Youth Forum 2017: Youth on Sustainable Tourism	International School of Sustainable Tourism	1
February 23-24, 2017	Orientation on Integrated Coastal Management (ICM) for the Province of Bataan	PEMSEA	6
March 8, 2017	Water Quality Checker, Aquaread Model: AP 800	De Leon Import and Export Corporation	7
March 23-24, 2017	3rd Leg of Pamana: World Heritage and Biosphere Reserve Nomination Series	Philippine National Commission for United Nations Educational, Scientific and Cultural Organization (UNESCO)	2
September 5-7, 2017	Training on Mainstreaming Green Growth in Development Planning (Part 1)	Global Green Growth Institute (GGGI)	6
September 14, 2017	Re-Echo Training on Water Resource Utilization	Licenses, Patents, and Deeds Division-Water Resource Utilization Section R3	2
October 4-6, 2017	Emission Inventory Training for LGUs	DENR-EMB R3	5
November 2-8, 2017	2017 Seminar on Green Ecological Aquaculture for ASEAN Countries	Xiamen Southern Oceanographic Center and Fujian Institute of Oceanography	1
November 13-15, 2017	Marine Turtle Protection and Network Planning Workshop-Manila Bay Rehabilitation Project	DENR-Biodiversity Management Bureau (BMB)	5
November 23-24, 2017	Greenhouse Gas (GHG) Emission Inventory Training	DENR-EMB R3	2
November 27-28, 2017	Mobile Continuous Ambient Air Quality Monitoring System On-Site Demo Training	BP Integrated Technologies, Inc.	4
December 4-8, 2017	Training Course on Seawater Nutrient Analysis and Quality Assurance & Quality Control	Ministry of Oceans & Fisheries, Republic of Korea, PEMSEA, Korea Marine Environment Management Corporation & Korea Institute of Ocean Science & Technology	1
December 11-12, 2017	Training on Troubleshooting, Maintenance, Fault Diagnostics & Instrument Repair on Model T101 Fluorescent SO_2 Analyzer, Model T204 Chemiluminescent NO/NO_2/NO_x Analyzer and Model T640 PM Mass Monitor	Teledyne Advanced Pollution Instrumentation	1
December 13-14, 2017	Orientation-Seminar for Ecosystem-Based Adaptation Mainstreaming	DENR-EMB R3	2
December 15, 2017	Multipartite Monitoring Team (MMT) Capacity Building on Environmental Quality Monitoring	GNPower Mariveles Coal Plant Ltd. Co.	2
January – June 2018	Training on Mainstreaming Green Growth in Development Planning	GGGI	4
March 8, 2018	Pollution Control Officer Training Course for Local Government Units	DENR-EMB R3	11
March 20-21, 2018	Hands-On Training for Marine Turtle Conservation and Protection Program	Lembaga Pemegang Amanah Taban-Taban Sabah	3

May 29-30, 2018	Orientation on the MSMED Plan 2017-2022 and Training Program on Mainstreaming Green Growth in the Localization of the MSMED Plan	GGGI	2
June 6-8, 2018	Coastal Vulnerability Assessment of the Marine Turtle Nesting Sites in Morong	PG-ENRO-ICM Cavite	6
June 12-15, 2018	Technical Writing Training	Biodiversity Resource Information Network Group (BRING)	2
June 18-22, 2018	Oil Spill Response Training and Marine Pollution Exercise (MARPOLEX) for Manila Bay Stakeholders	DENR-PENRO Bataan	1
August 1-3, 2018	Training Workshop on GHG Inventory	Philippine League of Local Environment and Natural Resources Officers	2
August 13-16, 2018	National Ambient Air Monitoring Conference	United States Environmental Protection Agency and National Association of Clean Air Agencies	1
November 5-16, 2018	Fish Examiners' Training	BFAR R3	1
November 22, 2018	Mobile Continuous Ambient Air Quality Monitoring System On-Site Demo Training	BP Integrated Technologies Inc.	4
December 11-14, 2018	e-Learning Course on Waste Management in Agribusiness	Asian Productivity Organization & Development Academy of the Philippines	1
December 27, 2018	Proper *Pawikan* Handling and Conservation	PG-ENRO	3
February 19-22, 2019	Workshop on Beach Profiling for the Proposed Cavite-Bataan-Zambales (CABATALES) Marine Turtle Protected Area Network	DENR-BMB	2
February 20-21, 2019	Competence Assessment Tool Orientation and Feedback of the Marine Protected Area Network (MPAN)	SMARTSeas PH, University of the Philippines (UP)-Marine Science Institute (MSI) and MPAN Managers	2
March 4-5, 2019	Regional Training Workshop on Risk and Vulnerability Assessment	UP-MSI and PEMSEA Resource Facility (PRF)	2
March 20-22, 2019	Basic Incident Command System Training Course	Regional DRRMC 3 and PDRRMO	1
March 21, 2019	Initial Status Review of the ICM Code and ICM Level II Planning Workshop	PRF	6
April 10, 2019	Training on Data Management System for 1Bataan Ambient Air Quality Monitoring Network	BP Integrated Technologies Inc.	4
April 16-17, 2019	Fish Examiners' Training (Phase 2)	BFAR R3	1
May 22, 2019	Forum on Improving Transparency in Fisheries to Stop Illegal, Unreported and Unregulated Fishing	Oceana Philippines	2
June 20-21, 2019	Strategic Planning Workshop	PRF	6
June 26-27, 2019	Orientation and Writeshop on the Formulation of the Fisheries Code in the Province of Bataan	Oceana Philippines	5
July 31, 2019	Technology Fora on Food Safety: Energy Systems Optimization: Conserving Energy to Ensure Sustainable Use	DOST R3	5
August 5-9, 2019	Training Course on Environmental Impact Assessment	UP Los Baños-School of Environmental Science and Management (SESAM)	3
August 8, 2019	Water Quality Monitoring Using the Platform of Palintest Macro 900 and Colitag	Blaise Scientific Trading	7
August 15-16, 2019	Capacity Building for Manila Bay PENROs and CENROs Personnel on Water Quality Sampling and Monitoring	DENR-Manila Bay Site Management Coordinating Office R3	1

August 19-23, 2019	Integrated Planning Course On Basic Incident Command System 2	RDRRMC 3 and PDRRMO	1
August 28-30, 2019	3-Day Local Climate Change Action Plan Writeshop	City Government of Balanga and UP Resilience Institute	1
September 25-27, 2019	System Development, Documentation, and Implementation Workshop	PRF	6
September 27, 2019	Training on Community Pest Control	National Committee on Urban Pest Control	1
October 8, 2019	Joint Planning Workshop of the Provincial Government of Bataan and BPSU	National Resilience Council (NRC)	2
October 27-November 24, 2019	Study Tour for Sustainable Coastal Development	Coastal and Ocean Management Institute and Xiamen University	2
December 11-13, 2019	Implementation, Monitoring and Measurement, and Review and Improvement Workshop	PRF	6
May 8-11, 2020	Green City Planning for Sustainable Urban Development	United Nations for Training and Research Unit (UNITAR)-International Training Centre for Authorities and Leaders (CIFAL)	1
June 6, 2020	Air Quality Monitoring, Standards, and Abatement	Simmons Consult International, Inc.	1
June 10, 2020	Pathways for Clean Air and Clean Energy Project: Capacity Building Workshop on Emissions Inventory, Air Quality Modeling and Health Benefits Mapping in Limay, Bataan	Clean Air Asia	4
July 28, 2020	Webinar on Sustainable Management of Medical Wastes During Health Crisis	UP CIFAL Philippines	1
August 10-12, 2020	Training Course on Stochastic Frontier Modeling, GIS Analysis, Land Use Simulation, Estimation of Housing Demand and Financing, and Applications in Urban and Regional Planning	Planning and Development Research Foundation Inc; DOST – Philippine Council for Industry, Energy and Emerging Technology and Development	1
August 24-October 20, 2020	Accessing the People's Survival Fund (PSF) E-learning Course	Climate Change Commission	1
December 12-13, 2020	Webinar on Geospatial Information Modeling Techniques	Philippine Institute of Environmental Planners (PIEP)-Albay Chapter	1
May 18, 2021	Part 1 of the Month of the Ocean 2021 Webinar Series: Climate Change & Coastal & Marine Ecosystems: Building Awareness on How Climate is Changing Our Marine & Coastal Ecosystems	Climate Change Commission	4
May 25, 2021	Part 2 of the Month of the Ocean 2021 Webinar Series: Climate Change & Coastal & Marine Ecosystems: Building Awareness on How Climate is Changing Our Marine & Coastal Ecosystems	Climate Change Commission	4
August 11-13, 2021	Webinar on GHG Inventory for Local Governments	Climate Change Commission	2
October 2-3, 2021	Integrated Programme for Better Air Quality in Asia (IBAQ Programme) Online Learning Series	Clean Air Asia	1
October 28-30, 2021	Production Technologies and Industry Development in Oysters and Mussels	BFAR R3	1
November 17-19, 2021	Building Alliance to Ensure Food Security in the West Philippine Sea: A Conference of the Local Governments	DILG	1
November 18, 2021	2021 Joint PNLG-PNLC Learning Forum	PEMSEA	1
February 22-24, 2022	CABATALES Marine Turtle Conservation Network Planning Workshop	DENR-BMB	2

May 4-6, 2022	2022 JITC-KOTI-EACACN Capacity Building Workshop: Building Carbon Neutral Society for Our Common Future-The Role of Mobility in Times of Transition	UNITAR-CIFAL	1
August 24-26, 2022	Capacity Building for Marine Turtle Conservation	Marine Wildlife Watch of the Philippines	7
October 12, 2022	Formulation of City Promise Work Plan First Coaching Session	ICLEI Southeast Asia	3

Source: PG-ENRO Bataan.

Implications and Recommendations

PG-ENRO as the coordinating office for ICM in Bataan Province has adequate staff and opportunities for capacity development. The Provincial Government should regularly allocate resources for the continuing training of ICM personnel particularly on scientific and technical aspects, such as environmental assessments and scientific/technical writing. To further institutionalize ICM in Bataan Province, the city and municipal governments, including higher education institutions like the Bataan Peninsula State University (BPSU) should invest in their own human resources for ICM, including hiring of additional staff and providing training opportunities for their personnel working on ICM. Membership of the BPSU in the PEMSEA Network of Learning Centers (PNLC) can be considered, which will be beneficial to the university and province as a whole in strengthening capacities for ICM.

References

PG-ENRO. Trainings attended by personnel from 2017-2022.

Capacity Building for Marine Turtle Conservation led by the Marine Wildlife Watch of the Philippines on August 24-26, 2022.

Capacity development

012 Human resource capacity

Description

This indicator measures local capacity in implementing coastal management in terms of human resources.

Rationale

The knowledge and skills of local personnel are essential for the effective implementation of coastal management.

Data Requirements

- Number of people trained in ICM
- Number of skilled personnel working in ICM programs
- Number of graduates in ICM-related courses
- Number of required ICM-trained people

Results

Since the re-organization and institutionalization of the Bataan ICM Program under the ICM Division of the PG-ENRO in 2016, five (5) full-time staff have been assigned, with strong support from the other sections of PG-ENRO including the Mines and Geosciences, Forest Management, and Environmental Management sections. ICM personnel had participated in ICM-related trainings and international study visits such as the Study Tour for Sustainable Coastal Development that was jointly organized by the Coastal and Ocean Management Institute, Xiamen University, and PNLG Secretariat in Xiamen, China on October 27 to November 4, 2019. As a member of the PEMSEA Network of Local Governments (PNLG) for the Sustainable Development of Coastal Areas, the province also participates in the annual forum of the Network including the technical workshops, which tackled the aspects on “Conservation to Ecological Restoration of the Coastal Areas for Blue Economy” in 2017; “25 Years of Partnerships for Healthy Oceans, People and Economies: Moving as One with the Global Ocean Agenda” in 2018; Blue Partnership for a Shared Future” in 2019; “Marine Eco-Civilization Blue Development” in 2020; “Networking for a New Ocean Decade of Hope” in 2021; and “Strengthening Coastal Resilience Towards Sustainable Local Blue Economies” in 2022.

A series of workshops from 2019 to 2020 was participated by the different PGB departments and the DENR-PENRO NGAs on ICM System Development, as part of the process for Level 2 Certification for the Bataan ICM program.

Opportunities for capacity building in the form of trainings and workshops are continuously provided to the local staff (see also **Indicator 11**). Starting in 2020, university students taking up coastal management and environment-related courses at the BPSU may apply for on-the-job training (OJT) at the PG-ENRO and take part in ICM-related work. Students in the aforementioned fields have also been working closely with PG-ENRO in the conduct of related researches on biodiversity conservation and coastal management.

Study Tour for Sustainable Coastal Development

On-the-Job trainees from BPSU

PG-ENRO staff currently working in ICM are competent individuals with related undergraduate and graduate studies in the field of fisheries, environmental planning, and economics (**Table 18**). With years of experience and trainings in ICM and exposure in partnership programs for coastal management in LGUs and the private sector, they gained the technical capacity in effectively implementing the ICM program.

Table 18. Personnel working in the program with ICM-related undergraduate and graduate courses.

Number of Personnel	Undergraduate Course	Graduate Course
1	Bachelor of Science in Economics	Master of Science in Sustainability Management
1	Bachelor of Science in Environmental Planning	Professional Masters in Tropical Marine Ecosystem Management
3	Bachelor of Science in Fisheries	

Implications and Recommendations

The process of vying for the ICM System Level 2 Certification for the ICM program in Bataan, which entailed a series of workshops provided an opportunity for the ICM personnel to delve deeper and advance their understanding of the ICM concepts and processes. ICM personnel regularly participate in relevant trainings and capacity building activities to continually enhance their technical knowledge that can be applied to ICM program implementation.

The engagement of BPSU in the ICM program provides an opportunity to train young leaders and build more expertise for ICM program implementation in the province. At the same time, the participation of the BPSU in the PEMSEA Network of Learning Centers (PNLC) is being explored and will open opportunities for learning exchanges, collaborative engagements and networking with member institutions of the PNLC and further enhance BPSU's capacity in support of the ICM program implementation in the province.

References

PEMSEA Network of Local Governments (PNLG). PNLG Forum themes.
PG-ENRO. Personnel with ICM-related undergraduate and graduate courses.

Biodiversity and Integrated Coastal Management Section of the Provincial Government - Environment and Natural Resources Office of Bataan Province, ca. 2020.

Financing mechanisms

013 Budget for ICM

Description

This indicator reports the financial requirements for coastal management and the government allocation including investments for environmental infrastructure. It also looks into the financial sources for coastal management, such as loans, and grants from financing institutions and donors.

Rationale

The activities for coastal management have specific budgetary requirements and thus need financial allocation for their implementation.

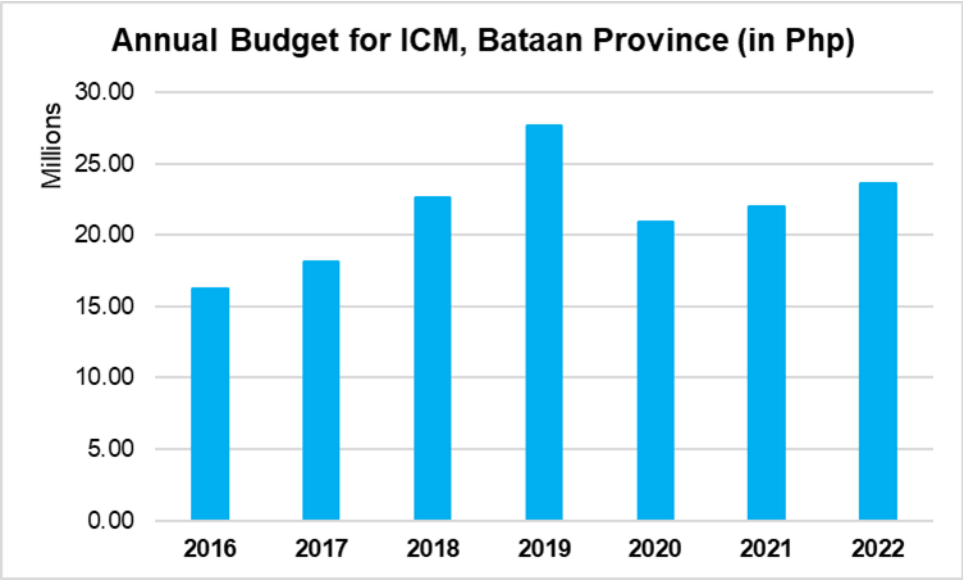
Data Requirements

- Total budget identified for coastal management
- Total budget allocated by LGU
- Total expenditure for coastal management
- Grants and loans from external sources
- Investments in environmental infrastructure

Results

The Provincial Government of Bataan has annual budget allocation for coastal management. From 2016 to 2019, budget for coastal management activities was allocated to the ICM Project Management Office (PMO), which includes its operational costs, and eventually to the PG-ENRO. Since 2019, ICM-related projects and activities are budgeted under the PG-ENRO only, with the rationalization and subsequent transfer of the PMO and ICM program to PG-ENRO's Biodiversity and ICM Section. As shown in **Figure 11**, the total budget for ICM program implementation in the province from 2016 to 2022 amounted to about Php 151.17 million. For the same period, it can be noted that budget for ICM is generally increasing. Expenditure items for ICM included such projects and activities as coastal resource assessment; coastal clean-up; mangrove development; *pawikan* (marine turtle) conservation; assistance to component LGUs in marine protected area (MPA); counterpart to Manila Bay rehabilitation program; and institutionalization of ICM program.

Figure 11. Annual Budget for ICM in Bataan Province, 2016-2022.

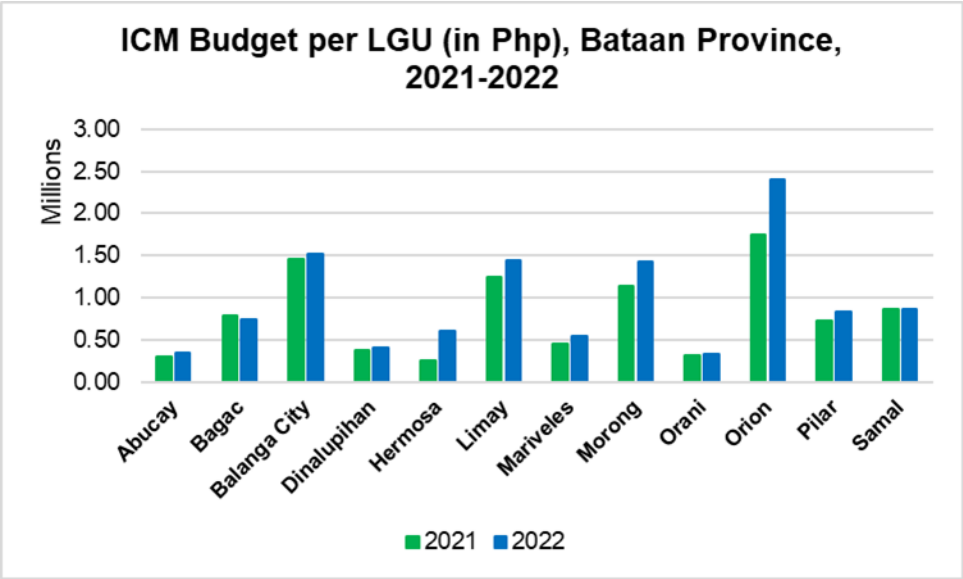


Source: Provincial Planning and Development Office; Provincial Budget Office.

Each of the 12 component LGUs of Bataan Province also allocates annual budget to ICM-related projects and activities implemented in their respective localities (**Figure 12**). Data from the Provincial Budget Office (PBO) showed that from 2020 to 2021, the total budget of LGUs for coastal management amounted to Php 21,079,299.39.

The budget of the city and municipalities are allotted for activities and projects such as the formulation of Coastal Resources Management (CRM) Plan, mangrove planting, coastal clean-up, and *Pawikan* (Marine Turtle) Festival celebration.

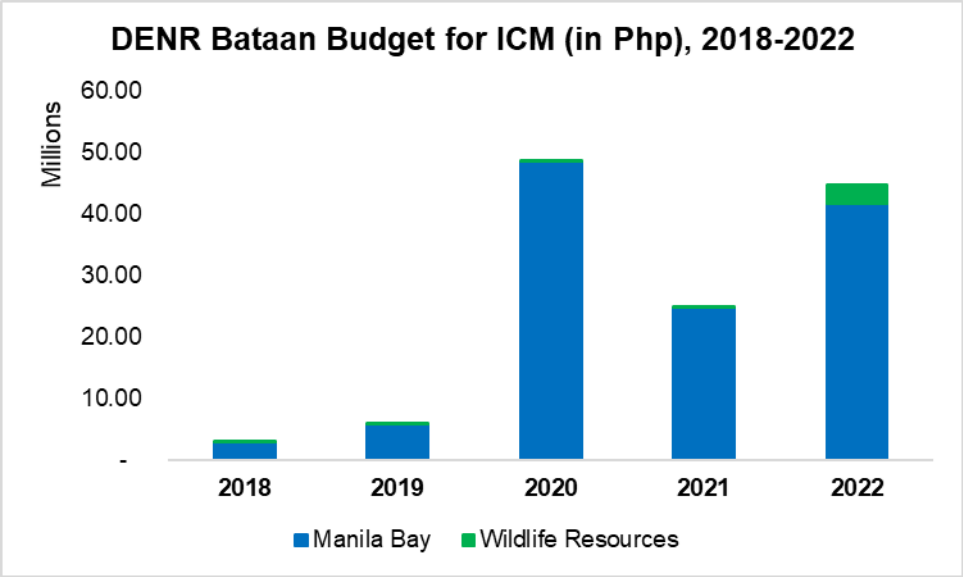
Figure 12. Annual Budget of C/MLGUs for ICM-related projects and activities, 2021-2022.



Source: Provincial Budget Office.

DENR Bataan also receives annual budget allocation from the General Appropriations Act (GAA) for the implementation of ICM-related programs and activities (**Figure 13**). Specifically, from 2018 to 2022, funds are released for the Manila Bay Rehabilitation Program and Wildlife Resources Program of DENR Bataan. The Manila Bay Rehabilitation Program includes initiatives such as clean-up drives and hiring of Estero Rangers; delineation of legal easements along rivers and waterways; fabrication of trash traps; and IEC campaigns. Meanwhile, the Wildlife Resources Program budget was allotted for activities related to the conservation of marine turtles or *pawikan* and migratory birds regularly settling in the province's coastal and mangrove areas.

Figure 13. DENR-PENRO Bataan Budget for ICM, 2018-2022.



Source: DENR-PENRO Bataan.

DENR also started implementing in 2021 the Enhancing Marine Litter Management in Manila Bay (EMLM) Project. The project, which will run until 2025, is funded by the Korea International Cooperation Agency (KOICA). Bataan Province is one of the project sites of the EMLM Project, which aims to facilitate the establishment of legal and institutional arrangements and pilot strategies for marine litter monitoring. It also aims to contribute to the overall marine litter management capacity of the Philippines.

The Provincial Government of Bataan also accesses external funding from the World Bank through the Department of Agriculture (DA)'s Philippine Rural Development Project (PRDP). This project aims to establish a modern, value chain-oriented, and climate-resilient agriculture and fisheries sector by providing key infrastructure, facilities, technology and information to raise incomes, productivity, and competitiveness in targeted areas. As of 2023, four (4) PRDP sub-projects have been implemented in Bataan (**Table 19**).

Table 19. List of PRDP subprojects awarded to the Province of Bataan.

Sub-Project	Year Contracted	Location	Project Cost (Php)
New Construction of San Antonio -Parang-Saysain Farm to Market Road (FMR)	2017	Bagac, Bataan	172,874,866.02
Establishment of Ice Plant and Cold Storage Building	2017	Mariveles, Bataan	8,776,204.98
Establishment of Ice Plant with Cold Storage	2017	Mariveles, Bataan	9,300,928.00
Establishment of Plant Nursery and Consolidation Facility for Sweet Potato Clean Planting Materials (CPM) in Bataan	2020	Bagac, Bataan	10,619,893.00

Source: PPDO.

Implications and Recommendations

Annual budget allocations at the national and local levels indicate the commitment of national and local governments in the implementation of ICM in Bataan Province. The implementation of externally funded projects such as the EMLM and PRDP also shows the readiness of the province to tap other funding sources for ICM. To ensure wise utilization of limited financial resources, it is recommended for the province to regularly review and monitor the annual budget allocations and implementation of ICM-related projects and activities of the city and municipalities. Doing so will help avoid redundancies and ensure complementary investments for coastal management.

References

DENR-PENRO. Budget for ICM.
PPDO and Provincial Budget Office. Budget for ICM of PG-ENRO.
PPDO. Philippine Rural Development Project (PRDP) subprojects awarded to the Province of Bataan. PG-ENRO.
Provincial Budget Office. Budget for ICM-related programs and activities of City and Municipal LGUs.

014 Sustainable financing mechanisms

Description

This indicator takes account of the institutionalization of measures and means to support environmental conservation and environmental infrastructure improvements. Economic and market-based instruments, such as public-private partnerships, environmental user fees, user-pay schemes, and corporate social responsibility (CSR) programs are among the tools being considered. The indicator also considers policies and programs put in place to enhance the climate for public and private sector financing of coastal management activities and for constructing and operating environmental infrastructure.

Rationale

Financial support for coastal management implementation may come from different sources. The sustainability of ICM programs is dependent on how revenue sources are developed and managed.

Transparency in all financial transactions is necessary to avoid suspicion from stakeholders. Apart from regular allocation from the government, various financing options must be explored to sustain financial inputs for coastal management activities and environmental infrastructure and service.

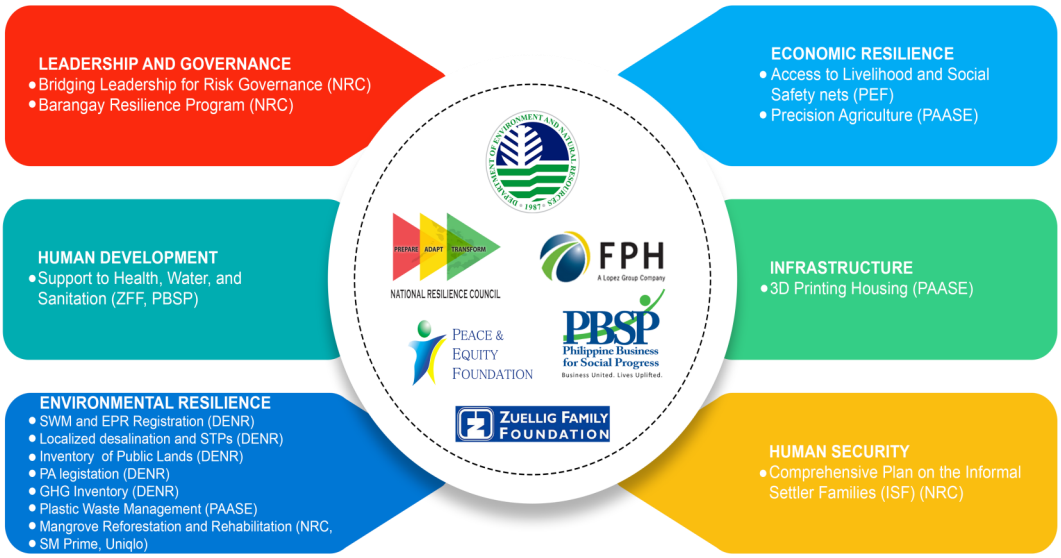
Data Requirements

- Corporate social responsibility (CSR)
- Private sector financing (e.g., PPP)
- Environmental user fees
- Percentage of environmental user fees allocated to environmental projects
- Private sector investments for environmental infrastructure
- Standard procurement process in place (e.g., defined ceiling for bidding, canvassing and shopping)
- Provincial/city/municipality authorized to engage in public-private partnership

Results

The private sector in Bataan continues to provide both technical and financial support for the implementation of programs, projects, and activities (PPAs) directed at environmental protection and management, ranging from capability building activities to putting up of environmental infrastructure. Apart from corporate social responsibility (CSR) initiatives, one of the recent notable projects is the Project TRANSFORM or Transdisciplinary Approach for Resilient and Sustainable Communities through Multistakeholder Engagement, a program initiated by the DENR, which was launched in the province on May 9, 2023. Building on the power of multi-stakeholder collaboration, its objective is to bring together the best practices from the government and private sector to create an inclusive, science-based, and data-driven template that all stakeholders, partners, and LGUs may utilize to address the worsening

climate emergency. Through Project TRANSFORM, partners from the private sector and civil society organizations (CSOs) pledge their commitment to support the government in carrying out PPAs on 1) Leadership and Governance, 2) Economic Resilience, 3) Human Development, 4) Infrastructure, 5) Environmental Resilience, and 6) Human Security. **Table 20** shows a summary of PPAs under Project TRANSFORM while **Table 21** lists down those funded by the private sector.



Framework for Project Transform in Bataan

Table 20. Programs and activities under Project TRANSFORM (C.Y. 2023).

Company/Organization	Programs and Activities (PPAs)	Fund Allocation (Php)
GNPower Mariveles Energy Center Ltd. Co.	**Baka1Bataan**: Mangrove Rehabilitation Program (Orani)	500,000.00
SM Prime Holdings, Inc./SM City Bataan	**Baka1Bataan**: Mangrove Rehabilitation Program (Balanga City)	500,000.00
San Miguel Corporation-Petron	**Baka1Bataan**: Mangrove Rehabilitation Program (Abucay)	500,000.00
SMC Global Power Holdings Corporation	**Adopt a Station**: Air Quality Monitoring/ Early Warning Systems (Limay)	TBD
GNPower Dinginin Ltd. Co.	**Coastal & Marine Biodiversity Conservation**: Marine Turtle Conservation Program (Morong)	1,000,000.00
GNPower Dinginin Ltd. Co.	**Coastal & Marine Biodiversity Conservation**: Restoring Marine Ecosystems- Coral Transplantation Project (Mariveles)	302,380.00
Rampver Financials Inc. Country Garden Development PH Inc.	**E-Mobility for Sustainability**: Donation of E-vehicles-2 BYD Dolphin and 1 Volkswagen ID.6	-

Table 21. PGB programs and/or CSR activities funded by the private sector.

Year	Company/Organization	Corporate Social Responsibility Activities/ Programs Funded by the Private Sector
2018	**Anvaya Cove Beach and Nature Club** **Ayala Land Inc.**	Coastal Vulnerability Assessment for the Marine Turtle Nesting Sites in Morong
	Anvaya Environmental Foundation **Ayala Land, Inc.** **GNPower Mariveles Coal Plant Ltd. Co.** **Orica Philippines, Incorporated** **Petron Foundation, Incorporated** **Philippine Resins Industries, Incorporated (PRII)** **Seafront Shipyard and Marine Services Corporation** **Sumi Philippines Wiring Systems Corporation**	Bataan Environment Summit
	Petron Foundation, Inc.	Hands-on Training and Study Tour on Marine Turtle Conservation in Sabah, Malaysia
2018-present	**PRII**	Establishment of Mangrove Ecotourism Site in Camachile, Orion
2022	**SMC Consolidated Power, Inc.** **Reysam Sweet Water Beach Resort** **Bataan White Corals Beach Resort** **PRII**	Capacity Building for Pawikan Conservation

In line with the vision of becoming one of the top investment destinations in the country, the provincial government leveled up and institutionalized its public-private partnership projects through the creation of its own Public-Private Partnership and Investment Center (PPPIC) in 2013. One of its successful projects is the construction of the Bataan Government Center and Business Hub called “The Bunker,” a seven-story building, which houses the majority of offices and departments of the provincial government, NGAs, and financial institutions. A summary of PPP projects is listed in **Table 22**.

The Bataan Environment Code provides for the imposition of an Environmental Protection and Enhancement Fee (EPEF) for the issuance of the Certificate of Environmental Compliance to poultry and piggery owners (**Table 23**). The amount collected annually from the EPEF is allocated for the implementation of PPAs related to environmental conservation and water quality management. At the city level, the passage of Ordinance No. 14, also known as the Balanga City Environment and Eco-Tourism Code of 2015, allows the filling out of the Tourists Registry Form and payment of the environmental and eco-tourism fee.

In 2019, City Ordinance No. 14, otherwise known as “An Ordinance Establishing the Fees and Charges System for Balanga Wetland and Nature Park (BWNP),” was amended by City Ordinance No. 38, which charges an Environmental and Eco -Tourism Fee of Php 10.00 per person for the enhancement and preservation of the BWNP. Similarly, to sustain maintenance and development at the Tanato Picnic Grove and River Resort in the city of Balanga, City Ordinance No. 39, Series of 2019, amending City Ordinance No. 11, Series of 2016, was enacted for the collection of a uniform environmental fee

of Php 10.00 from visitors subject to payment of entrance fees in the Resort. In lieu of the fee, visitors may opt to plant a seedling in designated areas with the assistance of the City Environment and Natural Resources Office. In the municipality of Morong, Ordinance No. 151, Series of 2019, entitled "An Ordinance Prescribing Environmental Fee in the Municipality of Morong, Bataan Providing Penalties for Violation Thereof" was passed for the collection of an environmental user fee of Php 20.00 from visiting local and international tourists. In the municipality of Bagac, a draft ordinance for the collection of the same is already subject to a public hearing.

The Provincial Government undertakes procurement in accordance with R.A. 9184, also known as the "Government Procurement Act" and Its Implementing Rules and Regulations. R.A. 9184 provides for the use of electronic means for procurement and the Philippine Government Electronic Procurement System (PhilGEPS), which serves as the primary and definitive source of information on government procurement. In the conduct of procurement procedures, the Provincial Government through its Bids and Awards Committee (BAC) utilizes PhilGEPS to improve transparency and enhance administrative efficiencies.

Table 22. List of PPP projects in Bataan.

Project Description	Proponent	Location	Status
1Bataan Government Center (The Bunker at The Capitol)	Alloy MTD	Capitol Compound, Tenejero, Balanga City, Bataan	**Project Under Implementation.** The Bunker Building is already constructed and occupied by government and commercial offices. The hotels and business process outsourcings (BPOs) and commercial centers are not yet constructed.
1Bataan Integrated Transportation System	Magic Leaf Marine Logistics Corporation	Sitio Wain, Mariveles, Bataan	**Project Under Implementation.** The trial run for the 1Bataan Integrated Transport System ferry services was scheduled to commence on November 15 to 30, 2023 (Wednesday to Sunday) and continue from December 1 to 31, 2023 (Monday to Sunday). This initiative aims to improve the convenience and efficiency of travel between Manila and Bataan. The designated terminal locations include the Manila Terminal at Esplanade Seaside Terminal (EST) in SM By the Bay, Pasay City, the Stopover Terminal at Camaya Coast Terminal (Camaya Coast Resort) in Mariveles, Bataan, and the Bataan Bus Terminal at FAB Central Terminal (FCT) in Mariveles, Bataan.
Bataan Provincial Healthcare Smartcard Project	eureKARE Corporation	The Bunker, Capitol Compound, Balanga City, Bataan	**Project Under Implementation.** The proponent is still in the process of obtaining the e-konsulta PhilHealth accreditation.
Establishment and Operation of the Agriculture Innovation and Technology Center (AITC) and Incubator Farm	Agrilever (HK) Ltd. (Agrilever)	Dinalupihan, Bataan	**Project Under Implementation.** The project has been implemented in the ten (10) pilot farms in Dinalupihan, Bataan.
Bataan Province No Contact Apprehension Program	QPAX Traffic Systems, Inc.	Roman Superhighway	**Project Under Implementation.** The No Contact Apprehension Program is non-operational since August 30, 2022, as ordered by the Supreme Court via a Temporary Restraining Order (TRO). As of this date, the TRO on the No Contact Apprehension remains in effect.

Hearing Center at Mariveles District Hospital	Una Bella Hearing Center	Mariveles District Hospital, Mariveles, Bataan	**Project Under Implementation.** Una Bella Hearing Center is a privately owned enterprise operating in Mariveles District Hospital (MDH). The Provincial Government of Bataan subleased a 20.48-square meter area in MDH in favor of Una Bella Hearing Center for the exclusive purpose of establishing a hearing center that will provide excellent ear and hearing health services to the community. The sublease agreement is from January 1, 2020 to December 31, 2024.
Engineered Sanitary Landfill Facility	Basic Environmental Systems and Technology Inc. (BEST)	Capitangan, Abucay, Bataan	**Project Under Implementation.** BEST is still in the process of obtaining the building and development permits from the Municipality of Abucay.

Table 23. Schedule of fees for the issuance of CEC to poultry and piggery owners.

Certificate of Environmental Compliance (CEC) - Piggery			
Application Fee: Php 100.00			
Environmental Protection and Enhancement Fee (EPEF) - Payable annually			
CLASSIFICATION	**POPULATION (Number of Pigs)**	**EPEF (Php)**	
Small Scale	500 and below	500.00	
Medium Scale	501 to 1,000	1,000.00	
Large Scale	1,001 and above	1,500.00	
CEC - Poultry			
Application Fee: Php 100.00 (1 year), Php 200.00 (2 years), or Php 300.00 (3 years)			
EPEF - Payable annually OR in lump sum			
CLASSIFICATION	**POPULATION (Number of Birds)**	**EPEF (Php) *Annual***	**EPEF (Php) *3-Year Lump Sum***
Small Scale	501 to 10,000	500.00	1,500.00
Medium Scale	10,001 to 50,000	1,000.00	3,000.00
Large Scale	50,001 and above	1,500.00	4,500.00

Source: Provincial Ordinance No. 03, Series of 2019.

Implications and Recommendations

The private sector is an important partner in the ICM program implementation in Bataan particularly in the mobilization of financial resources and sharing of business management skills and technical expertise as well as results of researches and relevant data. Industries located in Bataan individually or collectively support the implementation of ICM programs and activities ranging from capability building to establishment of environmental infrastructure. The launch of Project TRANSFORM also broadens opportunities for further multi-stakeholder collaborations geared towards sustainable development and at the same time, climate resilience. Nevertheless, strengthening partnerships with the private sector requires forging good relations by effectively engaging them in every step of the PPAs. Recognizing the BCCFI as an avenue for public-private partnerships, it is highly recommended that the BCCFI be revitalized. This move will build harmony and more importantly, allow the optimal pooling of resources to carry out PPAs focused on the sustainable management of Bataan's coastal environment and resources.

References

City Ordinance No. 11, Series of 2016.
City Ordinance No. 14, Series of 2011.
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City Ordinance No. 38, Series of 2019.
City Ordinance No. 39, Series of 2019.
DENR. Project TRANSFORM.
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PG-ENRO. Corporate Social Responsibility (CSR)/PGB projects funded by the private sector.
PG-ENRO. Programs and activities under Project TRANSFORM.
Provincial Ordinance No. 03, Series of 2019.
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R.A. 9184.

Natural and Man-Made Hazard Prevention and Management

015 Level of preparedness for disasters

Description

This indicator measures the availability of disaster preparedness and management plans, capable people, equipment, budget and operations to anticipate, reduce, respond to, and recover from various hazards/disasters.

Rationale

Local communities and disaster management personnel must be prepared to respond to various hazards, if the number of deaths and property losses due to natural and man-made hazards are to be minimized. Moreover, proper preparation and mitigation measures can reduce the frequency of man-made hazards and severity of disasters.

Data Requirements

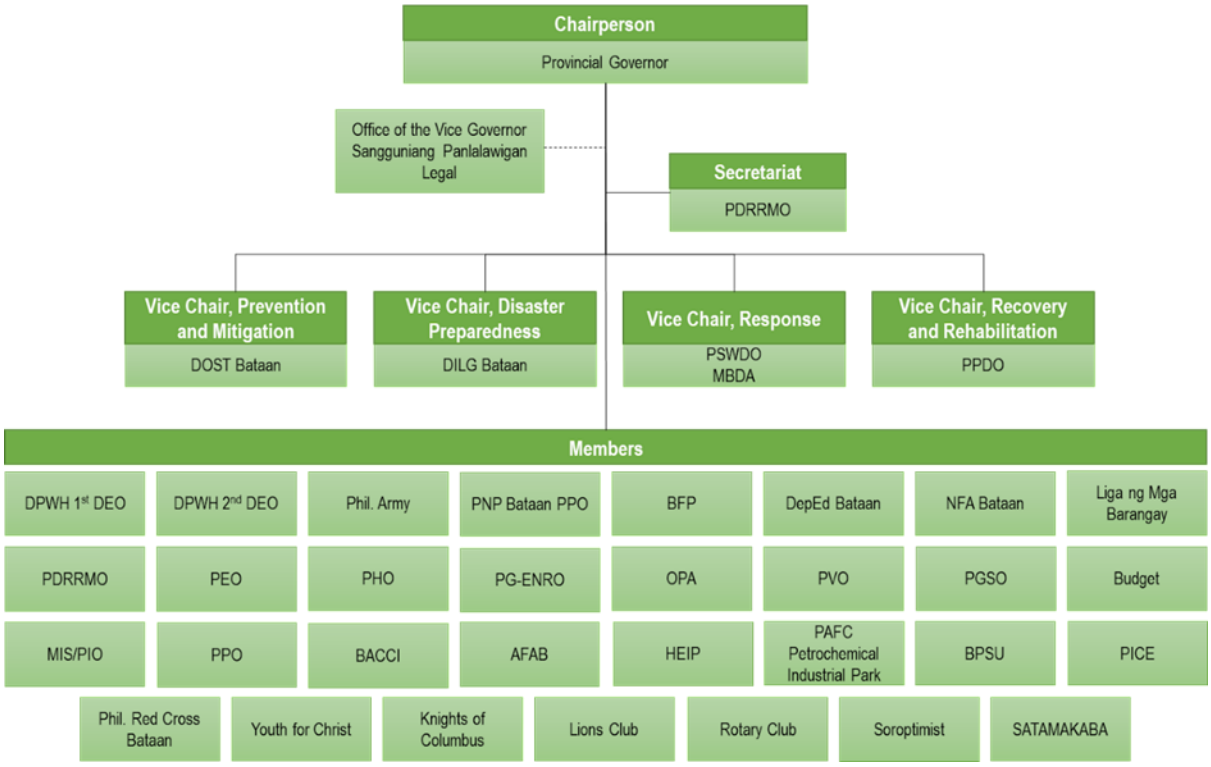
- Availability of natural/man-made disaster/ environmental emergency response plan
- Scope of natural/man-made disaster/ environmental emergency response plan (e.g., floods, earthquakes, oil spill, etc.)
- Identification of mitigation strategies
- Institutional mechanism for the implementation of the emergency response plan
- Number of trained and non-trained personnel allocated
- Early warning system in place
- Availability of adequate equipment
- Budget allocation for natural/man-made disasters

Results

The province through the Provincial Disaster Risk Reduction and Management Office (PDRRMO) updated the PDRRM Plan, covering the period 2020-2024. The PDRRM Plan has four thematic areas, in line with the National DRRM Plan, namely: (1) Prevention and Mitigation; (2) Disaster Preparedness; (3) Disaster Response; and (4) Recovery and Rehabilitation. The PDDRM Plan aims to integrate and harmonize efforts of local governments and relevant sectors in disaster management, build and ensure proactive support of the province to the municipal/city LGUs on disaster preparedness and response, and reduce risk and increase disaster resilience.

In compliance with R.A. 10121 or the Philippine DRRM Act, the PGB issued E.O. 61, Series of 2016, reorganizing the composition of the PDRRM Council (PDRRMC). The PDRRMC is chaired by the Provincial Governor, and has four (4) Vice-Chairs, corresponding to the four thematic areas in the PDRRM Plan (**Figure 14**). The Vice-Chair represents the responsible office for the implementation of the different PPAs under each thematic area. The PDRRMO, which acts as Secretariat of the PDRRMC, is the main implementing office for DRRM. To date, numerous initiatives have been undertaken to better deal with hazards and reduce the risk of disasters (**Table 24**).

Figure 14. Organizational structure of the PDRRM Council of the Province of Bataan.



Source: Bataan PDRRM Plan 2020-2024.

Table 24. List of current DRRM activities conducted in the Province of Bataan.

DRRM Thematic Area	Initiatives
Disaster Prevention and Mitigation	1. Conduct of Hazard and Vulnerability Assessment through hazard mapping in coordination with the concerned agencies such as DENR-MGB, PHIVOLCS, NAMRIA, PAGASA, etc. 2. Distribution of maps in the 1:10,000 scale and IEC materials to mayors of the component LGUs through LDRRMOs 3. Continuous real time monitoring of rainfall and water level through our installed Automatic Rain Gauges (ARGs) within Bataan 4. Installation of Early Warning System 5. Passing of the Province's Environment Code 6. 1Million Trees for 1Bataan Program 7. Installation of Ambient Air Quality Monitoring System 8. Conduct of Coaching and Mentoring and Research and Planning Programs through National Resilience Council (NRC) initiatives

Disaster Preparedness	1. Prepositioning of medicines in Public Hospitals 2. Stockpiling of 1,000 family packs of food items of the different Social Welfare and Development Teams, which are available at any given time 3. Capacity building through participation in the following trainings, seminars, workshops, and drills: • Basic Life Support/CPR Ready • Water Search and Rescue Training • Basic/Ladderized ICS Training (Province down to the Municipal level) • Contingency Planning Workshops • Community-Based DRRM Training • Fire, Earthquake Drills and Rescue Olympics • RDANA Training 4. Allocation of funding for Rescue Equipment and Vehicles 5. Orientation/Re-Orientation of Local Chief Executives (LCEs) through DRRM Summit
Disaster Response	1. Provided funds/assistance for recovery and rehabilitation of infra projects and programs 2. Formulation of Strategic Action Plans (Recovery Plans per sector) for affected population

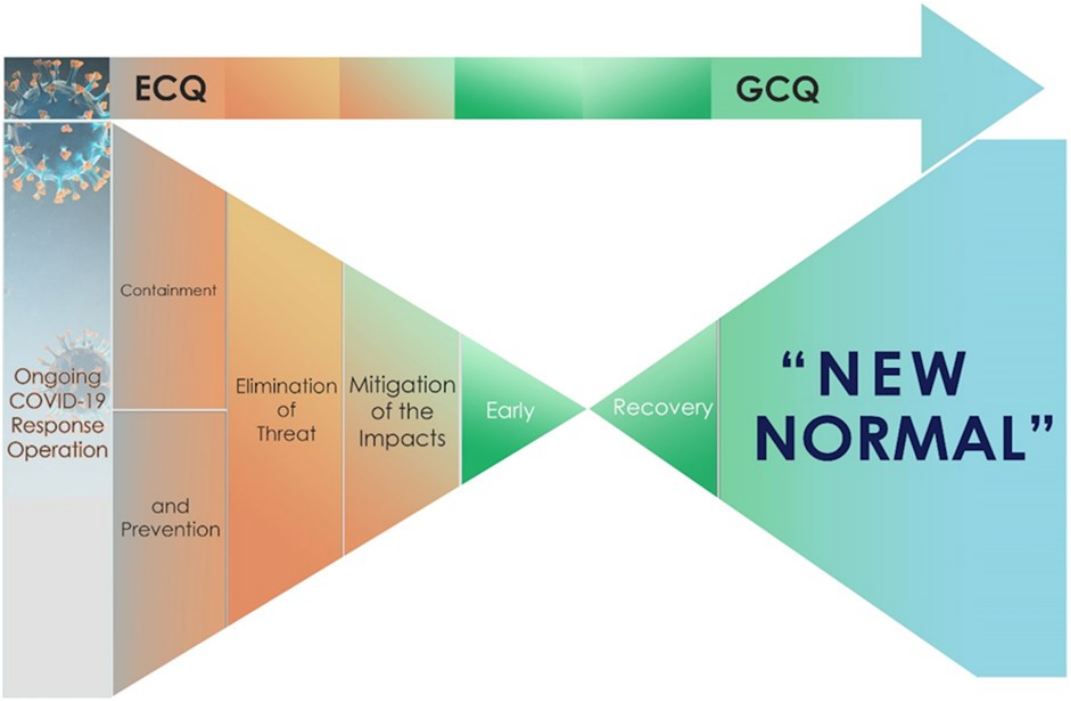
Source: Bataan PDRRM Plan 2020-2024.

Hazard-specific contingency plans were also prepared by the PGB through the PDRRMC. The Contingency Plan for Flood and Earthquake was formulated in 2019 and meant to be used by the government, private sector, NGOs, CSOs, volunteer organizations, and local communities in responding before, during, and after flooding or earthquake. In terms of marine environment, the PGB prepared a Local Oil Spill Contingency Plan in 2013 and a Contingency Plan for and Harmful Algal Bloom in 2021. Efforts to update the former are ongoing. Additionally, the Provincial Veterinary Office developed an African Swine Fever (ASF) Contingency Plan.

In response to the COVID-19 pandemic, the Bataan Inter-Agency Task Force for COVID-19 (IATF) formulated in May 2020 the Provincial Action Plan for COVID-19. This plan consolidated the PPAs of the different provincial departments and national government agencies to ensure the continuing delivery of public services to address the current and future impacts of the pandemic.

The framework for the province's action plan in response to the COVID-19 pandemic adopted five stages, i.e., (1) Containment and Prevention; (2) Elimination of Threat; (3) Mitigation of the Impacts; (4) Early Recovery; and (5) Adaption of "New Normal," and implementing activities from the most restricted Enhanced Community Quarantine (ECQ) and gradually transitioning to the more relaxed General Community Quarantine (GCQ) and the "new normal."

Table 25 lists the clustering of the PPAs in the COVID-19 action plan and the lead agencies for the implementation.



Conceptual framework for the Bataan Provincial Action Plan for COVID-19.

Table 25. Clustering of PPAs listed in the Bataan Provincial Action Plan for COVID-19.

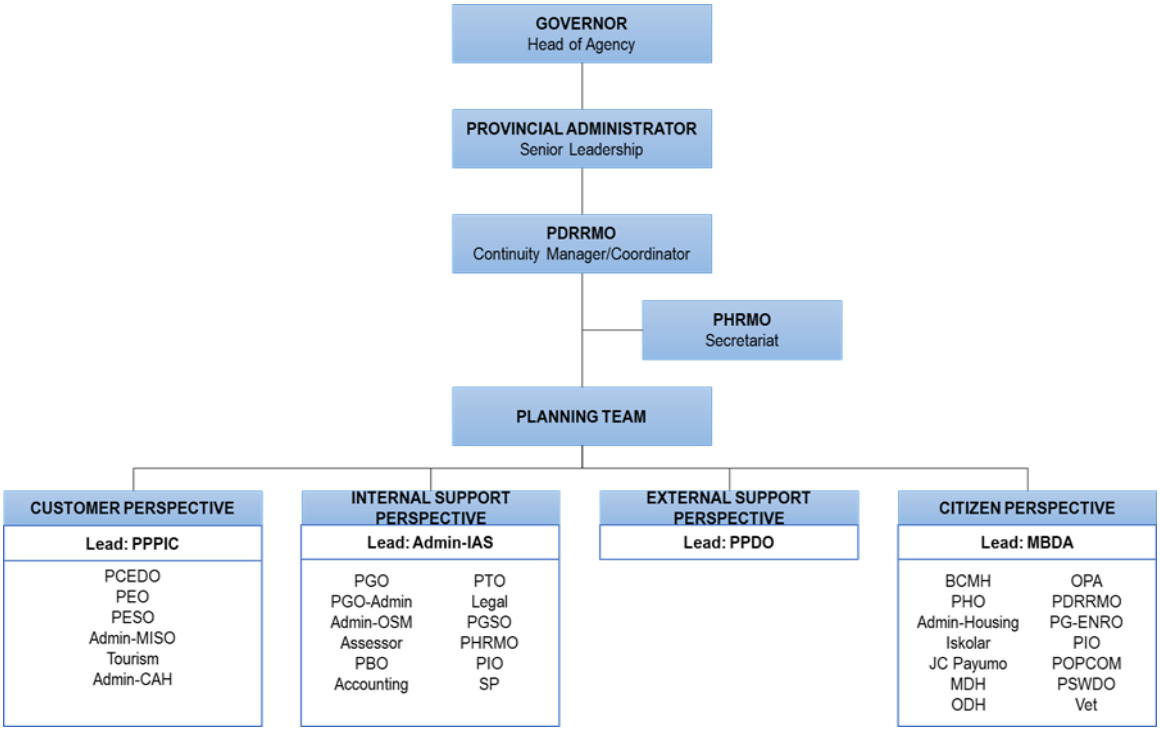
Cluster	Title	Lead
1	Health	PHO, PGO
2	Local Governance	PGO, DILG
3	Law and Order	PNP, MBDA, BFP, PCG, PA
4	Economy	PPPIC, PCEDO
5	Food and Non-Food Items	PGSO, PGO, C/MSWDOs, OPA, Vet
6	Logistics and Supplies	PGSO, PGO
7	Crisis Communication/Communication and Information Management	MIS, PHO, DOH
8	Management of the Dead	PHO, DILG
9	Transportation	PPDO, MBDA
10	Management and Monitoring of Prevention and Control of COVID-19 for Workplace (Private Companies)	DOLE

In compliance with National DRRMC Memorandum Circular No. 57, Series of 2020, the province updated the Contingency Plan for Hydro-Meteorological Hazards integrating Health Standard Protocols against COVID-19. The updated Contingency Plan contains the strategy for providing water, sanitation, and hygiene (WASH) and medical services and facilities to disaster-affected population and evacuees in the province.

The PGB also has its Public Service Continuity Plan (PSCP), which provides operational actions in response to various forms of disruptive incidents and ensuring continuity of operations through the restoration of essential functions.

Figure 15 shows the clustering of the different provincial offices in line with the province's strategy map in ensuring the continued performance of essential functions.

Figure 15. Provincial Continuity Core Team with member PGB offices/departments, Province of Bataan.



Source: Provincial Public Service Continuity Plan 2021.

As of 2021, the province has a total of 159 personnel allocated for disaster response, pursuant to E.O. 171, Series of 2021, otherwise known as “An Order Organizing and Establishing the 1Bataan Emergency Response Teams During Natural or Man-Caused Disaster and Emergencies.” The 1Bataan Emergency Response Teams consist of personnel from the PDRRMO, Capitol Security and Intelligence Unit (CSIU), Metro Bataan Development Authority (MBDA), and the Philippine National Police (PNP) (**Table 26**), which are trained in different search and rescue and response capabilities (**Table 27**).

Table 26. Inventory of disaster response personnel in the Province of Bataan.

Office/Department/ Agency	Number of Staff for Disaster Response
PDRRMO	8
CSIU	2
MBDA – Enforcers	92
MBDA – Medics	14
PNP	43
Total	159

Source: E.O. 171, s. 2021.

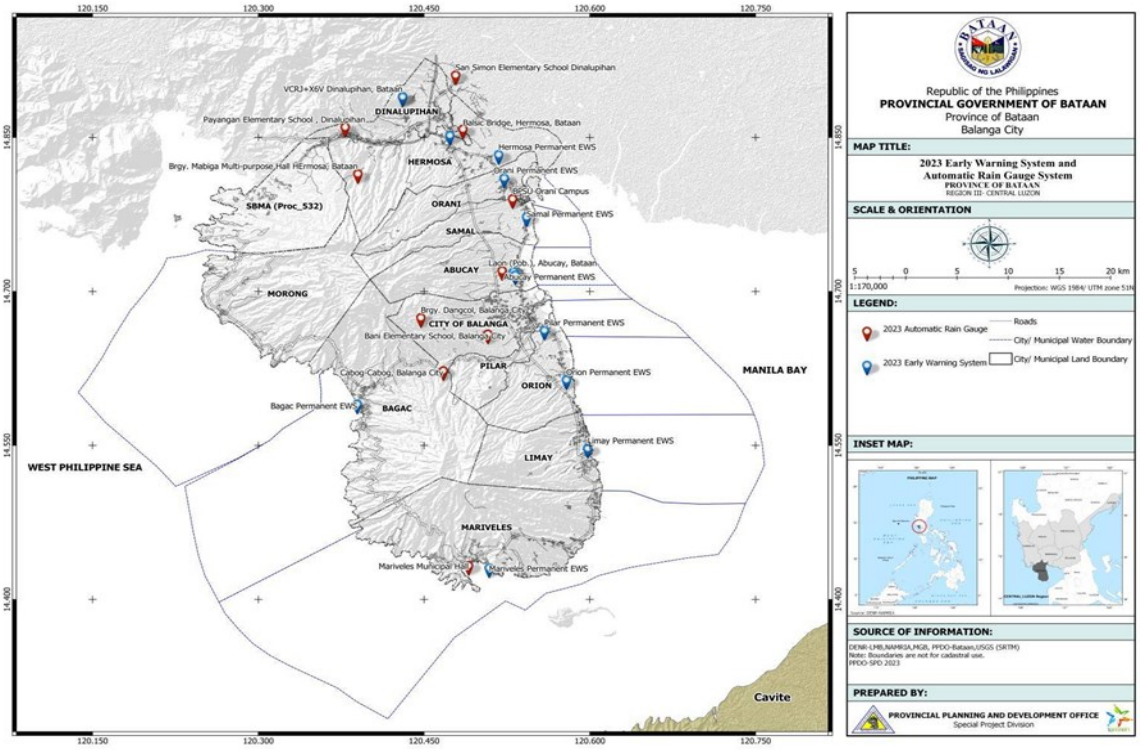
Table 27. List of 1Bataan Search and Rescue and Emergency Response Teams.

Team	Location	Capacity/Capabilities
Water Search and Rescue Team	1Bataan Command Center	WASAR
Medical Team	1Bataan Command Center; Tactical Operation Center	Medical/Patient Transfer/Vehicular Extrication
Safety and Security Team	The Bunker; 1Bataan Command Center	Safety and Security
Collapsed Structure Search and Rescue Team	1Bataan Command Center	Collapsed Structure Search and Rescue (CSSR)

Source: E.O. No. 171, s. 2021

The provincial, municipal, and city governments have installed Early Warning Systems (EWS) for rainfall, flood, and tsunami in hazard-prone areas in the province (**Figure 16**). The PGB has allocated adequate physical resources for disaster response particularly for flooding and collapsed structure search and rescue (CSSR) (**Tables 28-29**).

Figure 16. Location map of Early Warning Systems (EWS) installed by the Provincial Government of Bataan.



Source: PPDO Bataan.

Table 28. List of equipment for CSSR, as of December 2020.

No.	Description	Unit	Quantity
1	Axe – Flat Head	piece	4
2	Bolt Cutter – 24”	piece	4
3	Brick Hammer	piece	4
4	Cadaver Bag	unit	50
5	Crow Bar	piece	8
6	Extension Cords – With 6 Sockets 100 ft.	piece	4
7	Fire Extinguisher (for Vehicle)	unit	10
8	Rescue Gloves	unit	15
9	Goggles	unit	15
10	Hacksaw	piece	4
11	Hammer	piece	4
12	Head Lamp	unit	15
13	Heavy Duty Flashlight	unit	6
14	Rescue Helmet	unit	15
15	Helmet With Ear Protector	unit	30
16	Hoe	piece	4
17	Measuring Tape	piece	4
18	Megaphone	unit	2
19	Pliers 8”	piece	4
20	Raincoat	unit	20
21	Rescue Tactical Uniform	unit	15
22	Rescue Uniform	unit	20
23	Rescue Whistle	unit	15
24	Rope Rescue Gloves	unit	15
25	Rotary Hammer Drill	unit	3
26	Rubber Boots	pair	15
27	Ruler L-Square	piece	4
28	Safety Goggles	unit	15
29	Hand Saw	piece	4
30	Screwdriver Set	piece	2
31	Search Light	unit	3
32	Snips 12”	piece	4
33	Tactical Shoes	unit	15
34	Adjustable Wrench	piece	4
35	Folding Shovel	piece	4
36	Keyhole Saw	piece	4
37	Machete/Bolo	piece	8
38	Pick Mattock	piece	4
39	Pipe Wrench	piece	4
40	Rafter Square	piece	4
41	Sledgehammer	piece	8
42	Wood Chisel	piece	8
43	Vise Grip	piece	4
44	Circular Saw	unit	3
45	Demolition Hammer	unit	3
46	Jigsaw	unit	3
47	Reciprocating Saw	unit	3
48	Rescue Chainsaw	unit	3
49	Rescue Rotary Saw	unit	3
50	Toolbox	unit	2
51	Chainsaw (Concrete Type)	piece	1
52	Extrication Gloves	pair	7
53	Extrication Goggles	piece	4
54	Hard Hat (Yellow)	piece	11
55	Rescue Hydraulic Extrication Equipment	pair	1
56	Emergency Light Tower	piece	1
57	Portable Generator	unit	1
58	Rescue Van	unit	1
59	Rescue Pick-Up	unit	1
60	Ambulance	unit	1

Source: PDRRMO Bataan.

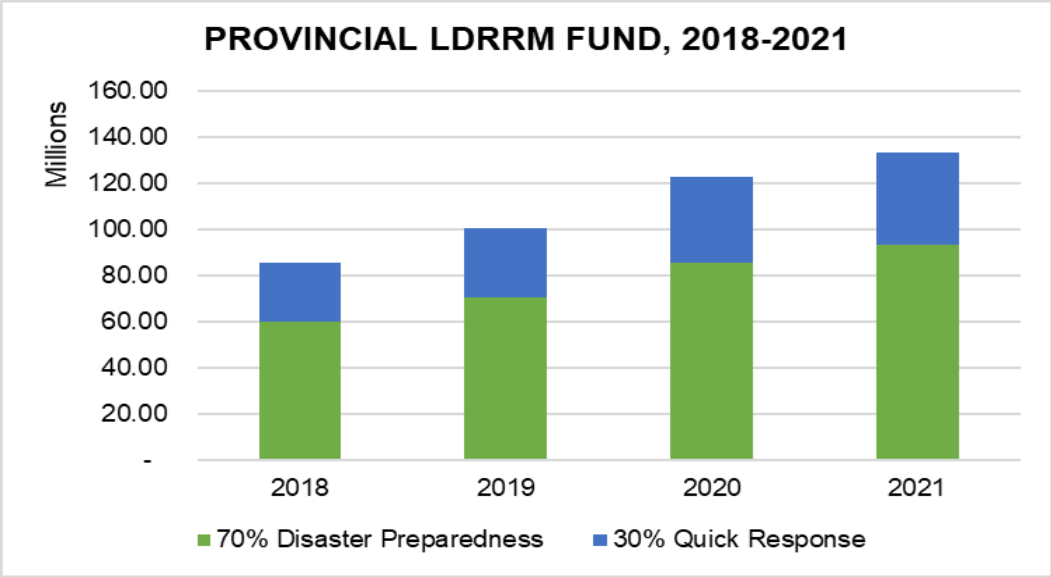
Table 29. List of equipment for flood, as of December 2020.

No.	Description	Unit	Quantity
1	Basket Stretcher	piece	2
2	Binocular	piece	2
3	Flood Lamp	piece	1
4	Hard Hat (Yellow)	piece	11
5	Life Vest (Blue)	piece	10
6	Life Vest (Light Blue)	piece	6
7	Life Vest (Red)	piece	4
8	Life Vest (Orange)	piece	16
9	Life Vest (D. Orange)	piece	15
10	Life Vest (Ordinary)	piece	5
11	Chainsaw	piece	1
12	Extrication Gloves	pair	7
13	Extrication Goggles	piece	4
14	Portable Oxygen Tank	piece	2
15	Paddle Boat	piece	21
16	Petzl Helmet	piece	6
17	Emergency Light Tower	piece	1
18	Portable Generator	unit	1
19	Rescue Can	piece	2
20	Ring Buoy	piece	12
21	Throw Bag	piece	14
22	Trauma Bag	piece	1
23	Wet Suit	piece	5
24	Rescue Tube	piece	2
25	AED	piece	1
26	Rigid Hull Fiber Boat	unit	2
27	Rubber Boat	unit	2
28	Rescue Van	unit	1
29	Rescue Pick-Up	unit	1
30	Ambulance	unit	1
31	Attack Shoes	pair	15
32	Life Vest (New)	unit	15
33	Rash Guard	unit	15
34	Raincoat	unit	20
35	Rescue Can (New)	unit	3
36	Throw Bags (New)	unit	5
37	Water Floatation Rescue Rope	roll	5
38	Wet Suit (New)	unit	15
39	Rescue Whistle	unit	15
40	Head Lamp	unit	15
41	Heavy Duty Flashlight	unit	6
42	Search Light	unit	3

Source: PDRRMO Bataan.

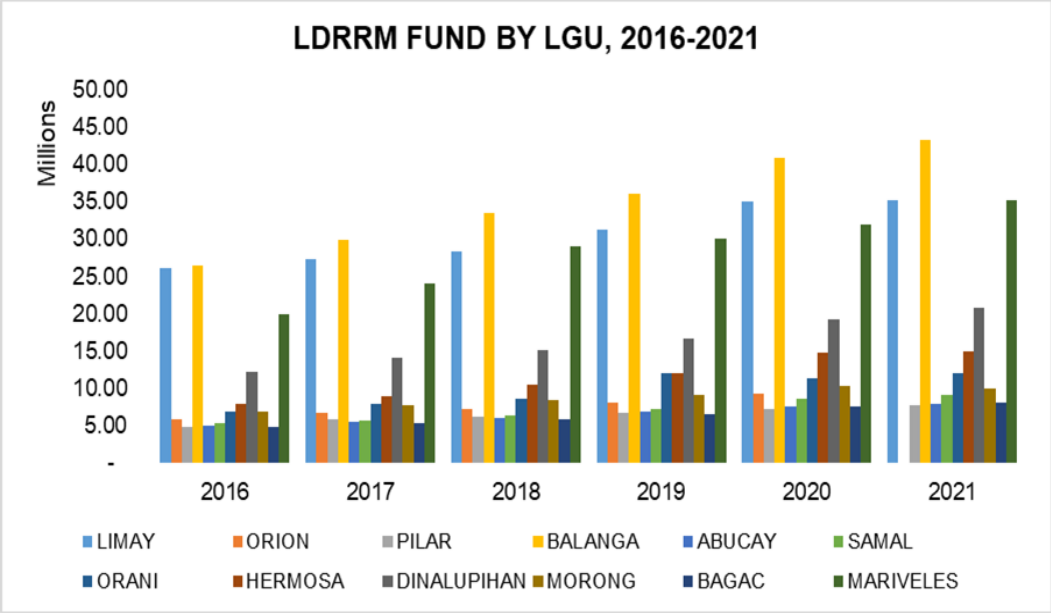
The provincial, municipal, and city LGUs have annual budget allocations for disaster risk reduction and management through the 5% Local Disaster Risk Reduction and Management Fund (LDRRMF). Similar with the 20% Development Fund allocated for the LGU's priority development projects, the 5% LDRRMF is a mandatory special-use appropriation for LGUs. For the province, the LDRRMF allocation increased from around Php 85M in 2018 to about Php 133.5M in 2021. High-income LGUs allocate as much as Php 35M annually for disaster preparedness and response while other municipalities have annual allocation ranging from about Php 5M to Php 15M (**Figures 17-18**).

Figure 17. LDRRM Fund of the Province of Bataan, 2018 to 2021.



Source: PDRRMO Bataan.

Figure 18. LDRRM Fund by LGU by year, 2016 to 2021.



Source: Provincial Budget Office.

Implications and Recommendations

Bataan is normally in the path of typhoon and tropical depressions, and experiences few geologic events, hence the need to strategically prepare and plan to effectively respond to various types of disasters. The province, municipalities, and city are continually implementing their respective DRRM Plans and ensuring that the plans are reviewed and updated every five (5) years.

The province also developed the Contingency Plans for Flood, Earthquake, and Hydro-Meteorological Hazards, the PSCP and the Provincial Action Plan for COVID-19 to anticipate, reduce, respond, and recover from various hazards/disasters.

References

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R.A. 10121.

Natural and Man-Made Hazard Prevention and Management

016 Degree of vulnerability to disasters

Description

This indicator measures the degree to which populations are at risk of exposure to natural and man-made hazards, i.e., populations living within various multi-hazard zones.

Rationale

The greater the degree of potential exposure to natural and man-made hazards, the more that government and local communities should be prepared and must put in place mitigation for disasters. Identification of the levels of threat from various hazards can also help focus preparations on the most relevant types of threat.

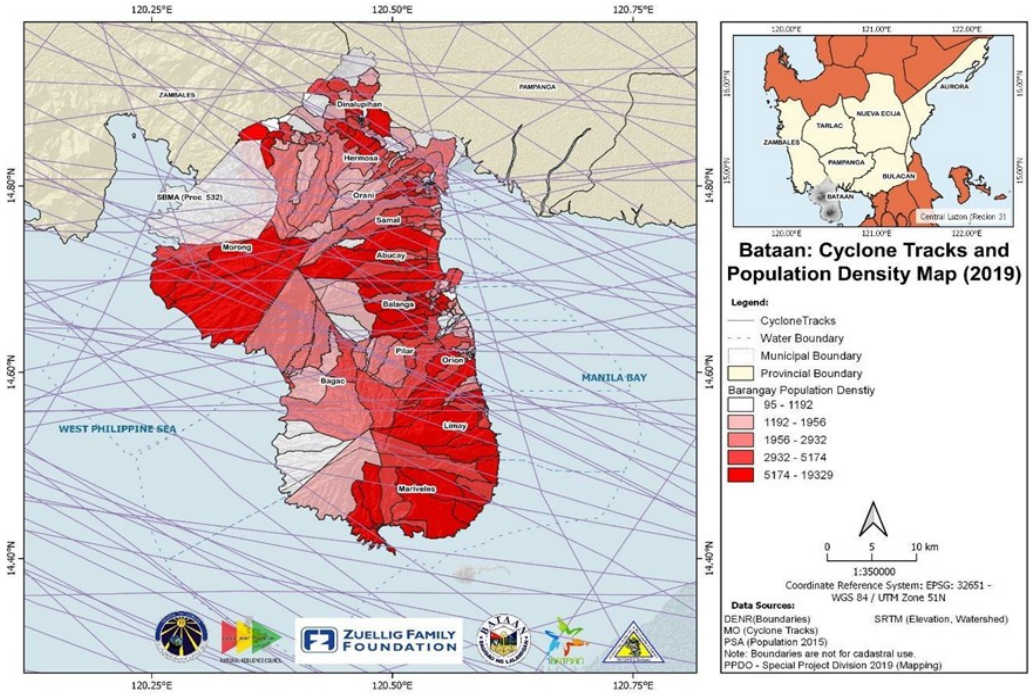
Data Requirements

- Availability of multi-hazard (landslides, storms, floods, etc.) map
- Number of people located in hazard prone areas
- Number of people relocated or moved away from hazard prone areas

Results

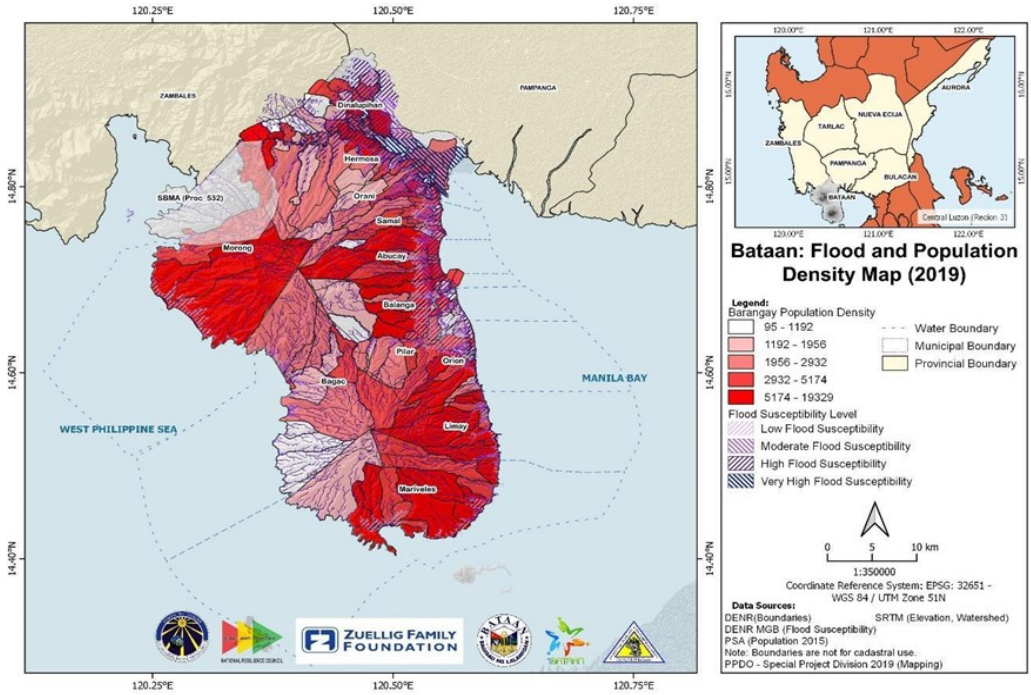
In 2019, the province developed hazard maps that were used in the preparation of the Provincial DRRM Plan and the Climate and Disaster Risk Assessment (CDRA) with assistance from the National Resilience Council (NRC) and the Manila Observatory.

Figure 19. Hazard map for tropical cyclone, Province of Bataan, 2019.



Source: PDRRMO Bataan/PPDO Bataan.

Figure 20. Hazard map for flooding, Province of Bataan, 2019.



Source: PDRRMO Bataan/PPDO Bataan.

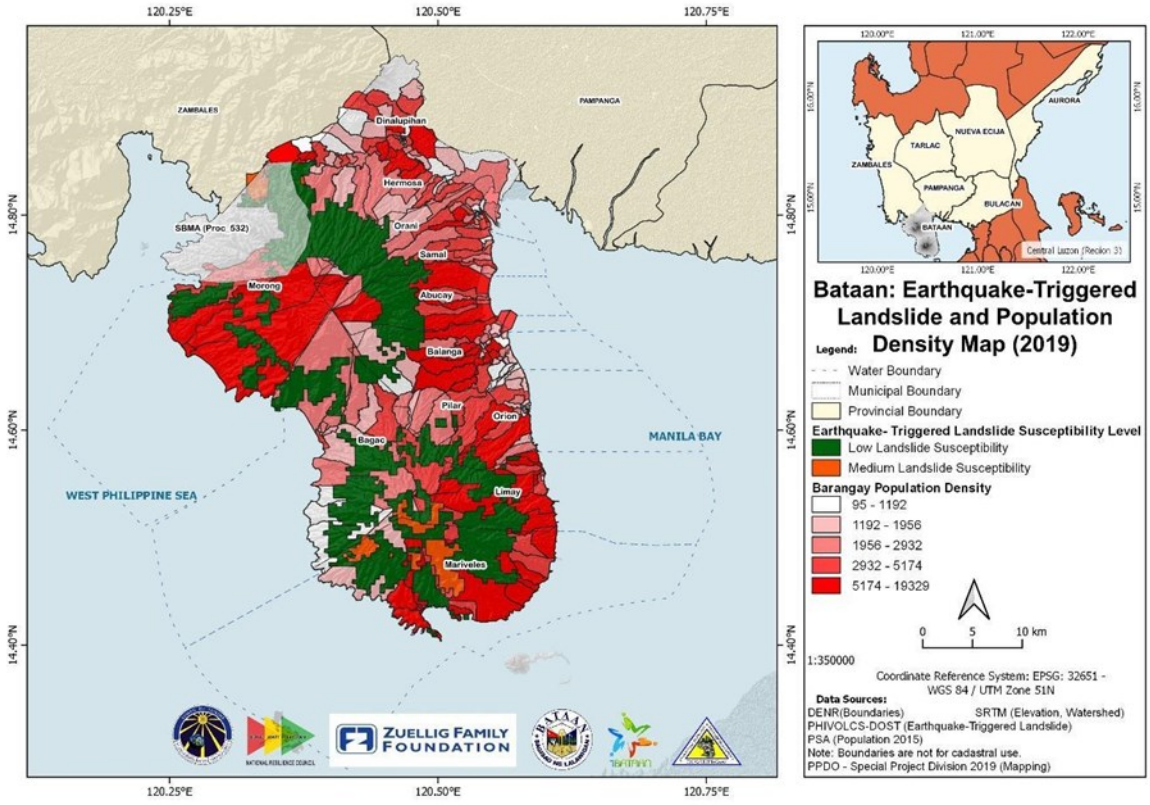
As shown in **Figure 19**, Bataan is one of the many provinces in the Philippines that is in the path of typhoons, tropical storms, and tropical depressions. In recent years, several weather disturbances caused major losses in terms of human lives and damage to properties and infrastructures.

Tropical Depression "Josie" (July 22, 2018) and Typhoon Fabian (July 16-24, 2021) were two of the recent hazard events that triggered flooding in Bataan.

At times, flash floods also occur in the province during consecutive days of monsoon rains (Habagat) followed by even a weak weather system. While Bataan is not often hit directly by strong tropical typhoons, the geography of the province comprising of numerous rivers and streams and long stretches of low-lying coastal areas renders it susceptible to flooding particularly in the northeastern portion (**Figure 20**).

Landslides frequently happen in the mountainous areas of Mt. Natib and Mt. Mariveles (**Figure 21**) affecting indigenous communities and road infrastructures. Landslide occurrences were associated with extreme rainfall and earthquakes. The landslide incident in Bataan on July 24, 2021 happened after consecutive days of rains followed by a magnitude 6.6 earthquake with epicenter in Calatagan, Batangas, a municipality located south of Metro Manila.

Figure 21. Hazard map for landslide, Province of Bataan, 2019.



Source: PDRRMO Bataan/PPDO Bataan.

Based on the estimates of the PDRRMO, a total of 464,124 persons or 93,224 families will be affected during a flooding incidence (**Table 30**). The estimates also show that affected population during earthquake incidence will be about 760,650 persons or 152,129 families (**Table 30**).

Table 30. Affected population by hazard and LGU, Province of Bataan.

Affected Area	No. of Affected Population						Characteristics
	Flooding		Assumptions	Earthquake		Assumptions	
	Family	Persons	(Why they were affected/ displaced/ evacuated)	Family	Persons	(Why they were affected/ displaced/ evacuated)	
Abucay	7,837	39,185	Coastal area	7,976	39,880	Affected by ground shaking	Women, Children, Senior Citizens, Vendors, Entrepreneurs, Foreign and Local Tourists, Professionals, IPs, etc.
Bagac	1,609	8,048	Coastal area	5,387	26,936	Affected by ground shaking	
Balanga City	11,479	57,395	Low lying area; riverside	19,212	96,061	Affected by ground shaking	
Dinalupihan	12,830	64,152	Low lying area	21,274	106,371	Affected by ground shaking	
Hermosa	7,936	39,681	Low lying area; riverside	13,172	65,862	Affected by ground shaking	
Limay	12,578	62,893	Low lying area; coastal area	13,614	68,071	Affected by ground shaking	
Mariveles	13,083	65,416	Low lying area; coastal area	25,507	127,536	Affected by ground shaking	
Morong	4,739	23,694	Coastal area	5,980	29,901	Affected by ground shaking	
Orani	7,110	35,551	Low lying area; riverside	13,382	66,909	Affected by ground shaking	
Orion	6,401	32,005	Low lying area	11,200	56,002	Affected by ground shaking	
Pilar	3,152	13,754	Low lying area; coastal area	8,365	41,823	Affected by ground shaking	
Samal	4,470	22,350	Low lying area; coastal area	7,060	35,298	Affected by ground shaking	
Total	**93,224**	**464,124**		**152,129**	**760,650**		

Source: PDRRMO Bataan.

As of 2021,13 housing projects were funded by the National Housing Authority (NHA) and implemented by the PGB and its component LGUs for the relocation/resettlement of low-income and/or informal settler families located in hazard-prone areas. Four (4) of the housing projects have started construction and accommodation of resettled/relocated families (**Table 31**). The relocation of a total of 975 families that were affected by a fire in 2019 from *Sitio* Depensa in Brgy. Capunitan, Orion, Bataan already commenced. The province was able to avail of the funding assistance from the NHA through the conduct of inventory of families/ households and subsequent formulation of local shelter plans by the respective municipalities and city.

Table 31. List of NHA housing projects in the Province of Bataan.

No.	Name of Project / Location	No. of Generated Units	Total Project Cost (PHP)	Work Progress	Remarks
1	Hermosa Ville Housing Brgy. Mabuco, Hermosa	1230	295,200,000.00	-	Completed/ continuous monitoring/for disposition of remaining lots/for turn-over to LGU
2	Hermosa Heights Brgy. Mabuco, Hermosa	498	119,520,000.00	-	
3	Dinalupihan Heights Dinalupihan	500	120,000,000.00	-	
4	1Bataan Village- Orion, Phase 1 Brgy. Daan Pare, Orion	216	240,000,000.00	100% occupied as of 2023	Completed
5	Mariveles Heights Brgy. Cabcaben, Mariveles	975	521,286,675.00	99.85% completed as of July 2021	Ongoing/ continuous monitoring
6	1Bataan Village-Balanga City (LRB) Brgy. Cataning & Brgy. Tenejero, Balanga City	216	259,998,000.00	99% completed as of 2023	
7	Mt. Samat Ville Brgy. Cataning, Balanga City	83	986,938,000.00	78% complete as of 2023	
8	Abucay Resettlement Project Brgy. Gabon, Abucay	115	10,000,000.00	-	Completed/ continuous monitoring/for turn-over to LGU
9	Balanga Resettlement, Phase I Brgy. Tenejero, Balanga City	150	12,000,000.00	-	
10	Balanga Resettlement, Phase II (Land Development) Brgy. Tenejero, Balanga City	122	5,268,000.00	-	
11	Orani Resettlement Brgy. Mulawin, Orani	133	12,000,000.00	-	
12	Orion Resettlement Brgy. Daan Pare, Orion	150	12,000,000.00	-	
13	Samal Resettlement Brgy. Imelda, Samal	146	12,000,000.00	-	

Source: Bataan Housing and Settlement Office.

Implications and Recommendations

Over the past years, Bataan Province has been frequented by floods, landslides, and storm surges. The occasional earthquake occurrence also indicates that stronger earthquake might happen anytime. Disaster preparedness and action plan in response to these hazards are therefore imperative. The multi-hazard maps developed for the province and subsequently used in the formulation of the Provincial DRRM Plan and the Climate and Disaster Risk Assessment (CDRA) were necessary to prevent and mitigate the effects of natural disasters. The implementation of these plans coupled with good governance, risk assessment and early warning, knowledge building, and awareness raising, reducing underlying risk factors and preparedness for effective response and early recovery ensures that the occurrence of natural and man-made disasters will have minimal, if not totally avoided, socioeconomic impacts on the province.

References

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017 Social and economic losses due to disasters

Description

This indicator measures the population affected, deaths and economic losses due to each type of disaster (including the severity of the cause of disaster). It is a measure that integrates: (a) the level and location of hazards vis-à-vis populations; and (b) the level of preparedness and response mechanisms that result in the frequency and severity of actual disasters.

Rationale

Disasters set back development and especially impact those least developed. The number of deaths, people and property affected are what hazard prevention and management ultimately aims to reduce.

Data Requirements

- Frequency of disaster incidents by type
- Number of people severely affected by natural/man-made disaster incidents
- Number of people that have died due to natural/man-made disaster incidents
- Total amount of economic losses due to natural/man-made disaster incidents

Results

Situational Reports of the PDRRMO show that from 2019 to 2021, the province was mostly affected by the Southwest Monsoon or *Habagat* and Tropical Storm, with four (4) incidents during the reporting period (**Table 32**). The province was also affected by Typhoon (three incidents) and Tropical Cyclone (one incident). From November to December 2021, the occurrence of Paralytic Shellfish Poisoning (PSP) or Red Tide in the coastal waters of Bataan was reported affecting a total of 898 individuals working in the shellfish/acetes/*alamang* industry. Regular monsoon rains typically leave zero or minimal damages/losses of lives and properties. However, social and economic losses are higher during southwest monsoons enhanced by weather systems (e.g., typhoon) due to flooding and at times, strong winds. During severe weather events, thousands of families were affected and subsequently evacuated, and tens to hundreds of million pesos of losses in agriculture and infrastructure were recorded by the PDRRMO and PDRRMC agencies (**Table 32**).

Table 32. Social and economic losses due to disasters in Bataan, 2019-2021.

Disaster Incident	Date Occurred/ Period Covered	Social Losses		Economic Losses	
		Affected Population	Casualties	Damage to Agriculture, Fisheries and Livestock	Damage to Infrastructure
Tropical Storm "Falcon"	July 18, 2019 to July 19, 2019	20 Families / 100 Individuals	0		
Southwest Monsoon (Habagat) / Severe Tropical Storm "Hanna"	August 2, 2019 to August 7, 2019	7,563 Families / 31,769 Individuals	0		42 houses partially damaged 3 houses totally damaged
Tropical Storm "Jenny" (Podul)	August 24, 2019 to August 28, 2019	0	0		
Southwest Monsoon (Habagat)	August 28, 2019 to September 1, 2019	0	0		
Typhoon "Tisoy"	December 2, 2019 to December 9, 2019	653 Families / 2,866 Individuals	0		
Typhoon "Ambo"	May 14, 2020 to May 17, 2020	0	0		
Tropical Cyclone "Butchoy"	June 13, 2020	0	0		
Typhoon "Ulysses"	November 11, 2020 to November 19, 2020	1,562 Families / 6,438 Individuals	0	₱100,105,375.35	3 government-owned structures partially damaged 1 health facility partially damaged 24 schools partially damaged 30 houses partially damaged 3 houses totally damaged 1 church partially damaged
Tropical Storm "Dante"	June 2, 2021 to June 5, 2021	35 Families / 144 Individuals	0	₱10,804,570.00	3
Southwest Monsoon (Habagat) Enhanced by Typhoon "Fabian"	July 20, 2021 to August 19, 2021	69,103 Families / 141,969 Individuals	0	₱145,124,669.90	₱403,200,000.00
Tropical Storm "Jolina"	September 8, 2021 to September 12, 2022	119 Families / 438 Individuals	0	₱8,317,900.00	₱0.00
Southwest Monsoon (Habagat) Enhanced by Typhoon "Kiko"	September 12, 2021 to September 14, 2022	1 Family / 3 Individuals	0	₱2,022,567.00	₱0.00
Paralytic Shellfish Poison (PSP) or Red Tide	November 9, 2021 to December 11, 2021	Zero case of Paralytic Shellfish Poisoning	0	507 affected shellfish growers/ workers/gatherers/ traders/processors 391 affected acetes/alamang gatherers/traders/ processors	

Source: PDRRMO Bataan.

Implications and Recommendations

Through the years, the province incurred social and economic losses due to incidences of natural and man-made disasters. The province has instituted mechanisms to increase its capacity to adapt, reduce the risk, and better respond to the different types of hazards including the preparation, adoption, and implementation of disaster management and contingency plans, as well as climate adaptation plans.

The effective implementation of these plans should translate to the significant decline in social and economic losses brought about by disaster incidence. However, time series data on social and economic losses through time are not available during the preparation of this report, and thus evaluating and reporting on impacts of the implementation of disaster preparedness and response and contingency plans are not possible. Systematic monitoring and reporting on the impacts of disasters are necessary to ensure that plans and other disaster management and response efforts are evaluated, adapted, and responsive.

References

PDRRMO. Situational Reports 2019-2021.
PDRRMO. Social and economic losses due to disasters in Bataan.

Rescue equipment for flood.

Habitat Protection, Restoration and Management

018 Habitat management plan and implementation

Description

This indicator measures the availability of plans, people, and budget to manage coastal habitats and heritage.

Rationale

Coastal habitats serve as critical life-support systems for a multitude of aquatic living resources. The quality of these habitats must be maintained and improved to sustain their benefits. Local governments need to identify specific strategies and action plans for habitats and the means to implement these action plans indicate the degree to which habitats will be effectively managed.

Data Requirements

- Availability of habitat management plan
- Staff and budget allocation for habitat management

Results

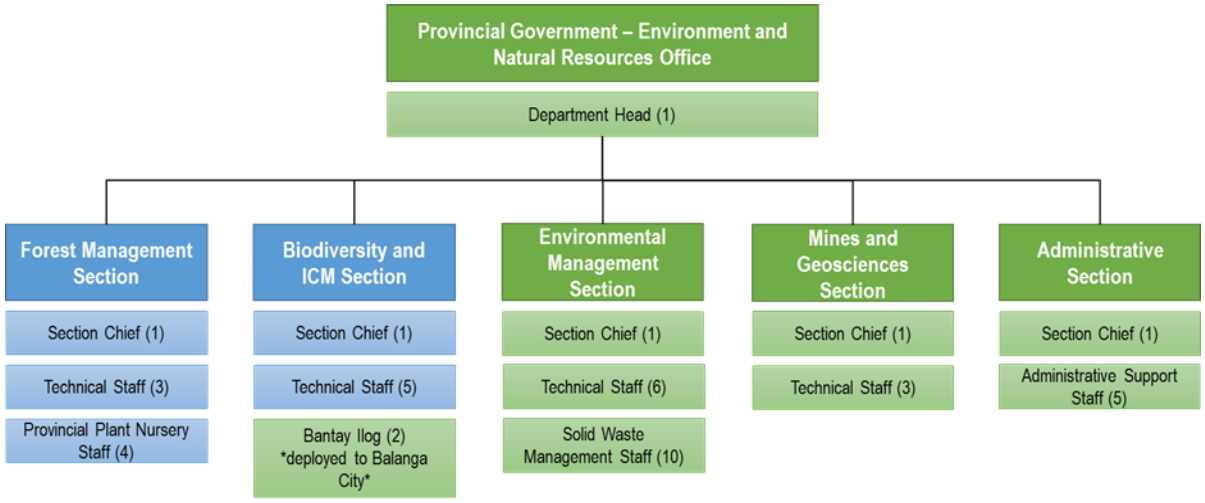
Except Dinalupihan, the LGUs have developed their Coastal Resource Management Plans (CRMPs) with technical assistance from BFAR. The CRMPs identify strategies for conservation and enrichment of coastal resources and habitats including mangroves, seagrass beds, and coral reefs. All of the LGUs except Hermosa have also prepared their Forest Land Use Plans (FLUPs), with assistance from DENR. The FLUPs identify management zones, e.g., protection or production zones for forestlands within the city/ municipalities. At the provincial level, the Provincial Integrated Coastal Resource Management (ICRM) Plan and the Bataan Forest Management Plan (BFMP) have been prepared, consolidating the city and municipal level CRMPs and FLUPs, respectively. Once approved and adopted, the Provincial ICRM Plan and the BFMP will guide the overall management and protection of coastal and upland habitats in the province.

The DENR through the Protected Area Management Board (PAMB) and the Protected Area Management Office (PAMO) also updated the Management Plans for the two protected areas in the province, namely the Bataan Natural Park (BNP) and Roosevelt Protected Landscape (RPLS), to address the different issues and concerns in the protected areas, including human encroachment, small-scale logging, and *kaingin* or swidden agriculture.

DENR also formulated in 2018 the Foreshore Development and Management Plan of Bataan Province (FDMP) 2018-2027 that provided the framework and strategies for management of the foreshore areas in the province.

Figure 22 shows the organizational structure for habitat management in the province including the number of allocated staff. PG-ENRO leads the implementation of habitat management programs (e.g., forestation/greening program, mangrove development, *pawikan* (marine turtle) conservation, etc.) particularly, the Forest Management and Biodiversity and ICM Sections.

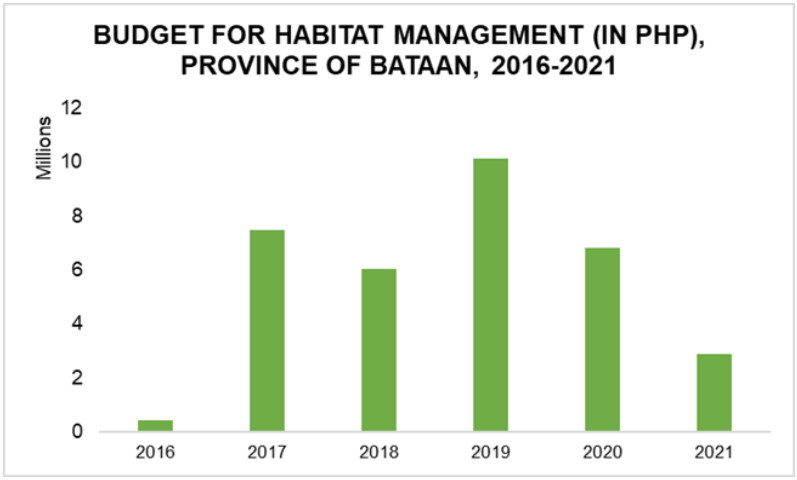
Figure 22. Organizational structure of PG-ENRO Bataan as of 2021.



Note: Blue color indicates staff allocated for habitat management.

The province allocates corresponding annual budget for PPAs on habitat management, including the greening program, campaign against illegal fishing and illegal logging, *pawikan* conservation, assistance to municipal/city LGUs in the establishment of marine protected area (MPA), coastal resource assessment, support to community-based forest management (CBFM), and maintenance of provincial plant nursery. The annual budget allocation ranged from Php 430,000.00 to about Php 10M for the period 2016 -2021 (**Figure 23**). The funding allocations were sourced from the province's General Fund and the 20% Development Fund of the Provincial Governor's Office and PG-ENRO (**Figure 23**).

Figure 23. Budget of the Provincial Government of Bataan for habitat management, 2016-2021.



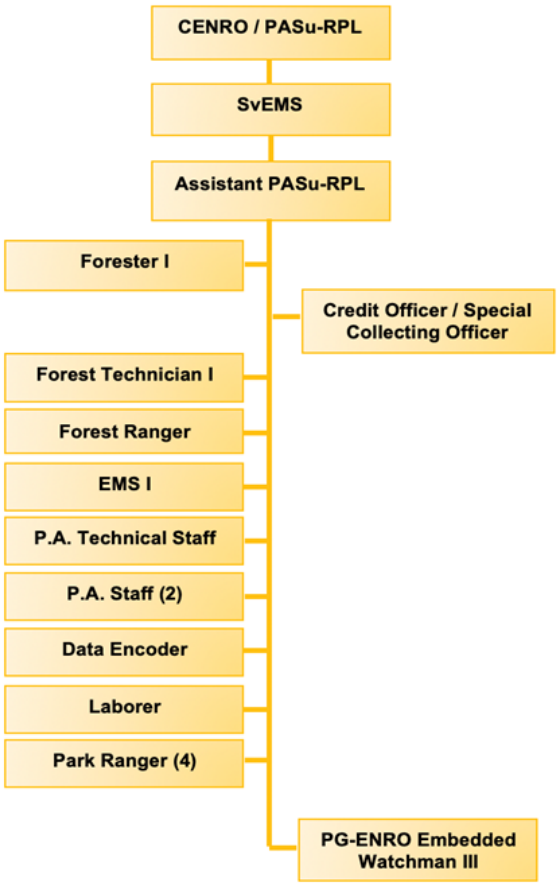
Source: Provincial Budget Office.

The two protected areas in the province (BNP and RPLS) have designated PAMOs with corresponding staff and budget allocation (**Figures 24-26**) for park operations and protected area management. The operational budget of the PAMOs comes from the General Appropriations Act (GAA) budget of DENR and collected fees from park users. The Provincial Government of Bataan represented by the Governor is an ex-officio member of PAMB both for RPLS and BNP and is involved in the decision-making process of the management of the protected areas. Relevant decisions of the PAMB are issued as resolutions and as agreed upon by member and approved by the PAMB Chairperson, i.e., the DENR Regional Executive Director.

The resolutions may include endorsements for a Gratuitous Permit, No Objection Certificates, Tree Cutting, developments within the Multiple-Use Zone of the protected area, etc.

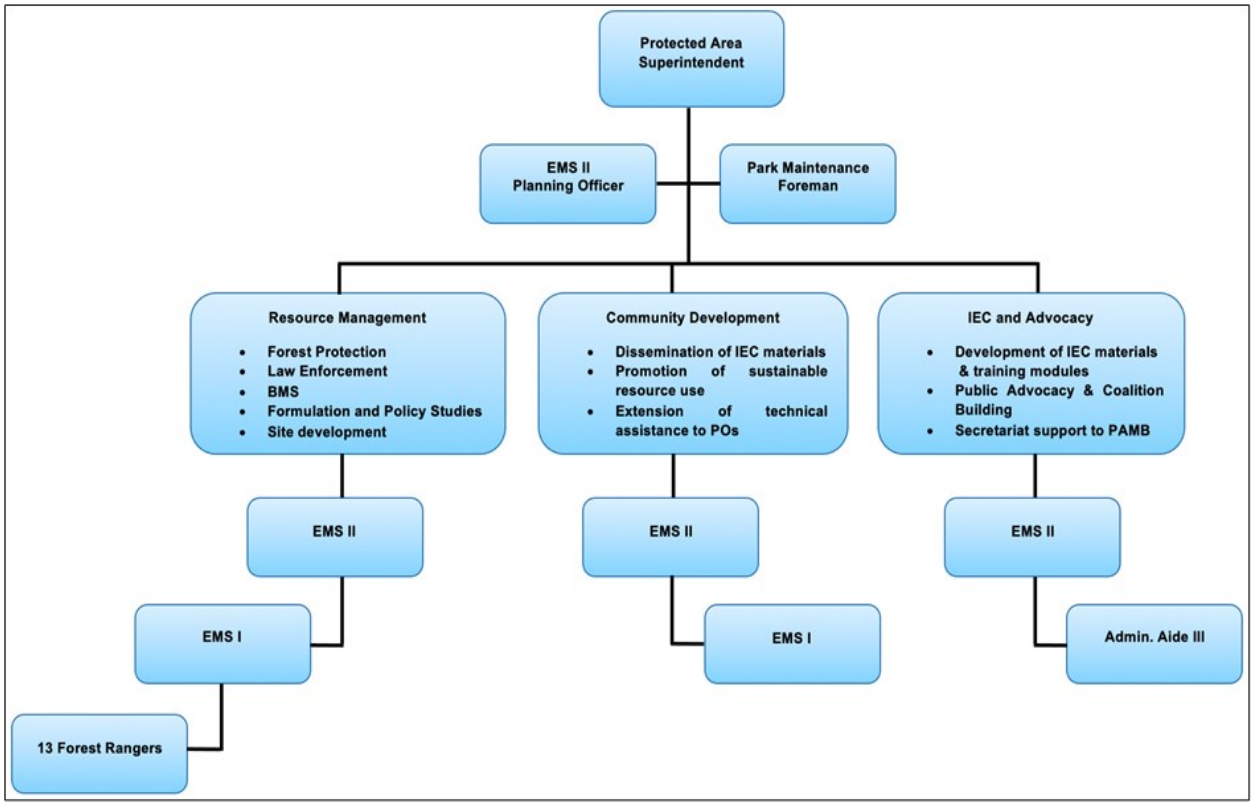
For the city and municipal LGUs, the staff allocated for environmental programs and services (e.g., pollution and waste management) also perform the functions related to habitat management. The LGUs fund their habitat management initiatives (e.g., tree planting, coastal resources management, mangrove planting, etc.) through the annual appropriations under the General Fund or the 20% Development Fund.

Figure 24. Current organizational structure of PAMO of Roosevelt Protected Landscape.



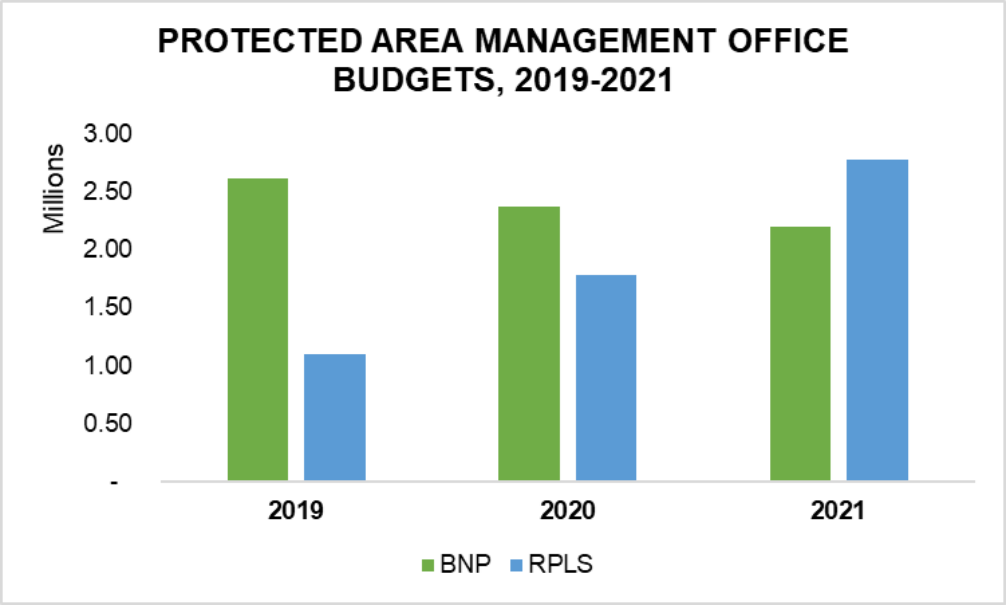
Source: DENR-CENRO Dinalupihan.

Figure 25. Current organizational structure of PAMO of Bataan Natural Park.



Source: DENR-PENRO Bataan.

Figure 26. Annual budget for operationalization of PAMO of BNP and RPLS, Bataan.



Source: DENR-PENRO Bataan.

Implications and Recommendations

Since 2015, a number of Habitat Management Plans have been developed and adopted by the city, municipal and provincial LGUs including the CRMPs, FLUPs, BFMP, among others, to guide the implementation of short- and medium-term priority actions for habitat protection, restoration, and management.

It is important to regularly monitor, evaluate, and report on the progress of implementing these plans to ensure that the goals and targets set in the plans are achieved, as well as updated and refined in response to new developments and emerging concerns.

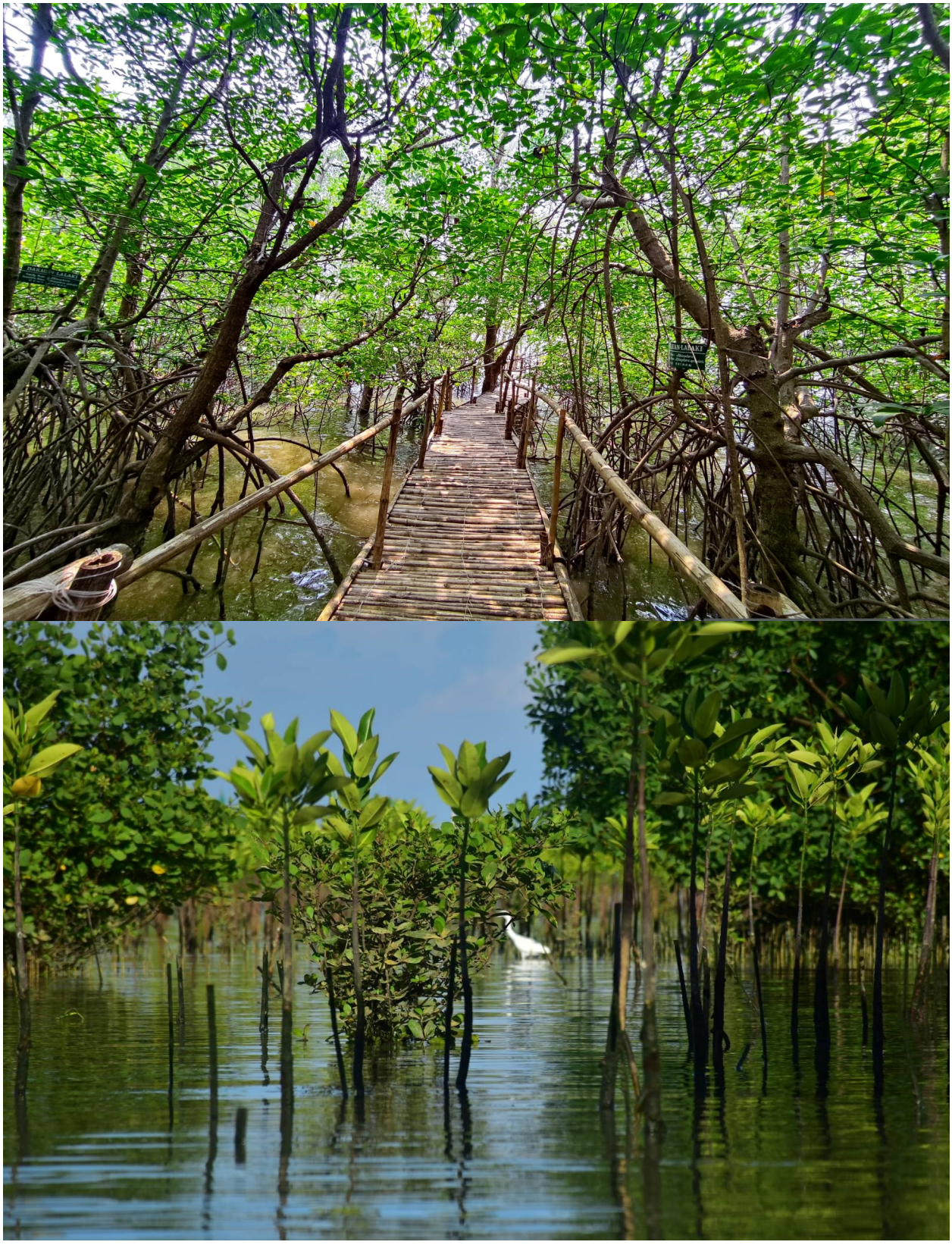
References

Community Environment and Natural Resources Office (CENRO) Dinalupihan. Organizational Structure of Protected Area Management Office (PAMO) of Roosevelt Protected Landscape (RPLS).

DENR-PENRO. Annual budget for operationalization of PAMO of the Bataan Natural Park (BNP) and Roosevelt Protected Landscape (RPLS).

DENR-PENRO. Organizational Structure of PAMO of BNP.

Provincial Budget Office. Budget of the Provincial Government of Bataan for habitat management.



Boardwalk at the Mangrove Eco-Park in Daan Pare, Orion and Bakawan (Rhizophora sp.) plantation in Kabalutan, Orani.

019 Areal extent of habitats

Description

This indicator measures the area of various natural habitats (coral reefs, seagrass beds, mangrove forests, beaches, forests, urban green areas)

Rationale

Natural habitats and associated species help sustain products and services that support and benefit human activities. The extent and condition of various habitats also indicate the populations of associated species.

Data Requirements

- Total area (km^2) of coastal habitats (coral reef, seagrass, mangrove, natural beach, forest (excluding mangroves), urban "green" areas)

Results

Data from the Forest Land Use Plans (FLUPs) and Comprehensive Land Use Plans (CLUPs) of the city/municipalities, as well as from DENR Bataan and PPDO show that forest lands cover 570.89 km^2 or about 42% of the province's total land area (**Table 33**).

Table 33. Total area (km^2) of forestland by city/municipality and by type, Province of Bataan.

LGU	Forestland (km^2)				
			Reservations		
	Timberland	Protected Area	Forest/ Watershed	Civil	Total
Abucay	16.25	11.66	-	-	27.91
Bagac	71.30	33.74	34.30	2.09	141.43
Balanga City	20.44	-	-	-	20.44
Dinalupihan	14.87	4.67	-	-	19.54
Hermosa	-	29.80	-	-	29.80
Limay	37.57	-	-	-	37.57
Mariveles	55.77	-	3.24	14.59	73.60
Morong	1.13	71.76	98.87	1.65	173.41
Orani	-	13.96	-	-	13.96
Orion	9.13	-	-	-	9.13
Pilar	-	13.95	-	-	13.95
Samal	-	10.16	-	-	10.16
Total	226.46	189.70	136.41	18.33	570.90

Sources: PPDO Bataan; city and municipal FLUPs.

Of the total forest land area, 189.69 km^2 are protected and part of the Bataan Natural Park (BNP), covering the municipalities of Abucay, Bagac, Hermosa, Morong, Orani, Pilar, Samal, and the Roosevelt Protected Landscape (RPLS) located in the municipality of Dinalupihan. The BNP covers residual old-growth forests and is home to some endangered species of flora and fauna (i.e., Luzon Water Redstart, Long-tailed Macaque, Giant Golden-crowned Fruit Bat, Philippine Eagle-Owl, Hanging Parrot, etc).

Based on the BNP Management Plan, some parts of the protected area are continuously threatened by rapid urbanization, industrialization, land conversion, and other illegal activities. The RPLS is also home to diverse floras and faunas but is threatened by the encroachment of growing population and untenured migrants within and outside the borders of the protected landscape. The Protected Area Management Boards (PAMBs) are exerting efforts to strengthen the protection and conservation of the two (2) protected areas. Plans and initiatives are tackled during quarterly PAMB meetings, as well as issues and evaluation of applications of various permits/ tenurial instruments within the protected area. All management decisions of the Board are translated into Resolutions that are approved by the DENR Regional Director and enforced by the PAMO.

The PAMB implements the zoning of the PAs and their corresponding regulations i.e., no developments within the Strict Protection Zone (SPZ); and permitted/tenured developments/ land uses within the Multiple Use Zone (MUZ).

About 226.45 km^2 of forestlands in the province are classified as timberland, and part of production lands. Utilization of these forestlands is subject to various tenurial instruments issued by the DENR, such as the Community Based Forest Management Agreement (CBFMA), Integrated Forest Management Agreement (IFMA), Socialized Industrial Forest Management Agreement (SIFMA), Forest Land

Grazing Management Agreement (FLGMA), Forest Land Use Agreement (FLAg), Forest Land Use Agreement for Tourism (FLAgT), and Special Land Use Permit (SLUP). The lists and locations of the CBFMA and timberland tenurial instruments in Bataan are given in **Tables 34-35** and **Figures 27-28**, respectively.

Table 34. List of Community-Based Forest Management Agreements (CBFMA) in Bataan.

City/ Municipality	Barangay	People's Organization (PO)	Area (km^2)
Dinalupihan	Maligaya	Mt. View Upland Farmers Association, Inc. (MVUFA)	4.53
Limay	Duale & Reformista	*Samahang Magsasaka sa Kagubatan ng* Limay, Bataan, Inc. (SAMASAKA)	4.58
Dinalupihan	Pita	Pita Upland Farmers Multi-Purpose Coop. (PUFMPC)	0.27
Abucay	Mabatang	*Kinikilalang Mangingisda ng* Mabatang, Inc. (KIMAMA)	0.09
Limay	Alangan	*Kabarangay* Alangan *Tungo sa Isang Gabay*, Inc. (KATIG)	0.01
Orion	Daang Pare	*Samahang Pamalakaya ng* Daang Pare, Inc. (SAMPAD)	0.07
Abucay	Bangkal	Bangkal-Bataan Upland Farmers Asso., Inc. (BBUFAI)	4.53
Abucay	Mabatang	*Balikatan ng Mangingisda para sa Bakawanan*, Inc. (BAMABA)	0.05
Orion	Gen. Lim	*Samahang Magsasaka sa Kataasang Lupa ng* Gen. Lim, Inc. (SAMAKALUGEN)	2.00
Orion	Bilolo	Bilolo Upland Farmers Association, Inc. (BUFAI)	3.51
Limay	Alangan	Alangan Farmer Producers Association, Inc. (AFPAI)	1.00
Dinalupihan	Roosevelt	Roosevelt Upland Farmers Association, Inc. (RUFAI)	0.57
Bagac	Parang	Ibis North Upland Farmers, Inc. (INUFI)	3.15
Bagac	Ibis	Brgy. Quinawan Upland Farmers Association, Inc. (QUFAI)	2.01
Bagac	Quinawan	Quinawan Upland Farmers Livelihood Cooperative, Inc. (QUFLCI)	2.02
Mariveles	Alas-asin	Alas-asin Community-Based Forest Management Association, Inc. (ACBFMA)	5.53
Bagac	Parang	Cabog Cabog Upland Farmers Association, Inc. (CCUFAI)	1.50
Mariveles	Camaya	Mariveles Watershed Farmers Association, Inc. (MAWAFAS)	20.00
Bagac	Ibis	*Samahang* Ibis Upland Farmers Association, Inc. (SIUFI)	2.02
Bagac	Banawang	*Banawang Mamamayang Sagip Kalikasan* Association, Inc. (BAMASAGKAI)	4.00
Bagac	Parang	Brgy. Small Coconut Farmers Association of Parang, Inc. (SCFAPI)	5.38
Mariveles	Alion	Alion Upland Farmers Cooperative, Inc. (AUF)	8.54
		Total	**75.36**

Source: DENR-PENRO Bataan.

Table 35. List of identified Tenurial Instruments in the Province of Bataan.

City/Municipality	Barangay	Type of Tenure	No. of Tenure	Total Area (km^2)
Abucay	Salian	SIFMA	13	0.41
Balanga City	Tuyo	SIFMA	6	0.43
Bagac, Orion & Limay	Parang, Bilolo & Reformista	IFMA	1	16.553
Limay	Duale & Alangan	SLUP	1	0.209
Bagac	Parang	SIFMA	1	2.500
Bagac	Banawang	SIFMA	1	2.246
Bagac	Paysawan	SIFMA	1	1.170
Bagac	Paysawan & Binuangan	IFMA	1	5.516
Morong	Mabayo	IFMA	1	5.850
Bagac	Ibis & Saysain	FLGMA	1	2.950
Bagac	Parang	FLGMA	1	4.340
Morong	Mabayo	FLAgT	1	0.029
Mariveles	Alas-asin	SLUP	2	0.151
Bagac	Saysain	SLUP	2	0.042
Bagac	Banawang	SLUP	1	0.007
Mariveles	Alion	SLUP	2	0.156
TOTAL				42.559

Source: DENR-PENRO Bataan.

Figure 27. Map showing CBFMA sites in the Province of Bataan.

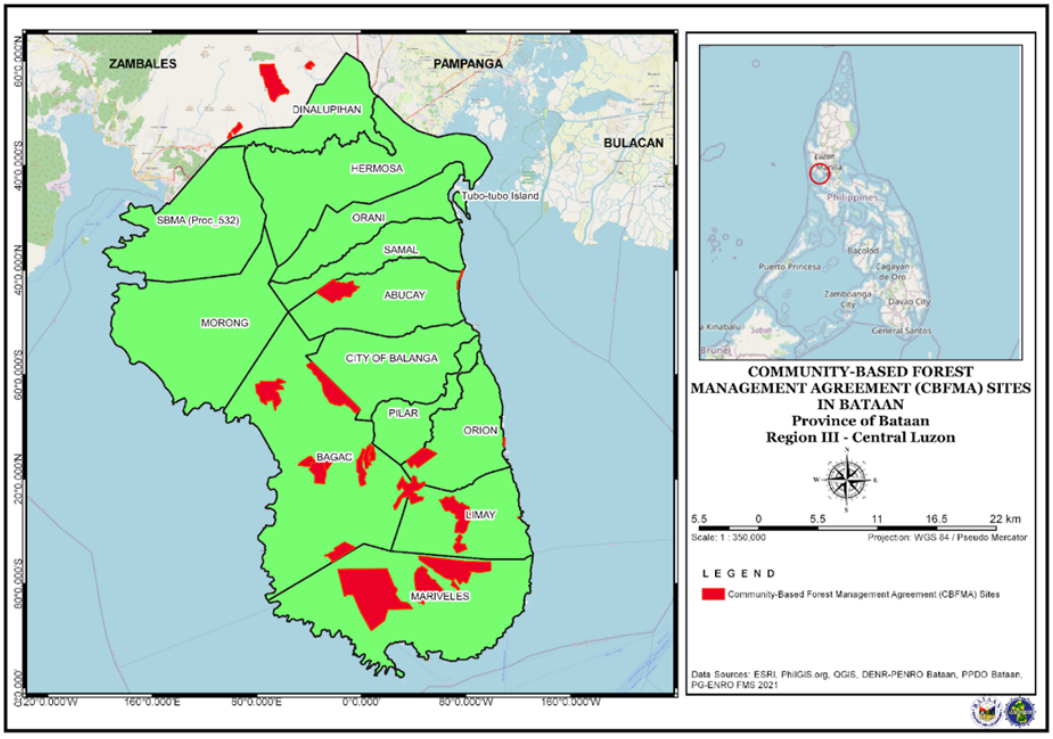
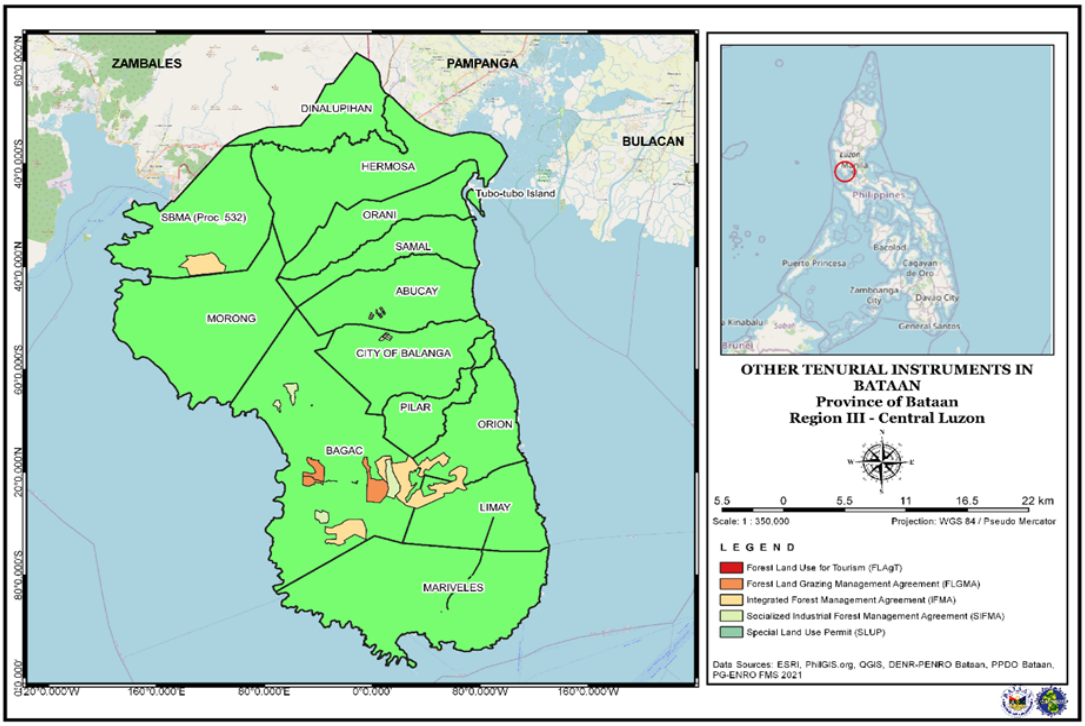


Figure 28. Map showing existing tenurial instruments in the Province of Bataan.

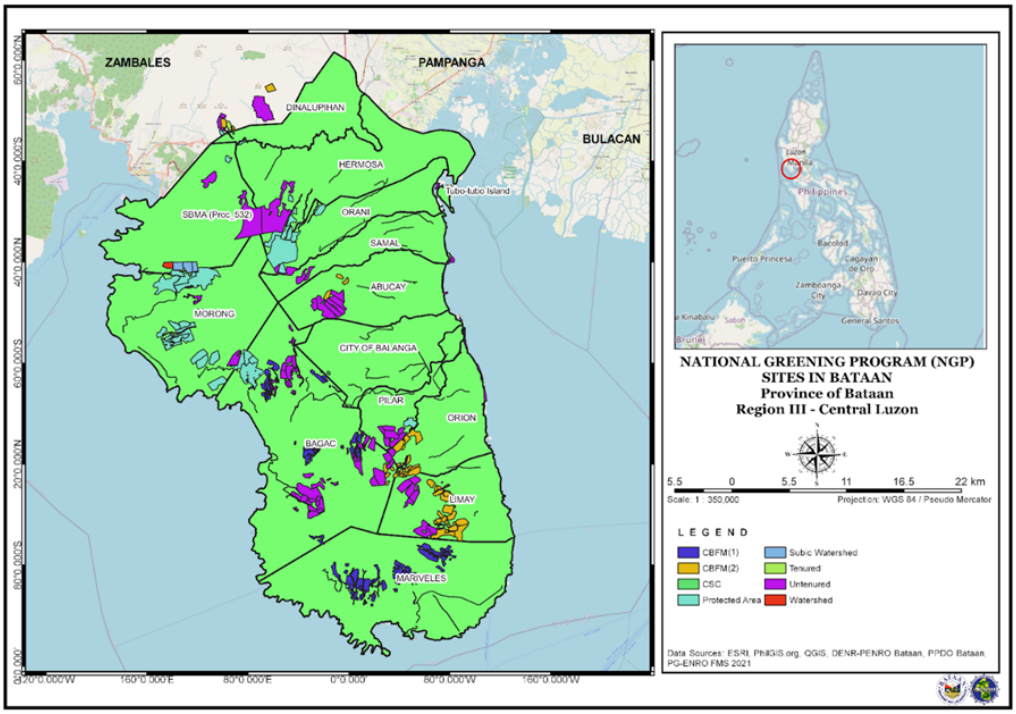


In an effort to address the worsening problem of forest degradation, the province supports the Enhanced National Greening Program (ENGP) of the DENR. Various planting activities that are conducted every year are participated by different stakeholders. The NGP areas located within the jurisdiction of the CENROs in Bagac and Dinalupihan were planted with different timber, fruit trees, bamboo and mangrove species (**Figure 29**). The planting locations of the NGP areas overlay within the CBFM, certificate of stewardship contracts (CSC), multiple use zones of protected areas, and lands with tenurial instruments. From 2018- 2021, the 1M41B Challenge was implemented as one of the province's reforestation efforts.

The province also included in its regular program the support to CBFM POs through the provision of farm supplies, including organic fertilizer, vegetable seeds, various seedlings, and planting tools and equipment.

Tree planting activities.

Figure 29. Map showing NGP sites in the Province of Bataan.



Farm inputs distribution to CBFM POs.

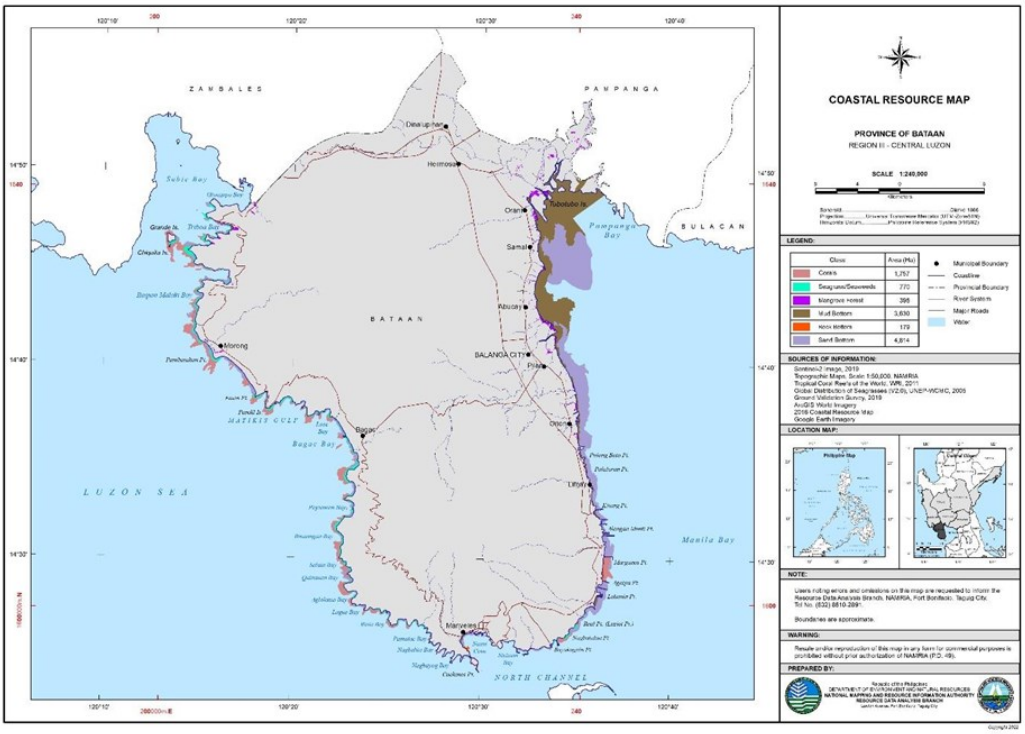
Results of the nationwide coastal resource mapping and assessment conducted by the National Mapping and Resource Information Authority (NAMRIA) from 2012 to 2016 showed that the areal extent of coastal habitats in the province totalled 29.22 km^2 (**Table 36**). **Figure 30** shows the locations of these habitats. The ground-truthing conducted by DENR-Bataan in 2015 showed that mangrove areas in the province cover 1.56 km^2 as compared to the 3.95-km^2-measurement from NAMRIA's data. It is important to note that NAMRIA's coastal resource map was generated using satellite images.

Table 36. Areal extent of coastal habitats in the Province of Bataan.

Coastal Resource/Habitat	Area (km^2)
Corals	17.57
Seagrass/Seaweeds	7.70
Mangrove Forest	3.95

Source: NAMRIA.

Figure 30. Coastal resource map of the Province of Bataan.



Source: NAMRIA.

Mangrove forests in the province are concentrated in the eastern portion along Manila Bay and in the northwest section along Subic Bay (**Figure 30**). A Rapid Resource Inventory for the Manila Bay Sustainable Development Master Plan (MBSDMP) showed that a total of 0.65 km^2 of mangrove forests is found in the northeast side of the province with *R. mucronata* and *S. alba* as the dominant mangrove species (**Table 37**). The northeast portion of Bataan hosts ten (10) mangrove species, the highest number of species within Manila Bay. In 2019, the DENR-

Ecosystems Research and Development Bureau (ERDB) also reported the occurrence of *Scyphiphora hydrophylaceae* (Nilad) in the province. Based on the Rapid Resource Inventory, the mangrove forests in Manila Bay have been severely degraded in the last few decades, with the loss of majority of the old growth forests and the distribution of relatively few remaining patches.

Table 37. Inventory of mangroves in Northeast Bataan.

Station	Latitude	Longitude	Area (km^2)	Substrate	Coastal/ Riverine	Dominant mangrove species
Abucay	14.7362	120.5422	0.0057	Semi-compact mud	Riverine	*R. mucronata*
Puerto Rivas	14.7003	120.5588	0.12	Semi-loose mud and clay	Coastal	*R. mucronata*
Tubo-tubo Island	14.8134	120.5576	0.0789	Semi-compact mud	Coastal	*S. alba*
Kabalutan 1	14.8127	120.5515	0.1013	Semi-compact mud	Riverine	*R. mucronata*
Kabalutan 2	14.8146	120.5461	0.0775	Semi-compact mud	Riverine	*S. alba*
Kabalutan 3	14.8091	120.5424	0.0827	Semi-compact mud	Riverine	*S.caseolaris*
Kaparangan	14.7915	120.5485	0.0969	Semi-compact mud	Riverine	*S. alba*
Ibaba	14.764	120.5492	0.0223	Semi-compact mud	Coastal	*A. marina*
East Calaguiman	14.7443	120.5509	0.0654	Semi-loose mud and clay	Coastal	*R. apiculata*

Source: Rapid Resource Inventory, Manila Bay Sustainable Development Master Plan, December 2020.

Coral reefs are found in the municipality of Mariveles along Manila Bay and in the municipalities of Bagac and Morong along the West Philippine Sea coastline. Based on the results of the Rapid Resource Inventory for the MBSDMP conducted in March 2020, the coral reefs in Mariveles and other sites in Manila Bay are in a highly stressed state with less than 10% of hard coral cover.

A number of interventions are implemented in the province to arrest the deterioration of coastal and marine habitats including the conduct of regular mangrove planting. The province also taps the support of the private sector (e.g., Philippine Resin Industries, Inc. (PRII), GNPower) in adopting mangrove stands, such as in Camachile, Orion and Kabalutan, Orani. Artificial reefs were also installed in Mariveles, Bagac, and Morong for the regeneration of corals and other substrates.

Mangrove planting activity.

Mangrove Ecotourism Site in Camachile, Orion, Bataan.

Coral patches in Brgy. Alangan in Limay fall under the poor category (0-25% Live Coral Cover (LCC)) and degraded condition. The majority of the substratum are dominated by Silt (SI) and Dead Coral with Algae (DCA). In the new Hard Coral Cover (HCC) scales, the site is in category D, the worst among the newly established scales. The remaining coral reefs in Alangan were also found in poor condition.

Reef fish assessment yielded a density value of very poor (<201) and category level 5 (65-256) log4 abundance[1]. Among the species documented, the Whitecheek monocle bream (*Scolopsis vosmeri*) recorded the highest abundance (n=41) followed by Ternate chromis (*Chromis ternatensis*), and Burroughs Damsel (*Pomacentrus burroughi*) with 37 and 14 individuals, respectively.

Seagrass and seaweeds are no longer present in the coast of Limay as validated in the NAMRIA Coastal Resources Field Validation/Assessment in 2014.

[1]Based on the logarithmic abundance of categories, if the estimated number of fishes ranges from 65 to 256, it is under the log4 abundance category 5.

Implications and Recommendations

Coastal habitats including coral reefs, sea grass beds, natural beaches, and mangrove forests are constantly threatened by unsustainable economic development and human activities. In the past three (3) years, the rehabilitation efforts of the province, with strong support from the private sector and the communities resulted in the increase of areal extent of mangrove areas. Efforts to manage and rehabilitate the other resources and habitats are also being undertaken but no discernible improvements have been observed thus far. It is therefore important to institute a regular monitoring or assessment of the different habitats to be able to measure the effectiveness and impacts of these management interventions.

The provincial, municipal, and city LGUs should continue their efforts in conserving and rehabilitating the habitats and enhance their monitoring and enforcement against illegal activities. The LGUs should also look into the establishment of additional areas for protection.

Habitat protection, restoration and management

Areal extent of habitats

References

DENR-PENRO. List of Community-Based Forest Management Agreement (CBFMA) sites in Bataan.
DENR-PENRO. List of identified tenurial instruments in Bataan.
NAMRIA. Coastal resource map of the Province of Bataan.
National Mapping and Resource Information Authority (NAMRIA). 2014. Coastal Resources Field Validation/Assessment.
NEDA. 2020. MBSDMP.
PG-ENRO. Map showing CBFMA sites in the Province of Bataan.
PG-ENRO. Map showing existing tenurial instruments in the Province of Bataan.
PG-ENRO. Map showing National Greening Program (NGP) sites in the Province of Bataan.
PPDO and City and Municipal FLUPs. Total area of forestlands.

020 Protected areas for coastal habitats and heritage

Description

This indicator measures the area of coastal habitats and heritage effectively protected from degradation, as well as the extent of rehabilitation.

Rationale

The protection of coastal habitats and heritage reflects the commitment of local governments to prevent habitat loss and degradation. The protection of these habitats helps sustain the environmental, social and economic benefits derived from them.

Data Requirements

- Number and area of terrestrial, marine and coastal heritage areas protected by law
- Management effectiveness rating of terrestrial, marine and coastal heritage protected areas
- Natural areas rehabilitated (km^2)

Results

The location of protected areas in the province is shown in **Figure 31**. As of 2021, there are six (6) protected areas in Bataan that were established by national laws and local ordinances (**Table 38**). In 2021, the *Sangguniang Panlalawigan* of Bataan issued Provincial Ordinance No. 30, declaring the *pawikan* (marine turtle) nesting sites in Morong, Bataan as critical habitat. In 2019, the Balanga Wetland and Nature Park (BWNP), composed of mangrove forest and foreshore land, was declared as a Community-Based Ecotourism Zone by virtue of R.A. 11365. The BWNP located in Brgy. Tortugas, Balanga City is an important habitat for migratory birds and waterfowls and part of the greater East Asian -Australasian Flyway (EAAF).

Figure 31. Location map of protected areas in the Province of Bataan.

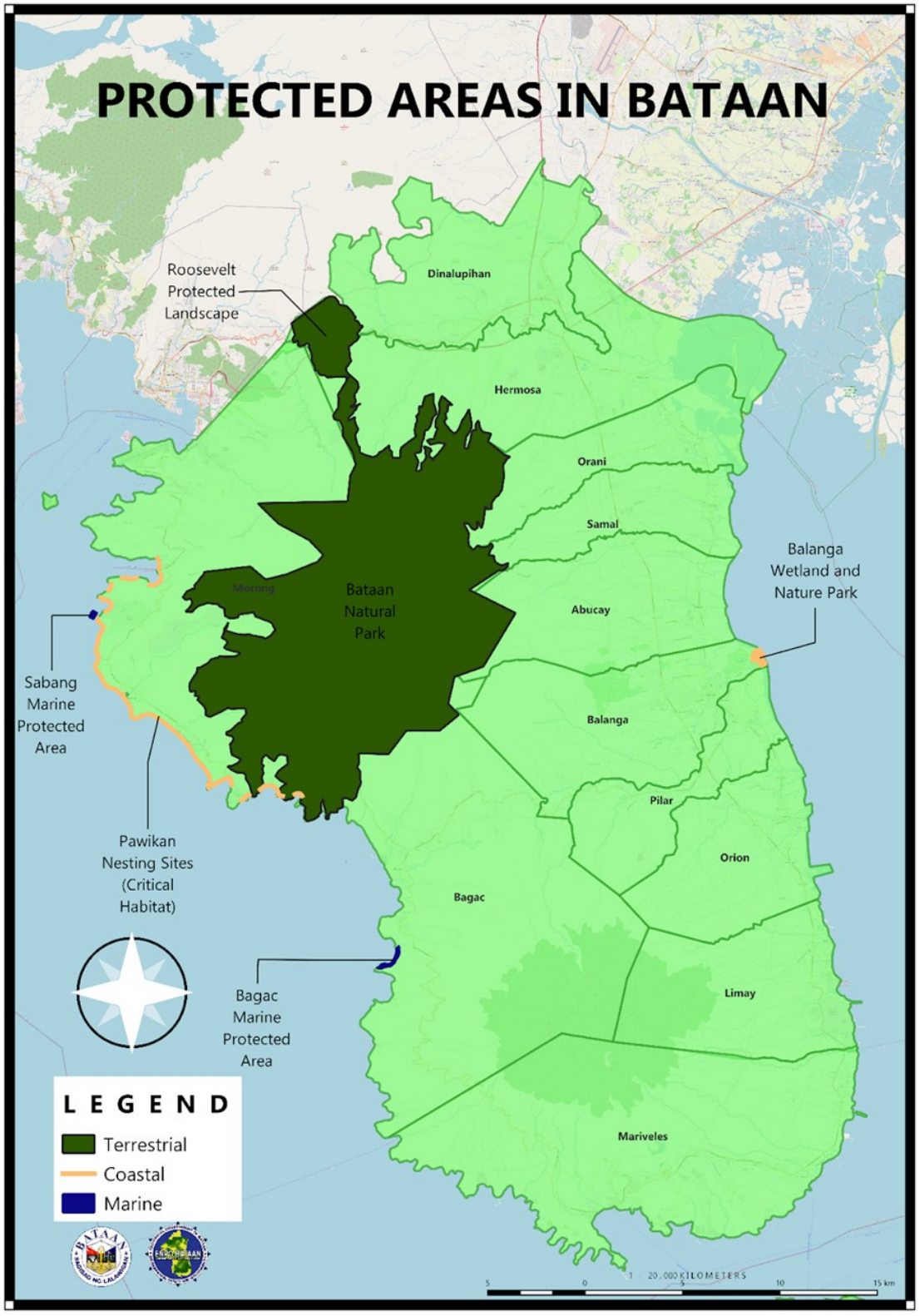


Table 38. List of protected areas in the Province of Bataan.

Protected Area	Ecosystem (PA Type)	Location/ Coverage	Area (ha)	Year Established	Legal Instrument
Pawikan Nesting Sites	Coastal (Critical Habitat)	Morong, Bataan	105	2021	Provincial Ordinance No. 30, Series of 2021
Balanga Wetland and Nature Park	Coastal (Special Ecotourism Zone)	Brgy. Tortugas, Balanga City, Bataan	34	2019	Republic Act No. 11365, Series of 2019
Bagac Marine Protected Area	Marine (Marine Protected Area)	Brgys. Banawang, Pag-asa, Saysain & Paysawan, Bagac, Bataan	439	2014	Municipal Ordinance No. 03, Series of 2014
Sabang Marine Protected Area	Marine (Marine Protected Area)	Brgy. Sabang, Morong, Bataan	10	2011	Municipal Resolution No. 39, Series of 2011
Bataan Natural Park	Terrestrial (Natural Park)	Abucay, Orani, Samal, Abucay, Bagac & Morong, Bataan	20,004	1992	Republic Act No. 7586, as amended
Roosevelt Protected Landscape	Terrestrial (Protected Landscape)	Dinalupihan, Bataan	950	1992	Republic Act No. 7586, as amended

The management of the Bataan Natural Park (BNP) and Roosevelt Protected Landscape (RPLS) is guided by their respective management plans, which identify strategies and management programs under three (3) categories, i.e., 1) Biodiversity conservation and environmental restoration, preservation of landscapes, unique habitats and species, sites and cultural characteristics; 2) Economic and social development programs; and 3) Institutional development programs.

Among the protected areas in the province, three (3) have available management effectiveness assessment/monitoring, including the BNP and the MPAs in Bagac and Sabang, Morong. The management effectiveness for BNP, which is part of the Expanded National Integrated Protected Areas System (ENIPAS) was assessed in 2013, 2014, and 2017 using the Management Effectiveness Tracking Tool (METT). According to the Report on the Management Effectiveness and Capacity Assessment (MECA) of Protected Areas in the Philippines by the DENR-BMB and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the METT score of BNP rose from 47 in 2013 to 72 in 2014, then 77 in 2017. The management effectiveness of the MPAs in Bagac and Sabang was assessed in 2019 using the MPA Management Effectiveness Assessment Tool (MEAT) that was adopted by the DENR and DA through the Coral Triangle Initiative (CTI). Being relatively new MPAs with no management body and thus, the management function mainly performed by the LGUs, both MPAs scored “Fair.” Out of 84 points, Sabang MPA and Bagac MPA scored 15 and 13, respectively.

Among the activities conducted for the protection and rehabilitation of the protected areas in Bataan include the enhancement planting of forest and fruit trees, bamboo, and mangrove; coastal clean-up drives; coral seeding and nursery; monitoring and apprehension of illegal fishing, illegal logging, and encroachment activities; and regulation of land and sea uses in the protected areas. The activities were implemented covering a total area of 215.42 km^2 by the LGUs, national government agencies (e.g., BFAR, DENR), private sector, people’s organizations, and other stakeholders in the province.

Implications and Recommendations

The province is endowed with rich natural resources that need to be protected and conserved. To date, the province has six (6) protected areas that were established over the past three (3) decades and with the varying levels of management effectiveness. The recent declaration of the *pawikan* nesting sites in Morong, Bataan as critical habitat warrants a collective effort of the different stakeholders for its effective implementation. It is highly recommended that awareness raising on Provincial Ordinance No. 24, Series of 2022, or the *Pawikan* Protocol be undertaken down to the community levels to ensure that all stakeholders are aware of its implementation particularly during the nesting to hatching season, i.e., months of September to March.

For protected areas with management plans (e.g., BNP and RPLS), the programs and activities indicated in the plans should be implemented and monitored to ensure the conservation and sustainable development of the areas. Developing and adopting plans to guide the management of the other protected areas should be considered. Regular updating of the assessment of management effectiveness of the protected areas should be carried out to track the progress and allow adjustments and/or strengthening of efforts to effectively manage the protected areas.

References

BMB and GIZ. 2017. Report on the Management Effectiveness and Capacity of Protected Areas in the Philippines.

DENR-Biodiversity Management Bureau (BMB) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). 2014. Report on the Management Effectiveness and Capacity of Protected Areas in the Philippines.

Marine Protected Area (MPA) Support Network. 2019. MPA Management Effectiveness Assessment Tool (MEAT).

PG-ENRO. Location map of protected areas in Bataan.

Provincial Ordinance No. 24, Series of 2021.

R.A. 11365.

021 Reclamation and conversion

Description

This indicator measures the area of coastal habitat that has been converted for other uses (e.g., mangrove to fishpond). This also includes the extent of reclamation in the coastal areas.

Rationale

The costs (limited access for some sectors, stability and safety of those using structures built on reclaimed land, destruction of mangrove nursery grounds of marine life, loss of fisheries fry gathering grounds, erosion, etc., benefits (ports that would benefit society, etc.) and the sectors that would be affected should be considered before reclamation or land conversion is authorized.

Data Requirements

- Total length of coastal area reclaimed
- Total coastal area converted to other uses (e.g. mangrove to fishpond)

Results

Reclamation activities and foreshore development in the province are regulated by the Philippine Reclamation Authority (PRA), the DENR, and the Provincial Government. Proposed reclamation and foreshore land use developments are required to secure the necessary permits and/or lease agreements from the PRA and/or the DENR. In recent years, there have been instances where the PRA halted ongoing reclamation projects (e.g., ports and coastal roads) due to pending issuance of permit.

Foreshore development projects, such as fishpond, resort, and industry are required to secure foreshore lease agreements (FLAs) or foreshore lease or miscellaneous sales from DENR. Inventory of DENR-Community Environment and Natural Resources Offices (CENROs) in Bataan recorded a total of 116 occupants with either FLAs with the DENR or foreshore lease or miscellaneous sales in 2017. Of the 116 occupants, 20 have active FLA/ miscellaneous lease agreement (MLA) contracts while the remaining have either pending cases, expired contracts, application which is for approval or appraisal, cancelled contracts, or pending requirements.

Section 43 of the Bataan Environment Code prohibits the construction, installation, or putting up of any permanent structure or any

improvement within 20 meters from the shoreline at high tide of the sandy beaches of the city/ municipalities in the province. The proponents of coastal development projects need to additionally secure a *Sangguniang Panlalawigan* resolution allowing them to proceed with the proposed development. Two (2) foreshore development projects have been approved by the *Sangguniang Panlalawigan in* 2017 and 2020, namely Resolution No. 355 stating No Objection on the FLA/MLA of Seafront Shipyard and Port Terminal Services Corporation in Mariveles, Bataan and Resolution No. 004, on the FLA of SEASIA Nectar Port Services.

The Authority of the Freeport Area of Bataan and the PRA, with reference from R.A. 9728 or the "Freeport Area of Bataan Act of 2009," as amended by R.A. 11453, are in the process of drafting guidelines for the review and approval of reclamation activities in the freeport area.

Implications and Recommendations

The regulation of reclamation and foreshore development activities will ensure that negative impacts on the environment will be prevented. For approved reclamation and foreshore developments, it is recommended that the provincial and municipal governments regularly conduct an assessment and evaluation to ensure their structural integrity and mitigate potential onsite (coastal erosion, marine habitat destruction) and offsite (e.g., land degradation and bathymetric changes due to excavation of filling materials) environmental impacts. Results of these assessment and evaluation should be properly communicated to local chief executives (LCEs) and regulatory agencies including the Environmental Management Bureau (EMB) of DENR and serve as a guide in screening and monitoring coastal developments.

Collaboration between the DENR and PRA can be strengthened for purposes of monitoring and apprehension while the DA-BFAR can be tapped for the proper reversion of abandoned fishponds to mangrove stands.

References

DENR-CENRO. List of occupants with Foreshore Lease Application (FLA) or miscellaneous sales.

Provincial Ordinance No. 03, Series of 2019.

R.A. 11453

R.A. 9728

Resolution No. 004, Series of 2020.

Resolution No. 355, Series of 2017.

Water Use and Supply Management

022 Water conservation and management

Description

This indicator measures the demand of the population for freshwater and accounts intensity of freshwater management efforts through the availability of water management and conservation plans, strategies adopted and staff and budget allocated.

Rationale

Freshwater is essential for life and effective management for its sustainable use is of utmost importance for a healthy community.

Data Requirements

- Availability of water management and conservation plan
- Mitigation and adaptation strategies identified
- Water uses per capita
- Staff and budget for water management

Results

Bataan is rich in water resources such as rivers, streams, creeks, waterfalls, and springs. It is drained by numerous rivers and streams, with very few meanders radiating and sloping from the two mountain groups of Mt. Mariveles and Mt. Natib down to the Manila Bay and the West Philippine Sea.

Bataan is comprised of three major watersheds, namely Subic, Mt. Natib, and Mariveles Watersheds. Subic Watershed covers the municipalities of Morong and half of Bagac. Mt. Natib Watershed drains in the municipalities of Dinalupihan, Hermosa, Orani, Samal, Abucay, and Balanga City. The Mariveles Watershed flows in Mariveles, Limay, Orion, Pilar, and half of Bagac.

Bataan has an estimated total watershed area of 97,109 hectares, including the sub-watersheds of Abo-abo River (Balanga), Batalan River (Morong), Lamao River (Limay), Saysain River (Bagac), and Mamala River (Mariveles). **Table 39** lists the sub-watersheds in the province.

Table 39. Summary of sub-watersheds in Bataan.

Sub-Watershed	Area	Sub-Watershed	Area
Amo River	28.98 km^2	San Juan River	0.243 km^2
Paniquian River	25.99 km^2	Orani River	0.238 km^2
Pangulisanin River	36.34 km^2	Abo-Abo River	317.04 km^2
Lamao–Camayuan River (Lamao River)	25.98 km^2	Nagbatalan River	194.08 km^2
Alangan River	21.56 km^2	Saysain River	119.99 km^2
Mamala-Duale River (Mamala River)	36.84 km^2	Aglaloma River	107.18 km^2
Pandan River	26.47 km^2	Morong River	66.02 km^2
Orion River	23.30 km^2	Almacen River	80.80 km^2
Pilar River	33.75 km^2	Bagac River	15.38 km^2
Talisay River (from PASu)	142.24 km^2	Kabayo River	7.83 km^2
Ibayo River	29.36 km^2	Sutuin River	14.69 km^2
Paliwas River	37.47 km^2	Bayandati River	23.47 km^2

The river systems provide water sources for the entire province particularly for irrigation of agricultural lands, fishing, and navigation purposes.

The province has rich groundwater and surface water reserve potentials amounting to approximately 1,721 MCM/year and 7,890 MCM/year, respectively. However, previous studies showed that most of the residents rely on groundwater supply for domestic and agricultural purposes and as of 2017, only 43% of the population are connected to water districts. The rest sourced their water supply through wells, free flows, and private pumps, which are unmetered and not covered by existing rules and regulations. These practices compounded by rapid industrialization, increasing population, and climate change might lead to overextraction and/or depletion of groundwater reserves, desertification, and subsidence, among others.

Recognizing these threats, the Sustainable Groundwater Resources Management Master Plan (GRMMP) was formulated by the PG-ENRO in consultation with relevant stakeholders (local governments, water districts and relevant industries) in 2019. The Plan aims to raise public awareness on the current status of water resources in the province, identify actions to protect, conserve, preserve, and sustainably manage the available water resources, and ensure the availability of clean, safe, and potable water for future generations. The following summarizes the proposed short, intermediate, and long-term strategies and activities identified in the Plan:

Short-Term Plan

- Identification and Characterization of Aquifers
- Drafting of a Groundwater Resource Vulnerability Assessment Report
- Completion of the ongoing groundwater well inventory and data interpretation
- Conduct groundwater quality assessment tests
- Conduct IEC campaigns

Intermediate Plan

- Drafting of a Feasibility Study for Surface Water Utilization
- Delineation and Protection of the Recharge Areas in the Province
- Determination of Possible Ways to Enhance the Recharge Rate of the Groundwater Resource

Long-Term Plan

- Establishment of Surface Water Utilities
- Implementation of Recharge Rate Enhancement Methods

In 2019, the province conducted river profiling and characterization of Talisay, Salian, Paniquian, and Almacen rivers as part of data gathering for establishing the baseline data for the GRMMP. Groundwater well inventory was likewise initiated but discontinued due to changing priorities and health restrictions brought about by the COVID-19 pandemic.

Talisay River is one of the major river systems draining into Manila Bay and as part of the implementation of the Supreme Court's Continuing Mandamus to Clean Up and Rehabilitate the Bay, water quality monitoring is continuously being performed. Monthly water quality sampling from upstream, midstream, and downstream is being conducted while daily river clean-up is implemented in the downstream.

The province fully supports the implementation of E.O. 193, S. 2015 or the Enhanced National Greening Program, which targets poverty reduction, food security, environmental stability, biodiversity conservation, and enhanced climate change mitigation and adaptation. Some projects and activities implemented by the province in support of the ENGP include:

- Establishment of Bamboo Plantation with 1,366 has from 2017- 2021
- Declaration of Palanas Watershed in Mariveles
- Continued Management of Bataan Natural Park and Roosevelt Protected Landscape
- Provision of assistance to the monitoring, conservation and protection of PAs thru hiring of additional personnel designated to PA and donating monitoring tools and equipment to the PAMO
- Comprehensive Tree Planting Program: 1Bataan Green Legacy (1M41B, Riverbank Stabilization through Bamboo Planting, Arbor Day Celebration every June 25th, and Mangrove Development Program).

The first SOC Report recommended for the province to explore the possibility of issuing and canceling permits for water supply/surface water resources, allocating sub-authority to the municipal level (leveling of authority), and monitoring and regulating groundwater extraction. The National Water Resources Board (NWRB) is the mandated regulatory agency for utilization of water resources in the country. National government agencies are identified in the NWRB Resolution No. 15-1116 that can serve as NWRB's deputy offices for water use regulation particularly in the acceptance and verification of water permit application. This, however, does not include the LGUs due to possible conflict of interest. For example, the province is exploring the possibility of establishing a Bulk Water Supply System. To avoid any conflict of interest, the issuance of permit should be coming from a regulatory body other than the LGU.

Implications and Recommendations

With the rich surface water reserve of the province, strategies must be developed and implemented to sustain its utilization. The proposed Sustainable Groundwater Resources Management Master Plan should be adopted for implementation. Once adopted, the implementation of the short-, intermediate-, and long-term strategies should be undertaken in consideration of the development direction of the province towards agro-industrialization. In the last two years, there have been proposals for the development of Bulk Water Supply System in select municipalities through the Bataan Public-Private Partnership and Investment Center. While the Master Plan is yet to be adopted, the development of Bulk Water Supply System, including the conduct of feasibility studies is aligned with the intermediate strategies identified in the Plan. Grey water management may be an additional water conservation strategy as alternative source of water used for cleaning, washing, watering, etc.

Activities on river profiling/characterization and well inventory should be continued to serve as basis in reviewing existing plans and/or formulating new plans for the sustainable development and management of the water resources in the province.

References

DENR-PENRO. List of sub-watersheds in Bataan.

E.O. 193, Series of 2015.

National Water Resources Board (NWRB) Resolution No. 15-1116.

PEMSEA and Provincial Government of Bataan. 2017. State of th Coasts of Bataan Province.

PG-ENRO. 2017. Pre-Feasibility Study on the Establishment of Bulk Water Supply System in the Province of Bataan.

PG-ENRO. Sustainable Groundwater Resource Management Plan.

Water Use and Supply Management

023 Access to improved water source

Description

This indicator estimates the households with access to an improved water source, the amount delivered and the amount paid by households for water supply.

Rationale

Freshwater resources, whether scarce or abundant, may not necessarily be accessible or equitably accessible. Difficulty of access including high prices disproportionately burdens those with less resources, especially more vulnerable individuals and households within communities.

Data Requirements

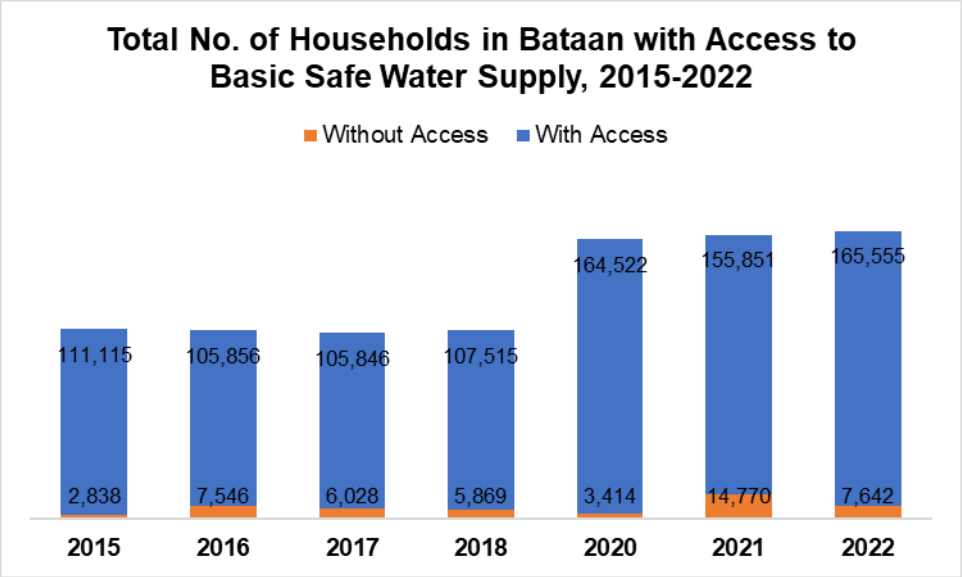
- Households with access to using improved water sources
- Volume produced from piped water sources
- Water pricing per cubic meter

Results

Data from the Field Health Service Information System (FHSIS) of the Department of Health (DOH) show that the number of households in Bataan Province with access to basic safe water supply[2] increased from 111,115 in 2015 to 165,555 in 2022. However, for the same period, an increase in the number of households without access to basic safe water supply was also observed (**Figure 32**). This translates to an overall decrease in proportion of households with access to safe water supply, from 97.51% in 2015 to 95.59% in 2022.

[2]Basic safe water supply means drinking from an improved drinking water source. These water sources are source that which by nature of their design and construction, have the potential to deliver safe water such as Level I, Level II, and Level III water system (DOH, 2022).

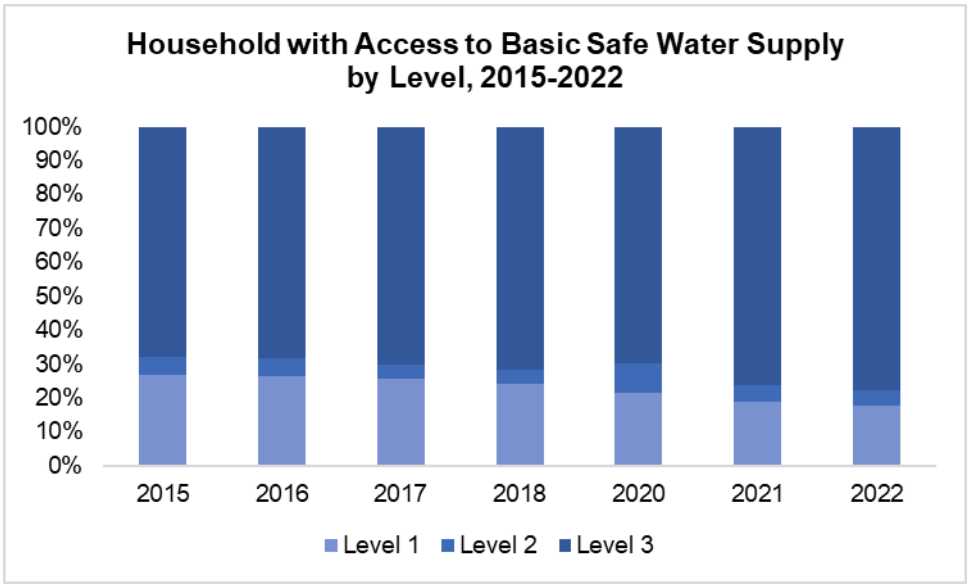
Figure 32. Total number of households in Bataan with access to basic safe water supply, 2015-2022.



Source: DOH FHSIS.

As shown in **Figure 33**, most households in Bataan have access to Level 3 water supply, i.e., from 64.66% in 2015 to 74.30% in 2022. Access to Level 1 water supply increased from 25.30% in 2015 to 16.87% in 2022 while access to Level 2 water supply decreased from 5.06% in 2015 to 4.42% in 2022. From 2015 to 2022, more households were able to upgrade to Level 3 water supply (**Figure 33**), which is partly due to the increase in coverage and capacity of the water supply service providers in the province.

Figure 33. Household in Bataan with access to basic safe water supply by level, 2015-2022.



Source: DOH FHSIS.

Table 40. Level of water system in the Philippines, based on infrastructure type, 2017.

Level	Description	Service (Size & Distance)	Area Classification
I	Point sources/Stand-alone water points -Hand pumps -Artesian wells -Rain water collector	Serving an average of 15 households within a 250-meter distance	Rural
II	Piped water with communal water point -Bore well -Spring system -Communal faucet	Serving an average of 4-6 households within a 25-meter distance	Urban
III	Piped water supply with a private water point/waterworks system -House connection	Based on daily water demand of more than 100 liters per person	Urban

Source: NEDA Board Resolution No.12, Series of 1995.

There are currently nine (9) water districts in the province providing water supply to residential, commercial/industrial, and government users, with Orani Water District being semi-privatized with PrimeWater. PrimeWater also services the municipality of Samal and portions of the municipality of Abucay.

As shown in **Tables 41 to 44**, water pricing per cubic meter varies from the service areas.

PrimeWater generally has higher rates compared to the water districts, from Php 26.92/cu.m. for residential/government to as much as Php 105.89/cu.m. for bulk/wholesale. Higher rates have also been observed in municipalities that are industrial (e.g., Limay) and hilly (e.g., Dinalupihan), where there are challenges in water supply distribution.

Table 41. Water rates (in Php) of Dinalupihan Water District as of April 2023.

Classification	Minimum Charge 1 – 10 cu.m.	Commodity Charge				
		11 – 20 cu.m.	21 – 30 cu.m.	31 – 40 cu.m.	41 – 50 cu.m.	51 and above cu.m.
Residential	190.00	19.90	21.35	22.80	24.70	26.60
Government	190.00	19.90	21.35	22.80	24.70	26.60
Commercial	380.00	39.80	42.70	45.60	49.40	53.20
Commercial A	332.50	34.80	37.35	39.90	43.20	46.55
Commercial B	285.00	29.85	32.00	34.20	37.05	39.90
Commercial C	237.50	24.85	26.65	28.50	30.85	33.25
Bulk/Wholesale	570.00	59.70	64.05	68.40	74.10	79.80

Table 42. Water rates (in Php) of Hermosa Water District as of August 2023.

Volume of Water Billed	Classification of Concessionaire					
	Residential	Full Commercial	Commercial A	Commercial B	Commercial C	Government
First 10 cu.m.	40.00	80.00	70.00	60.00	50.00	40.00
11 – 20	4.38	8.76	7.67	6.57	5.48	4.38
21 – 30	4.59	9.18	8.03	6.89	5.74	4.59
31 – 40	4.86	9.72	8.51	7.29	6.08	4.86
41 – 50	5.19	10.38	9.08	7.79	6.49	5.19
51 and above	5.57	11.14	9.75	8.36	6.96	5.57

Table 43. Water rates (in Php) of Limay Water District as of November 2022.

Classification	Commodity Charge					
	11 – 20 cu.m.	21 – 30 cu.m.	31 – 40 cu.m.	41 – 50 cu.m.	51 and above cu.m.	
Residential/Government	14.50	16.75	19.25	22.00	25.00	per cu.m.
Commercial A	25.35	29.30	33.65	38.50	43.75	per cu.m.
Commercial B	21.75	25.10	28.85	33.00	37.50	per cu.m.
Commercial C	18.10	20.90	24.05	27.50	31.25	per cu.m.

Table 44. Water rates (in Php) of Orani Water District/PrimeWater as of September 2022.

Classification	Size	Minimum Charge	Commodity Charge			
			11-20 m^3	21-30 m^3	31-40 m^3	41 m^3 above
Residential/Government	½"	227.92	26.92	29.38	32.28	35.30
	¾"	364.67				
	1"	729.34				
	1 ½"	1,823.36				
	2"	4,558.40				
	3"	8,205.12				
	4"	16,410.24				
Commercial/Industrial	½"	455.84	53.84	58.77	64.56	70.59
	¾"	729.34				
	1"	1,458.69				
	1 ½"	3,646.72				
	2"	9,116.80				
	3"	16,410.24				
	4"	32,820.48				
Commercial A	½"	398.86	47.06	51.37	56.49	61.72
	¾"	638.18				
	1"	1,276.35				
	1 ½"	3,190.88				
	2"	7,977.20				
	3"	14,358.96				
	4"	28,717.92				
Commercial B	½"	341.88	40.35	44.04	48.42	52.91
	¾"	547.01				
	1"	1,094.02				
	1 ½"	2,735.04				
	2"	6,837.60				
	3"	12,307.68				
	4"	24,615.36				
Commercial C	½"	284.90	33.63	36.71	40.35	44.11
	¾"	455.84				
	1"	911.68				
	1 ½"	2,729.20				
	2"	5,698.00				
	3"	10,256.40				
	4"	20,512.80				
Bulk/Wholesale	½"	683.76	80.76	88.15	96.84	105.89
	¾"	1,094.02				
	1"	2,188.03				
	1 ½"	5,470.08				
	2"	13,675.20				
	3"	24,615.36				
	4"	49,230.72				

In 2017, water districts produced 25.8 million cubic meters against water consumption of 20.5 million cubic meters. Water demand in the province has been rapidly increasing while availability of new or additional groundwater sources are becoming lesser. More recently, people in some areas in Bataan have been reporting weaker water pressure in the past years, especially in the dry season. Some also noted that so-called “freeflow” communal water supply, such as those in Samal and Abucay, has already dried up.

To secure enough water supply, service providers have been upgrading water extraction and distribution systems. Regular reforestation activities in watershed areas are also being done by the water districts, LGUs, and DENR in partnership with various stakeholders. In addition, the Provincial Government is currently looking into alternative water supply sources, such as bulk water supply using surface water, rainwater harvesting, and desalination systems. However, feasibility of these alternatives is yet to be studied.

Implications and Recommendations

Bataan is able to maintain a high proportion of its households with access to Level 3 water supply. With increasing population and rapid development, the province should continue to expand its water supply coverage to ensure access of the population to clean and safe water supply. The province should also continue to explore alternative sources of water supply, with utmost consideration of their affordability. Water service providers should further improve their distribution systems to minimize water loss. Aside from supply management, managing water demand should be considered including water conservation, recycling/treatment, and recirculation.

References

Department of Health (DOH). Field Health Service Information System (FHSIS).
NEDA Board Resolution No.12, Series of 1995.
PG-ENRO. 2017. Pre-Feasibility Study on the Establishment of Bulk Water Supply System in the Province of Bataan.

024 Incidences/deaths due to waterborne diseases

Description

This indicator measures the number of reported cases and number of deaths due to diarrhea and other waterborne diseases.

Rationale

While other factors (such as food handling practices, etc.) may affect these figures, the waterborne diseases also indicate the level of sanitation services and the cleanliness of freshwater supplies and of bodies of water for recreation.

Data Requirements

- Number of incidences of illness/infections and deaths due to waterborne diseases (e.g., diarrhea; typhoid fever; cholera; amoebiasis; schistosomiasis; giardiasis; etc.)

Results

Typhoid and paratyphoid fevers, acute watery diarrhea (AWD), and acute bloody diarrhea (ABD) are three (3) of the major water-borne diseases in the province. Some cases of cholera were also recorded (**Table 47**).

Table 45 shows that the highest number of typhoid fever cases was recorded in 2016, of which 36% or 56 cases were from Orani and Mariveles. The highest number of incidence was recorded in Limay and Orani in 2017 and 2018, respectively. Results show that higher incidences of typhoid fever were recorded in urban municipalities that may imply possible contamination of water sources.

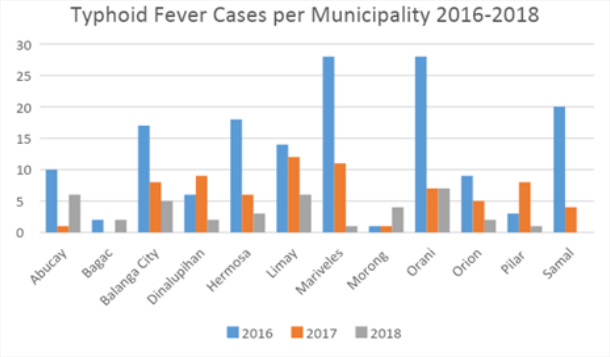
The highest incidence of ABD was recorded in 2017 (**Table 46**). According to reports, zero cases of ABD and AWD were recorded in 2019 to 2020. There were also no cases of typhoid and paratyphoid fever from 2019 to 2021. However, total number of cases of AWD more than doubled from 2021 to 2022 while the number of typhoid and paratyphoid fever cases totalled 107 in 2022 (**Table 47**). Only three (3) cases of cholera were recorded both in 2021 and 2022 (**Table 47**).

Table 45. Typhoid fever cases per LGU in Bataan, 2016-2018.

LGU	2016	2017	2018
Abucay	10	1	6
Bagac	2	0	2
Balanga City	17	8	5
Dinalupihan	6	9	2
Hermosa	18	6	3
Limay	14	12	6
Mariveles	28	11	1
Morong	1	1	4
Orani	28	7	7
Orion	9	5	2
Pilar	3	8	1
Samal	20	4	0
Total	156	72	39

Source: PHO Bataan.

Figure 34. Distribution of typhoid fever cases per municipality and city in Bataan, 2016-2018.



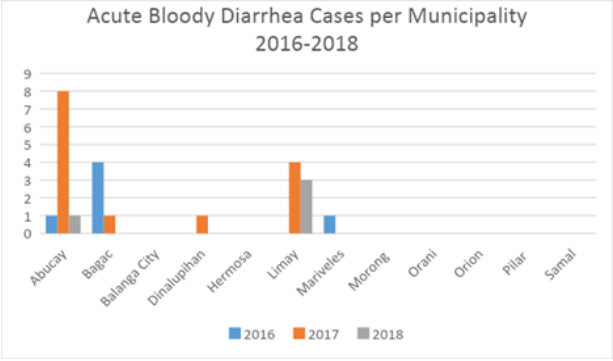
Source: PHO Bataan.

Table 46. Acute bloody diarrhea cases per LGU in Bataan, 2016-2018.

Municipality	2016	2017	2018
Abucay	1	8	1
Bagac	4	1	0
Balanga City	0	0	0
Dinalupihan	0	1	0
Hermosa	0	0	0
Limay	0	4	3
Mariveles	1	0	0
Morong	0	0	0
Orani	0	0	0
Orion	0	0	0
Pilar	0	0	0
Samal	0	0	0
Total	6	14	4

Source: PHO Bataan.

Figure 35. Distribution of acute bloody cases per municipality and city in Bataan, 2016-2018.



Source: PHO Bataan.

Table 47. Cases of waterborne diseases in Bataan, 2021-2022.

Waterborne Diseases	2021	2022
Acute Bloody Diarrhea	3	7
Acute Watery Diarrhea	81	267
Typhoid and Paratyphoid Fever	-	107
Cholera	3	3

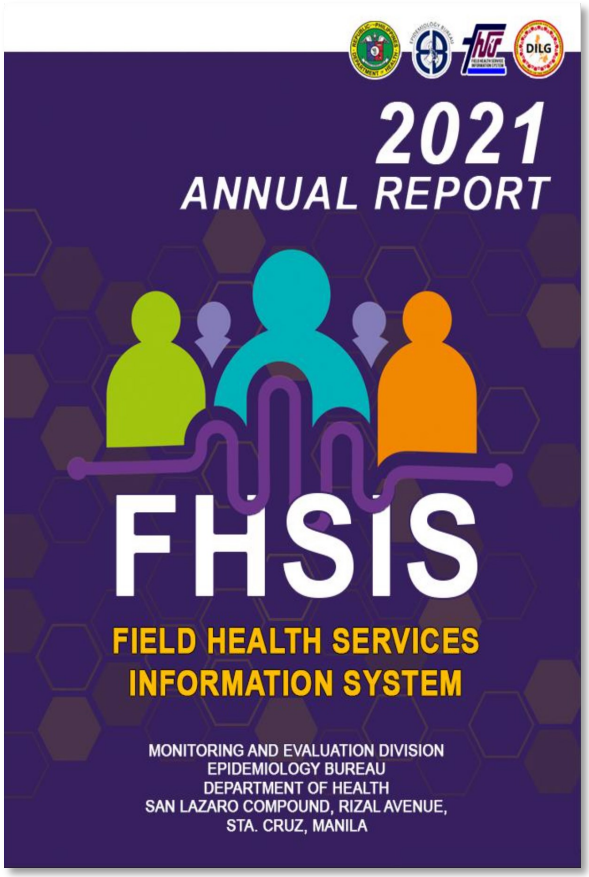
Source: DOH FHSIS.

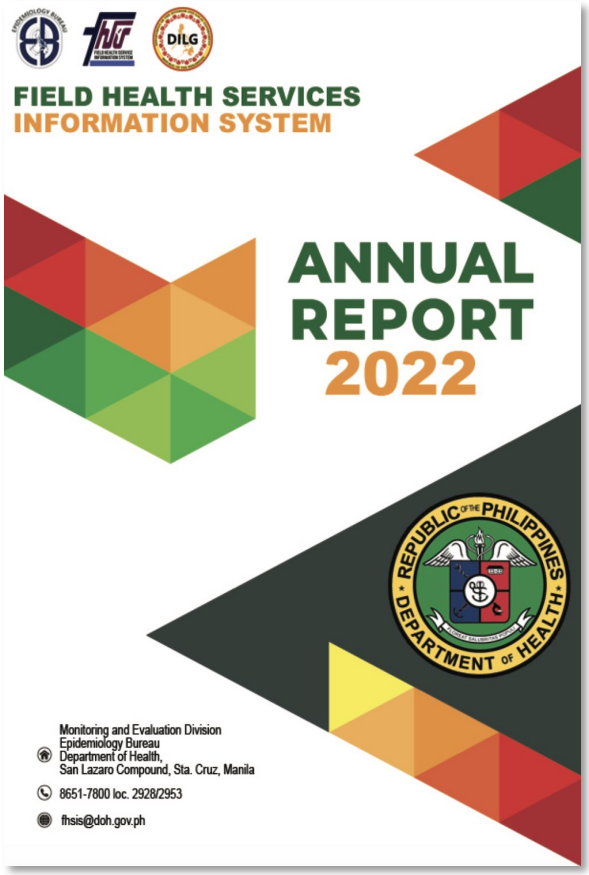
Implications and Recommendations

The incidences of waterborne diseases imply potential contamination of water sources including the groundwater, which is the primary source of water supply in the province. As stated in the previous indicator, high percentage of the population in the province still relies on groundwater from wells for their water supply, which normally has no treatment prior to consumption. Leakage from improperly disposed wastes, untreated sewage, and other sources of pollution might have seeped through the groundwater table causing contamination. It is recommended that the provincial, municipal, and city governments in partnership with relevant national government agencies, local water utilities, and the private sector give utmost importance to the establishment of sewage treatment facilities, implementation of a septage management program, and the strict enforcement of relevant laws and ordinances (e.g., Clean Water Act, Ecological Solid Waste Management Act) to ensure clean and safe water sources. It is important to continue the systematic monitoring and recording of the incidences of waterborne diseases to be able to determine the effectiveness of management interventions in ensuring access to safe and clean water.

References

DOH. FHSIS
PHO. Acute bloody diarrhea cases per LGU.
Provincial Health Office (PHO). Typhoid fever cases per LGU.





Water use and supply management

Incidences/deaths due to waterborne diseases

2021-2022 Annual Reports of the Field Health Services Information System.

Food Security and Livelihood Management

025 Fishery management plan and implementation

Description

This indicator estimates the extent of fisheries management efforts through availability of fisheries management plans, staff and budget allocated.

Rationale

Fish is a direct product of the coastal zone, providing both food and livelihood to coastal dwellers, and to consumers far from the coast. Fisheries management is a challenging and necessary aspect of managing marine and coastal resources in order to ensure the sustainability of this valuable natural asset. Management strategies, supported by adequate resources and equipment, are markers of local government towards managing this resource.

Data Requirements

- Fisheries Management Plan
- Staff and budget allocation for fishery management

Results

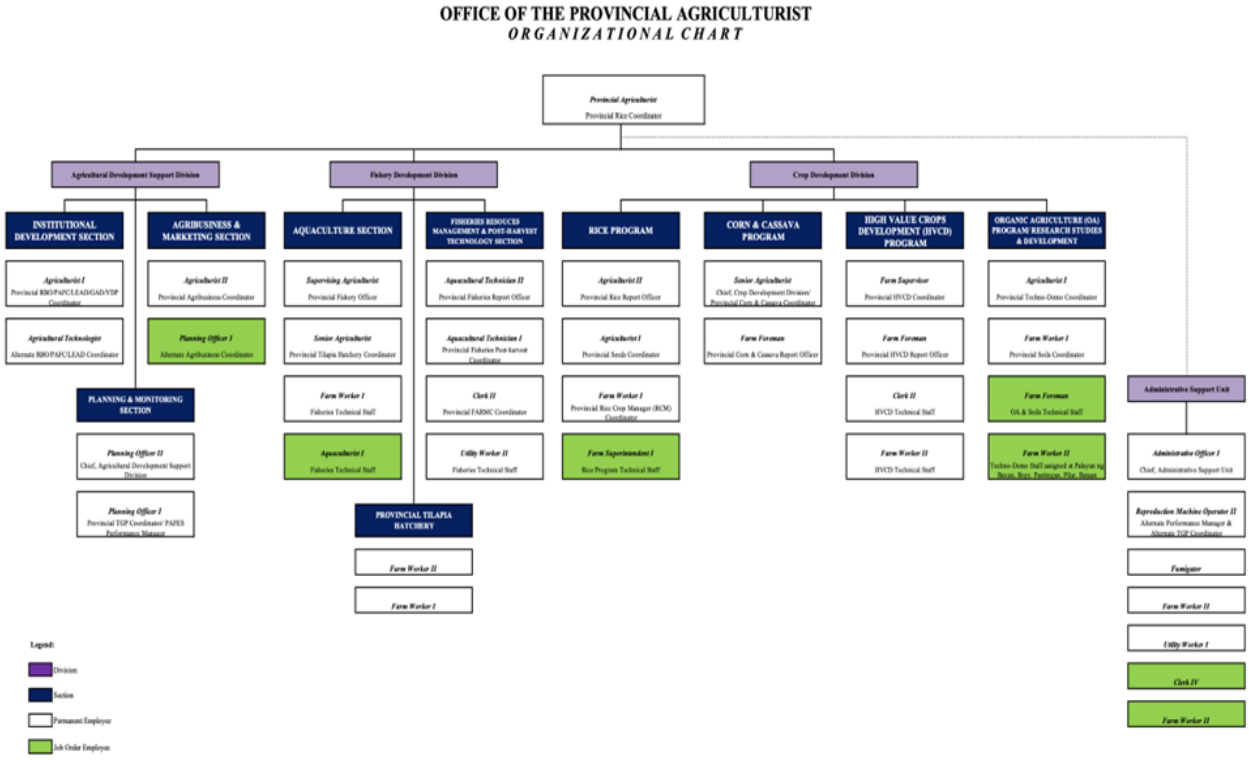
While the coastal city and municipalities have no fisheries management plans, strategies for conserving and managing the fishery resources are integrated into their CRM plans. These PPAs focused on reducing fishing pressures and habitat rehabilitation and protection, specifically, the establishment of MPAs, fish sanctuaries and reserves, as well as mangrove nurseries.

A Provincial ICRM Plan covering the period 2021-2025 has been drafted, integrating the CRM plans of the coastal city and municipalities. The draft Plan provides the overall direction for the management of coastal and fisheries resources in the province. Adopting the four (4) strategies in the BSDS, namely “Inform,” “Mitigate,” “Protect and Preserve,” and “Develop,” major programs indicated in the draft ICRM Plan include coastal law enforcement, livelihood management, fisheries management, habitat management, foreshore management, tourism management, and coastal zoning.

Also at the provincial level, a Fishery Development Division with staff and budget allocation is functioning under the Office of the Provincial Agriculturist (OPA) (**Figure 36**). Meanwhile, City and Municipal Agricultural Offices have fisheries technologists as personnel in charge of fishery management-related PPAs with regular budget appropriation. Additionally, the BFAR continues to provide support to the LGUs.

Draft Provincial ICRM Plan.

Figure 36. Organizational Chart of the Office of the Provincial Agriculturist.



Source: OPA.

Implications and Recommendations

The strategies and actions identified in the city, municipal, and provincial ICRM plans integrate fisheries protection and management. The process of developing the provincial ICRM Plan provided an opportunity to review the individual ICRM plans of the coastal LGUs and address the existing gaps. This consolidation of programs will allow the creation of a responsive Provincial Plan for the holistic protection and management of fisheries and other coastal resources. The adoption and integration of the provincial ICRM Plan into the local governments' development plans are necessary to ensure that resources will be allocated for its implementation.

While the ICRM Plan is comprehensive and covers fishery resources, the creation of a Fisheries Management Plan will allow a more focused approach in sustainably managing the fishery resources. This will help ensure the proper protection and optimal utilization of these highly valuable marine resources.

References

BCCFI. 2006. BSDS.
OPA. Organizational structure.

Fishing banca in Sabang, Morong.

026 Fisheries production

Description

This indicator measures the trend in fisheries production and tries to estimate whether fisheries stocks are sustainable (using changes in catch composition and/or the frequencies of various sizes per species).

Rationale

The increasing fish catch would mean either greater dependence of the population to fisheries' resources or improved condition of resources.

Data Requirements

- Municipal (small-scale), commercial (large-scale) and aquaculture fishery production
- Size and composition of fish catch

Results

From 2016-2021, the province's average share in the total fish production for Region III (Central Luzon) was 9.7% or equivalent to an average of 30,271.8 metric tons (MT) annually (**Table 48**).

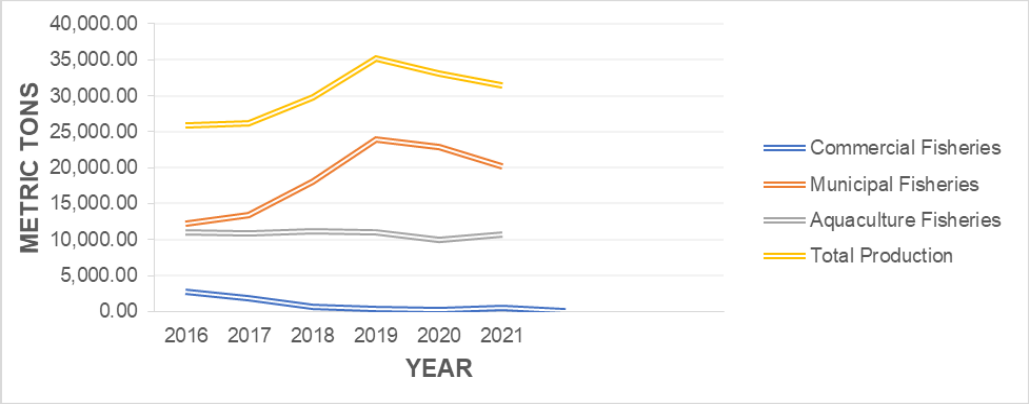
The total fisheries production for each of the sub-sector, namely commercial and municipal fisheries and aquaculture, from 2016-2021 is also shown in **Table 48**.

Table 48. Fisheries Production by Sub-sector in Bataan, 2016-2021.

Year	Total	Commercial Fisheries	Municipal Fisheries			Aquaculture
			Total Municipal	Marine Municipal	Inland Municipal	
2016	25,877.6	2,683.5	12,137.6	12,085.4	52.2	11,056.5
2017	26,183.5	1,852.8	13,451.2	13,382.5	68.7	10,879.5
2018	29,788.3	585.1	18,006.8	17,936.1	70.7	11,196.4
2019	35,165.3	316.6	23,856.4	23,785.7	70.7	10,992.4
2020	33,116.2	256.4	22,853.6	22,759.6	94.0	10,006.2
2021	31,499.9	563.5	20,277.6	20,123.4	154.2	10,658.8

Source: 2022 Regional Social and Economic Trends (RSET) Region III Central Luzon.

Figure 37. Fisheries Production by Sub-sector in Bataan, 2016–2021.



Source: 2022 RSET Region III Central Luzon.

Table 49 shows aquafarm production in Bataan from 2019 to 2021 while **Table 50** details the annual volume of production of various marine species in Bataan from 2019 to 2021. Several species exhibited fluctuating production levels over the three years, with only anchovies, fimbriated sardines, Indian mackerel, and squid showing an increasing trend.

In the case of major inland species in Bataan from 2019 to 2021, tilapia production was consistently high, with a slight increase in production from 2019-2021 (**Table 51**). **Table 52** shows the volume of production of major aquaculture species in Bataan from 2019 to 2021. Albeit showing slight fluctuations, highest production was recorded for milkfish over the three-year period.

Table 49. Volume of Production by Type of Aquafarm in Bataan (in Metric Tons), 2019 to 2021.

	2019	2020	2021
Brackishwater Fish Pen	-	2.58	0.11
Brackishwater Fishpond	9,747.38	8,788.75	9,462.27
Freshwater Fishpond	1,010.07	1,097.38	1,146.59
Oyster	-	0.93	0.15
Mussel	234.95	117.52	49.83

Source: Fisheries Statistics of the Philippines 2019-2021.

Table 50. Volume of Production of Marine Species in Bataan (in Metric Tons), 2019 to 2021.

	2019	2020	2021
Anchovies	395.88	732.18	781.85
Big-eyed Scad	206.86	450.06	408.25
Bigeye Tuna	175.11	138.12	75.13
Blue Crab	2,725.97	2,462.67	2,098.92
Cavalla	199.34	187.73	279.48
Crevalle	425.30	391.61	492.50
Eastern Little Tuna	192.45	139.86	134.52
Fimbriated Sardines	307.26	412.92	565.68
Frigate Tuna	225.86	295.10	241.55

Grouper	168.34	142.14	220.58
Indian Mackerel	361.95	422.51	537.38
Bali Sardinella	116.04	68.67	65.60
Indo-Pacific Mackerel	356.36	245.69	393.00
Round Scad	315.63	179.30	352.54
Siganid	455.05	153.52	135.41
Skipjack	179.73	131.21	115.35
Slipmouth	1,168.34	1,562.80	1,312.33
Snapper	56.62	28.92	25.46
Spanish Mackerel	324.97	246.15	225.42
Squid	368.94	468.66	682.85
Threadfin Bream	262.00	382.18	220.78
Yellowfin Tuna	504.70	428.87	379.09

Source: Fisheries Statistics of the Philippines 2019-2021.

Table 51. Volume of Production of Major Inland Species in Bataan (in Metric Tons), 2019 to 2021.

	2019	2020	2021
Silver Perch (Ayungin)	3.29	3.39	0.45
Milkfish (Bangus)	0.26	3.17	3.55
Freshwater Goby (Biya)	9.86	11.51	7.62
Carp (Karpa)	0.10	0.11	0.84
Mudfish (Dalag)	3.71	2.19	3.07
Gourami	0.38	0.06	0.54
Freshwater Catfish (Hito)	1.01	3.01	3.20
Freshwater Eel (Igat)	0.53	0.12	2.33
Freshwater Catfish (Kanduli)	4.35	6.67	23.50
Tilapia	24.65	25.34	26.65

Source: Fisheries Statistics of the Philippines 2019-2021.

Table 52. Volume of Production of Major Aquaculture Species in Bataan (in Metric Tons), 2019 to 2021

	2019	2020	2021
Carp	-	0.09	-
Catfish	0.23	0.28	0.28
Milkfish	8,608.00	7,644.06	8,385.78
Mud Crab	123.97	98.85	86.23
Mussel	234.95	117.52	49.83
Tiger Prawn	717.01	614.56	634.03
Tilapia	1,097.33	1,167.65	1,216.06
White Shrimp	38.40	32.00	14.73

Source: Fisheries Statistics of the Philippines 2019-2021.

Implications and Recommendations

The recent decline in fisheries production may be attributed to different factors including illegal, unreported, and unregulated (IUU) fishing, loss of fishing grounds and habitat, and weather disturbances. To address these issues, actions including strengthening monitoring and surveillance mechanisms for better law enforcement and establishment of fish sanctuaries and marine protected areas should be prioritized. In addition, fisheries management plans should be formulated to ensure sustainable fisheries stocks and production.

References

Philippine Statistics Authority (PSA). 2022. Fisheries Statistics of the Philippines 2019-2021.

PSA. 2022 Regional Economic and Social Trends (RSET) Region III Central Luzon.

Food Security and Livelihood Management

027 Malnutrition rate

Description

This indicator measures the proportion of the population with access to sufficient daily dietary requirements.

Rationale

Nutrition status is an indicator that integrates availability and equitability of access to food and livelihood. While other factors (such as agriculture and trade) may affect these figures, nutrition status is also affected by the availability of seafood.

Data Requirements

- Number of undernourished males (all ages)
- Number of undernourished females (all ages)
- Number of undernourished males (less than 5 years old)
- Number of undernourished females (less than 5 years old)

Results

Based on the data from the Provincial Health Office (PHO) through the Operation *Timbang* (OPT) Plus program of the National Nutrition Council, malnutrition is not a public health concern for Bataan Province. As shown in **Figures 38**, the prevalence rate of underweight and severely underweight males aged less than 5 years old (0-59 months) remained below 5% (4.6% in 2016 down to 3.4% in 2021). This is equivalent to 1,824 males in 2016 and 1,203 in 2021. The same can be observed for females aged less than 5 years old (0-59 months) (**Figure 39**). In 2016, there were 1,611 underweight and severely underweight females (4.3%), while in 2021 there were 1,000 females (3.0%) under said categories (**Figure 39**).

Figure 38. Weight-for-age status of males aged less than 5 years old (0-59 months) in Bataan Province, 2016 to 2021.

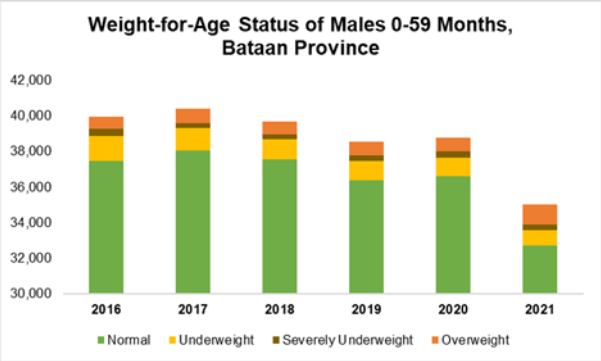
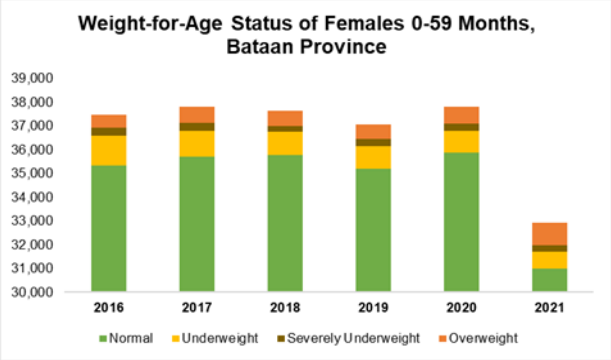


Figure 39. Weight-for-age status of females aged less than 5 years old (0-59 months) in Bataan Province, 2016 to 2021.



Source: Provincial Health Office.

Figure 40. Length/height-for-age status of males aged less than 5 years old (0-59 months) in Bataan Province, 2016 to 2021.

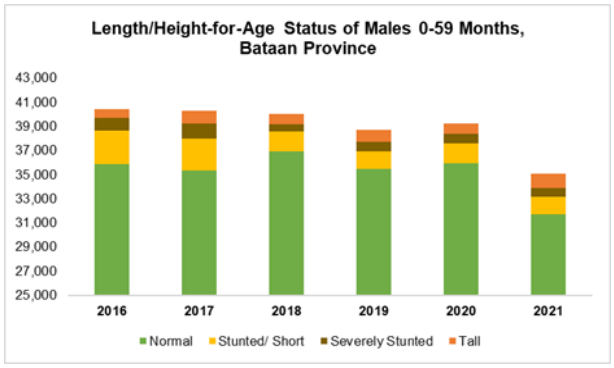
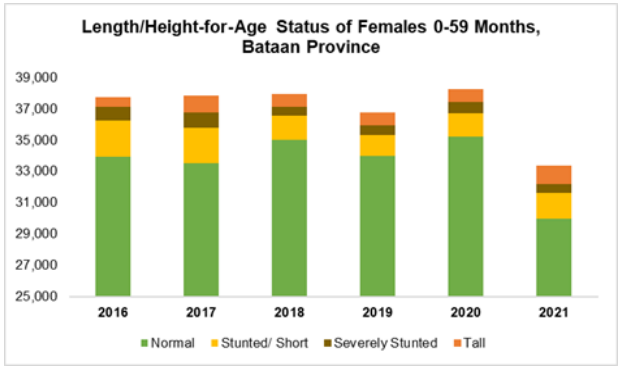


Figure 41. Length/height-for-age status of females aged less than 5 years old (0-59 months) in Bataan Province, 2016 to 2021.

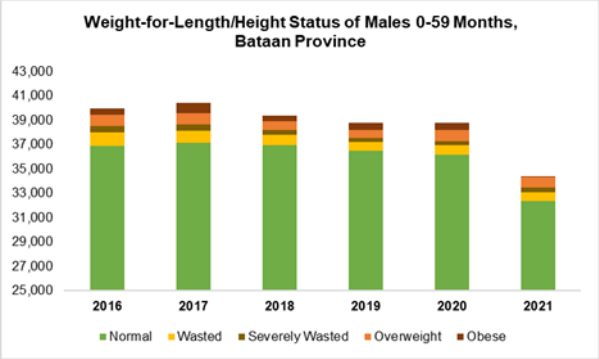


Source: Provincial Health Office.

Similarly, prevalence rate for stunted and severely stunted children below 5 years of age (0-59 months) remained below 10% from 2016 to 2021. In 2016, there were 3,805 stunted and severely stunted males (prevalence rate of 9.4%), and 3,216 females (prevalence rate of 8.5%) (**Figures 40-41**). By 2021, there were 2,206 stunted and severely stunted males and 2,206 females, equivalent to 6.3% and 6.6% prevalence rates, respectively (**Figures 40-41**).

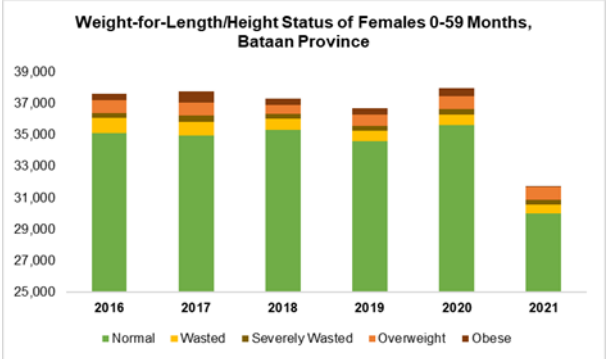
Likewise, weight-for-length/height data from 2016 to 2021 show that the prevalence rates for both wasted and severely wasted, as well as overweight and obese children below 5 years old remained below 5%. In 2016, there were 1,612 wasted and severely wasted males (4.0% prevalence rate), and 1,317 females (3.5%) (**Figures 42-43**). By 2021, there were 1,082 males (3.2%) and 872 females (2.8%) with low weight for length/height. Meanwhile, there were 1,448 overweight and obese males (3.6% prevalence rate), and 1,183 females (3.1%) in 2016. By 2021, there were 867 males (2.5%) and 810 females (2.6%) with high weight for length/height (**Figures 42-43**).

Figure 42. Weight-for-length/height status of males aged less than 5 years old (0-59 months) in Bataan Province, 2016 to 2021.



Source: Provincial Health Office.

Figure 43. Weight-for-length/height status of females aged less than 5 years old (0-59 months) in Bataan Province, 2016 to 2021.



Source: Provincial Health Office.

Despite not being a public health concern for the province, the PHO together with the health offices and units at the city and municipal levels continue to implement a nutrition program for infants and young children.

This includes dietary supplementation and micronutrient supplementation (Vitamin A, Iron, etc.), promotion of breastfeeding, and complementary feeding.

Implications and Recommendations

Through the continuing OPT program, the nutritional status of infant and young children is being assessed annually. Although the 6-year data show consistency in prevalence rates being below the national nutrition thresholds, it should be continuously monitored to ensure that good nutritional status will be sustained through time.

The provincial, city and municipal governments need to be more aggressive in rolling out programs to significantly reduce, if not totally eliminate, the number of malnourished children, including those belonging to the overweight and obese categories.

References

PHO. 2016-2021. Operation *Timbang* (OPT) Plus Consolidated Report.

Implementation of the Healthy Paaralan para sa Malusog at Matatag na KaBATAAN program in Bataan.

028 Poverty, education and employment

Description

This indicator estimates the degree of poverty, employment and the potential for employment.

Rationale

The degree of poverty reflects an area's degree of social development. Productive employment is a foundational element needed to provide households with goods and services in their struggle against poverty, while education is a key to productive employment.

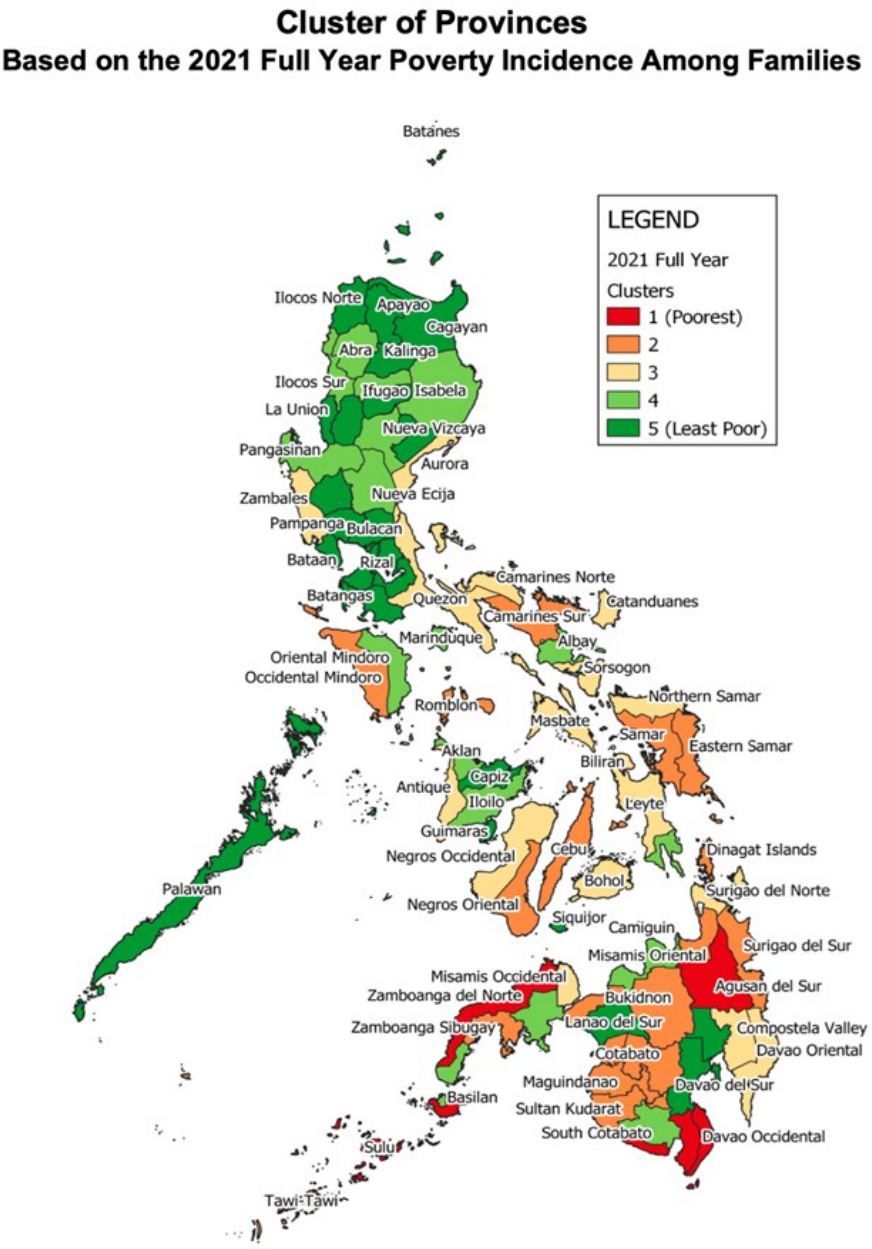
Data Requirements

- Poverty threshold
- Poverty incidence
- Income per capita (male/female)
- Total employment (male/female)
- Education; proportion of population (male/female; primary/secondary/tertiary)
- Budget allocation for livelihood programs

Results

While poverty incidence rose from 5.8% in 2018 to 9.0% in 2021 (**Table 53**), **Figure 44** shows that Bataan remains to be one of the least poor provinces in the country. These estimates were also lower than the national figures (**Table 53**). Looking into other poverty measures, such as, income gap, poverty gap, and severity of poverty, the estimates computed in the province slightly increased from 2015 to 2021, with the exception of income gap which decreased from 2018 to 2021 (**Table 54-56**). Notwithstanding, the estimates consistently remained below the national percentages throughout the period (**Table 54-56**). In addition, the annual per capita poverty threshold continued to increase from 2009 to 2021 (**Table 57**). Among the provinces in Central Luzon, Bataan had the second lowest estimates for magnitude of poor families in 2018 and 2021, after having the lowest number in 2015 (**Table 53**). Family Income and Expenditure Survey (FIES) shows that the average annual family income in Bataan is Php 397,360 and Php 372,430 in 2018 and 2021, respectively, both of which are higher than the regional figures (**Table 58**).

Figure 44. Cluster of provinces based on the Full Year Poverty Incidence Among Families.



Source: 2021 Full Year Official Poverty Statistics of the Philippines.

Table 53. Poverty Incidence and Magnitude of Poor Families by Province in Region III, 2015, 2018, and 2021.

Region/Province	Poverty Incidence among Families (%)			Magnitude of Poor Families		
	Estimates (%)			Estimates		
	2015	2018	2021	2015	2018	2021
Philippines	18.0	12.1	13.2			
Region III	8.3	5.2	9.7	212,900	143,370	247,660
Aurora	27.3	11.8	16.5	16,180	6,100	9,130
Bataan	0.8	5.8	9.0	1,400	10,930	18,540
Bulacan	3.1	3.5	8.3	23,400	28,740	73,150
Nueva Ecija	16.8	6.6	10.0	98,150	35,250	57,040
Pampanga	2.7	2.1	2.9	14,260	13,880	20,210
Tarlac	13.2	7.7	8.1	40,780	25,260	28,610
Zambales	12.3	10.9	17.7	18,720	23,210	40,980

Source: 2022 RSET Region III; 2021 Full Year Official Poverty Statistics of the Philippines.

Table 54. Income Gap by Province in Region III, 2015, 2018, and 2021.

Province	Income Gap		
	Estimates (%)		
	2015	2018	2021
Philippines	25.1	21.7	22.6
Region III	20.3	17.7	18.8
Aurora	26.9	18.7	21.8
Bataan	15.9	19.5	17.4
Bulacan	18.7	17.2	19.7
Nueva Ecija	20.0	17.0	16.6
Pampanga	11.8	14.6	13.6
Tarlac	21.0	15.2	19.8
Zambales	22.8	22.8	21.9

Source: 2021 Full Year Official Poverty Statistics of the Philippines.

Table 55. Poverty Gap by Province in Region III, 2015, 2018, and 2021.

Province	Poverty Gap		
	Estimates (%)		
	2015	2018	2021
Philippines	4.5	2.6	3.0
Region III	1.7	0.9	1.6
Aurora	7.3	2.2	3.6
Bataan	0.1	1.1	1.6
Bulacan	0.6	0.6	1.6
Nueva Ecija	3.4	1.1	1.7
Pampanga	0.3	0.3	0.4
Tarlac	2.8	1.2	1.6
Zambales	2.8	2.5	3.9

Source: 2021 Full Year Official Poverty Statistics of the Philippines.

Table 56. Severity of Poverty by Province in Region III, 2015, 2018, and 2021.

Province	Severity of Poverty Estimates (%)		
	2015	2018	2021
Philippines	1.7	0.9	1.0
Region III	0.5	0.3	0.5
Aurora	2.7	0.6	1.1
Bataan	0.0	0.3	0.5
Bulacan	0.2	0.2	0.5
Nueva Ecija	1.0	0.3	0.4
Pampanga	0.1	0.1	0.1
Tarlac	0.9	0.3	0.5
Zambales	0.9	0.9	1.3

Source: 2021 Full Year Official Poverty Statistics of the Philippines.

Table 57. Annual Per Capita Poverty Threshold (in Pesos) by Province in Region III, 2009, 2012, 2015, 2018, and 2021.

Region/Province	Annual Per Capita Poverty Threshold (in Pesos) All Areas				
	2009	2012	2015	2018	2021
Philippines	-	-	22,747	25,813	28,871
Region III	18,188	20,170	22,867	26,954	31,584
Aurora	14,979	18,466	22,665	25,219	30,282
Bataan	17,643	19,383	23,127	29,496	31,046
Bulacan	18,434	19,910	21,181	27,244	33,591
Nueva Ecija	18,732	20,847	23,006	25,466	29,751
Pampanga	17,399	19,163	21,686	26,633	33,122
Tarlac	17,559	18,810	22,344	25,386	29,704
Zambales	18,448	21,885	26,983	29,977	33,383

Source: 2022 RSET Region III; 2021 Full Year Official Poverty Statistics of the Philippines.

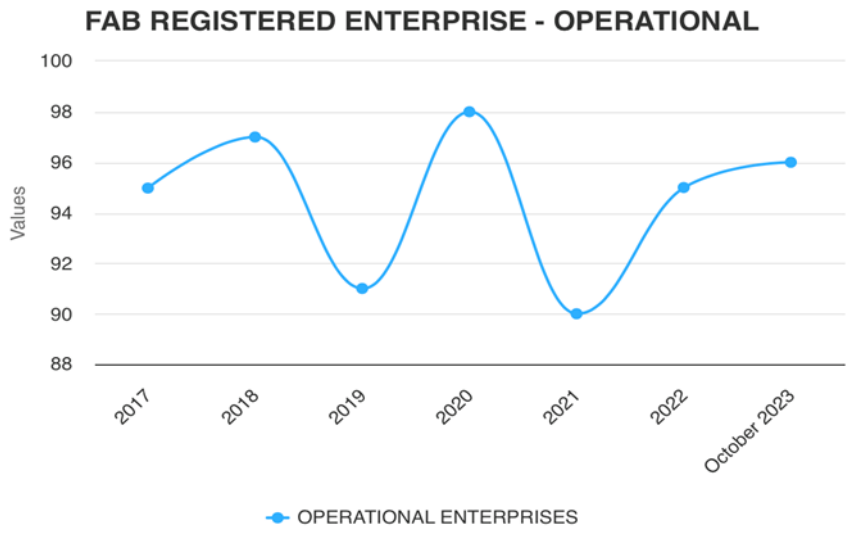
Table 58. Average Annual Family Income and Expenditure by Province in Region III, 2018 and 2021.

Region/Province	Income Average		Expenditure Average	
	2018	2021	2018	2021
Region III	333,968	328,540	270,206	258,450
Aurora	284,410	278,370	224,210	226,510
Bataan	397,360	372,430	306,560	281,040
Bulacan	356,940	340,370	281,100	253,360
Nueva Ecija	308,780	267,120	223,070	185,270
Pampanga	333,400	372,140	290,740	319,820
City of Angeles	398,260	443,240	328,330	360,260
Tarlac	280,110	305,770	240,220	254,240
Zambales	297,320	252,060	271,360	224,440
City of Olongapo	382,060	335,530	345,730	314,370

Source: 2022 RSET Region III.

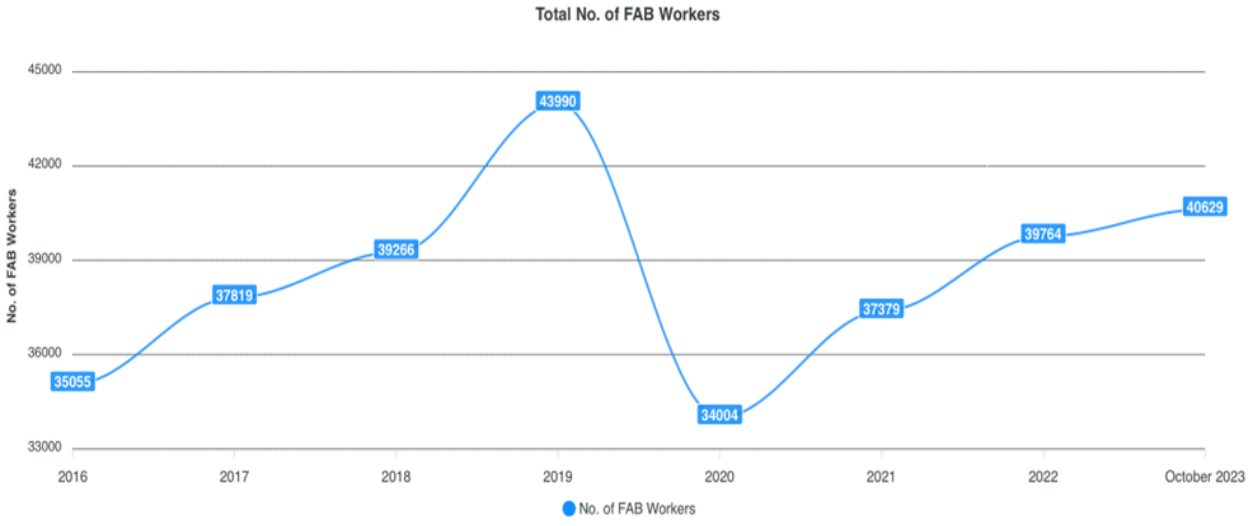
Data from the Philippine Statistics Authority (PSA) shows that the employment rate in the whole of Central Luzon increased from 95.3% in October 2022 to 96.7% in October 2023 while the rate of unemployment decreased from 4.7% to 3.3% during the same period. As reported by the Public Employment Service Office, the province continues to generate employment. In the Freeport Area of Bataan (FAB) alone, the total number of firms has continued to increase beginning in 2021. As of October 2023, 96 firms have been registered as operational enterprises in the FAB (**Figure 45**). The number of FAB workers, on the other hand, started to increase from a total of 34,004 in 2020 to 40,629 in 2023 (**Figure 46**). In the Hermosa Ecozone Industrial Park (HEIP), data from 2020 shows that six (6) industrial and 11 commercial firms were operational.

Figure 45. No. of Operational Freeport Area of Bataan (FAB) Registered Enterprises, 2017-2023.



Source: FAB.

Figure 46. Total No. of FAB Workers, 2016-2023.



Source: FAB.

Elementary education is offered in 185 public and 79 private schools in the province. The province has a total of 39 public and 35 private secondary schools. There has been a steady increase in enrollment in public elementary and secondary schools from school year (S.Y.) 2017 –2018 to S.Y. 2021-2022 and S.Y. 2015-2016 to S.Y. 2020-2021, respectively (**Tables 59-60**).

Table 59. Summary of Public and Private Elementary Enrollment and Number of Teachers in Bataan by School Year.

School Year	Public Elementary		Private Elementary	
	Enrollment	No. of Teachers	Enrollment	No. of Teachers
2014 - 2015	94,952	2,784	7,881	418
2015 - 2016	94,519	2,636	8,050	408
2016 - 2017	93,257	2,674	7,867	437
2017 - 2018	89,125	3,091	7,877	657
2018 - 2019	89,386	3,354	8,620	459
2019 - 2020	90,967	3,684	8,335	468
2020 - 2021	101,438	3,479	5,900	409
2021 - 2022	107,624	3,458	4,235	436

Source: PPDO.

Table 60. Summary of Public and Private Secondary Enrollment and Number of Teachers in Bataan by School Year.

School Year	Public Secondary		Private Secondary	
	Enrollment	No. of Teachers	Enrollment	No. of Teachers
2015 - 2016	47,371	1,631	10,395	385
2016 - 2017	48,844	1,894	11,582	448
2017 - 2018	51,682	2,205	13,674	808
2018 - 2019	54,822	2,339	20,598	642
2019 - 2020	69,661	2,444	15,997	669
2020 - 2021	76,355	2,754	14,901	368
2021 - 2022	77,346	2,790	9,311	731

Source: PPDO.

Tertiary education is offered in three (3) government institutions such as the Bataan Peninsula State University (with 6 campuses located in Balanga City, Abucay, Orani, Dinalupihan and Bagac), Polytechnic University of the Philippines in Mariveles, and Limay Polytechnic College and in ten (10) private institutions situated in different municipalities and city in Bataan. Post graduate and 2-year technical vocational courses are also offered at BPSU. **Table 61** shows the total enrollment and number of graduates for tertiary education for S.Ys. 2020–2021 and 2021-2022.

Table 61. Summary of College Enrollment in Bataan, S.Y. 2020-2021 and S.Y. 2021-2022.

	Name of School/Location	Enrollment	Number of Graduates	Enrollment	Number of Graduates
		S.Y. 2020-2021		S.Y. 2021-2022	
	PUBLIC				
1	Bataan Peninsula State University (Main Campus)	13,386	573	15,517	1,475
2	Bataan Peninsula State University (Abucay Campus)	1,098	60	1,645	109
3	Bataan Peninsula State University (Bagac Campus)	516	25	564	78
4	Bataan Peninsula State University (Balanga Campus)	5,859	250	7,090	655
5	Bataan Peninsula State University (Dinalupihan Campus)	1,592	94	1,758	150
6	Bataan Peninsula State University (Orani Campus)	951	6	1,245	78
7	Polytechnic University of the Philippines, Mariveles	3,371	-	3,461	413
8	Limay Polytechnic College, Limay	1,159	-	1,159	100
	Sub-total	**27,932**	**1,008**	**32,439**	**3,058**
	PRIVATE				
1	Bataan Heroes Memorial College, Balanga City	4,006	125	5,095	258
2	Tomas del Rosario College, Balanga City	934	-	1,063	122
3	Microcity Computer College, Balanga City	144	21	201	16
4	Eastwoods Professional College of Science & Technology, Balanga City	961	64	1,080	110
5	AMA Computer Learning Center College, Balanga City	337	26	337	32
6	Asia Pacific College of Advanced Studies, Balanga City	2,721	42	3,767	298
7	Philippine Women's University, Balanga City	227	-	27	12
8	Maritime Academy of Asia and the Pacific (MAAP), Mariveles	3,207	198	3,207	151
9	Colegio de San Juan de Letran	252	1	348	39
10	Eastwoods Professional College of Science & Technology, Dinalupihan	548	-	731	117
	Sub-total	**13,337**	**477**	**15,856**	**1,155**
	TOTAL - PUBLIC AND PRIVATE	**41,269**	**1,485**	**48,295**	**4,213**

Source: PPDO.

Implications and Recommendations

Despite the increase in poverty incidence from 2015-2021, Bataan remains to be one of least poor provinces in the country. The province continues its effort to attract businesses and investments, and thus the increase in registered enterprises in its freeport zone. At the same time, the presence of the Bataan Natural Park and Balanga Wetland and Nature Park which offer recreational activities and facilities as well as ecotourism products and services also contribute to the growing economy of the province. While economic development is pursued, the government should ensure that economic growth is inclusive and sustainable. In terms of education, there has been a continual increase in enrollment particularly in public elementary and secondary schools. The government should continue the subsidy for public education including the tertiary level to provide more balanced opportunities for those population below the poverty threshold.

References

FAB. Total No. of Operational FAB Registered Enterprises (FREs).
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Provincial Government of Bataan. 2021 Socio-Economic Profile (SEP).
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Food Security and Livelihood Management

029 Livelihood programs

Description

This indicator measures the availability of programs, people, and budget to help enhance coastal livelihoods. It also looks into the sectors benefited and the impacts of these livelihood programs.

Rationale

Livelihood programs help optimize productivity of coastal areas and help households maximize their potential for income.

Data Requirements

- Existing livelihood programs
- Staff and budget allocation for livelihood programs
- Accessibility and budgets
- Sectors covered
- Impacts of livelihood programs

Results

Various livelihood programs are being implemented by the local government and NGAs in the Province of Bataan. In 2019, the Provincial Cooperative and Enterprise Development Office (PCEDO) supported the establishment of *Barangay* Quinawan Cashew Processing Center to provide a sustainable income generating activity for the *Barangay* Quinawan Agriculture Cooperative. The total budget for the activity amounted to Php 1,760,000.00.

With financial support from the Department of Labor and Employment (DOLE) (Php 1,000,000.00) and the Department of Science and Technology (DOST) (Php 1,885,200.00) through the Regional Grants-in-Aid Program, and technical assistance from the Department of Trade and Industry (DTI) and the Purveyors of Local, the establishment of the 1Bataan Handicraft Industry Ecosystem (Phase 1) was undertaken in 2021 with the *Sining Kahoy* Association of Bagac and the BAMASAGKA Producers Cooperative as main beneficiaries. The 1Bataan Handicraft Industry Ecosystem is a community-shared manufacturing program focused on producing small batch handcrafted products where industrial processes are improved and taught to local communities.

Other livelihood programs that were implemented by DOST from 2017-2022 are summarized in **Table 62.**

Barangay Quinawan's Cashew Processing Center.

Table 62. Livelihood Programs Implemented by DOST III Provincial Science and Technology Office (PSTO) Bataan, 2017-2022.

Year	Livelihood Program	Program Description	Budget Allocation	Beneficiaries
2017-2022	Small Enterprise Technology Upgrading Program (SETUP)	SETUP is one of the flagship programs of DOST for Filipino micro, small, and medium enterprises (MSMEs) to support and sustain their growth thru acquisition of appropriate technologies. DOST provides technological innovations to improve their operations thereby improving their productivity and competitiveness. SETUP is open to MSMEs based in the Philippines and owned by Filipino citizens that are operational for at least 3 years and with legal personality. MSMEs must also belong to identified priority sector - food processing, furniture, marine and aquatic resources, agriculture and horticulture, pharmaceuticals, ICT and electronics, gifts/ housewares/decors and metals and engineering. SETUP qualifiers can avail seed funds for technology acquisition which are payable in 3 years at 0% interest; technical trainings; technical consultancy; assistance in packaging and label designs; product testing and calibration and others.	2017: Php 4,484,500.00 2018: Php 3,565,560.00 2019: Php 3,712,598.50 2020: Php 4,012,235.50 2021: Php 2,109,935.50 2022: Php 3,664,599.28	Micro, Small, and Medium Enterprises in Bataan

2017-2022	Grants-in-Aid (GIA) Program	The DOST's Grant-in-Aid (GIA) Program aims to harness the country's scientific and technological capabilities to spur and attain a sustainable economic growth and development. Through the funding of relevant S&T undertakings, the GIA program is designed to contribute to productivity improvement and quality of life for Filipinos by generating and promoting appropriate technologies. It also aims to strengthen the participation of various S&T sectors particularly in research and development (R&D), promotion, technology transfer and utilization, human resources development, information dissemination, advocacy, and linkages.	2019: Php 3,461,899.60 2020: Php 5,254,656.00 2021 Php 5,102,800.00 2022 Php 9,164,185.92	Any Filipino public or private entity such as State Universities and Colleges (SUCs), LGUs, Cooperatives, etc.
2018-2022	Community Empowerment thru Science and Technology	CEST is another flagship program developed by the DOST in support to the government's national program on poverty. It is a package of S&T interventions which aims to build progressive, empowered, and resilient rural communities.	2019: Php 2,095,727.00 2020: Php 1,562,515.00 2021: Php 3,179,049.60 2022: Php 3,227,871.68	Members of the following: Indigenous People Marginalized sector (Farmers/ Fisherfolk) Women's group Areas with conflict Members of GIDA communities

Source: DOST III PSTO Bataan.

In 2017, the regional office of the Department of Social Welfare and Development (DSWD) allocated Php 2,902,440.00 as part of the agency's Cash-for-Work Program, benefiting 1,100 individuals in the municipality of Orani.

Under the Risk and Resiliency Program for Climate Change Adaptation and Mitigation-Disaster Risk Reduction (RRP CCAM DRR), which is a 10-day cash-for-work activity entitled "Mangrove Reforestation, Establishment of Nursery, and Tree Growing," 300 indigent residents of Orion received Php 3,000 each as compensation for their 12-day work in 2020. In 2022, 776 individuals from the municipalities of Orani, Hermosa, and Dinalupihan participated in the program while in 2023, the municipalities of Bagac, Orion, Pilar, Abucay, Samal, Orani, and Dinalupihan had 389 beneficiaries each. Meanwhile, the DSWD's program Assistance to Individuals in Crisis Situation (AICS) under AFAB's "FABayanihan" project, provided a total of Php 55,920,000.00 to 18,632 FAB workers affected by the pandemic in 2021.

Another initiative of the DSWD is the Sustainable Livelihood Program (SLP), which awarded Php 10,000.00 worth of Livelihood Assistance Grant (LAG) to MSMEs in 2022 to help them recover from the socio-economic impacts of COVID-19.

To address the high rice prices and ensure rice availability and affordability, and as part of the SLP, payouts amounting to Php 15,000.00 were given to a total of 550 *sari-sari* storeowners and micro rice retailers in 2023.

Under DOLE's *Tulong Panghanapbuhay sa Ating* Disadvantaged/Displaced Workers (TUPAD) program, a total of 2,936 individuals were given temporary wage employment in May 2020. Additionally, the DOLE Integrated Livelihood Program (DILP) or the *Kabuhayan Program*, provided starter kits, *negosyo* karts, and group projects to different beneficiaries in the province (**Table 63**).

Table 63. Summary of the DOLE Integrated Livelihood Program implementation in Bataan, 2017 -2022.

Year	Livelihood Program	Program Description	Budget Allocation	Beneficiaries
2017	DOLE Integrated Livelihood Program (Starter Kit, *Nego*Kart and Group Project)	Selected beneficiaries are provided with livelihood opportunities, as well as training support, to help augment their incomes and consequently reduce their vulnerability.	5,002,000.00	507
2018			5,020,000.00	502
2019			4,538,370.00	654
2020			4,830,000.00	690
2021			20,195,000.00	1,803
2022			4,400,000.00	456

Source: DOLE Bataan.

Since 2017, the Department of Agriculture (DA) through the Provincial Veterinary Office (PVO) has been implementing its Livelihood Improvement Program and allocated 431 cows, 107 carabaos, and 75 horses for 613 farmer-beneficiaries, 316 of whom have received their allocation during the pandemic. In 2022, the DA through the Agricultural Training Institute Regional Training Center III and in partnership with Office of Senator Grace Poe (OSGP) and LGUs extended the *Binhi ng Pag-asa* Program (BPP) to Bataan to help enhance the potential of the youth in terms of community and agricultural development. 455 young farmers from the municipalities of Hermosa, Orani, Samal, Abucay, Pilar, Orion, Limay, Mariveles, Bagac, and Morong and Balanga City received a total of 3,700 female chickens, 910 male chickens, and 455 bags of grower feeds to initiate a free-range chicken production business.

At the city and municipal level, various livelihood programs in the form of trainings, provision of materials and equipment, and financial support are extended to beneficiaries like farmers, farm owners, fisherfolk, women, indigenous peoples, etc. (**Table 64**). While some programs are initiated by the LGUs themselves, majority are carried out through the assistance of NGAs, for instance, the DA. An example is the DA-BFAR-led *Ahon Lahat, Pagkaing Sapat Laban sa* COVID (ALPAS) program, which provided livelihood support to fishers from the municipalities of Abucay, Limay, and Hermosa through the assistance of the OPA. Most of these programs intend to increase fish population in identified sites, as well as improve capture fisheries for sustainable fisheries development, poverty alleviation, and food security. Apart from this, OPA led its own livelihood trainings to different stakeholders in the province (**Table 65**).

Distribution of cows to farmers (Bataan PIO, 2021).

Awarding of livelihood kits to IPs (PIA, 2022).

Table 64. Materials and equipment and/or trainings provided as part of livelihood programs in LGUs in Bataan, 2017-2023.

Municipality/City	Provided Materials and Equipment and/or Trainings	Beneficiaries
Abucay	*Ahon Lahat, Pagkaing Sapat Laban sa* Covid (ALPAS): 2 Units of Fish-Vending Equipment Elevated Solar Dryer 12 Gill Nets 2 Marine Engines 7 Solar Lamps 9 Polyethylene (PE) Nets Earthen Pond for Bangus Nursery Water Quality Test Kits	Fisherfolk and Farm Owners
	Fishing Supply Trading	*Kinikilalang Mangingisda ng Mabatang*
	Fishing Boat Project	*Kasapian ng Mananamahan sa Pandilis* Association
	Dried Crispy Dilis	PWDs
	Motorized Fishing Boat	Fisherfolk & Displaced Workers
Bagac	Provision of Fishing Paraphernalia from BFAR	Fisherfolk
	Provision of Fish Processing Package (Smoked-Fish, Bottled Bangus)	
Balanga City	*SAgot sa Pag-unLAD* (SAPLAD) Program	Farmers & Fisherfolk
	IPangkabuhayang Proyekto Para sa Balangueño	
	Trainings on *Tahong* Chips and Crab Paste Making	Fisherfolk
	Boat Admeasurement Training and Detection of Dynamite Illegal Fishing	
	Tilapia and Bangus Fingerlings Dispersal	
	Distribution of Fishing Paraphernalia	
	Distribution of Banca	
	Fuel Subsidy	
	Training on Postharvest Technology	
	Training on Dishwashing Liquid and Fabric Conditioner for RIC	

Dinalupihan	*Balik Sigla sa Ilog at Lawa* (BASIL) Project: Pond Preparation Inputs and Organic Pest Control	Fishpond Operators
	Balik Sigla sa Ilog at Lawa Project (BASIL): Tilapia Fingerlings Dispersal from BFAR	
Hermosa	Milkfish Fingerling Dispersal	Farmers and fisherfolk
	BASIL Project: Tilapia Fingerling Dispersal	
	Provision of Motor Boat and Banca	
	Provision of 25-Footer Motorized Fiberglass Reinforced Plastic (FRP) Boat	
	Provision of Fishing Paraphernalia (Gill Net, PE Net, Panti, Handvit, Headlight, Portable Solar Lamp, etc.)	
	Pond Preparation and Organic Pest Control	
	Fuel Subsidy	
	ALPAS: Supply and Materials for the Establishment of a Mangrove Crab Lying-in Project	
Limay	ALPAS: 11 Gill Nets	Fisherfolk
	2 12 Horsepower Marine Engines	
	7 Solar Lamps	
	1 Fish-Vending Equipment	
	5 100-Meter Long Lines	
	Community Fish Landing Center	
Mariveles	Distribution of Inbred Rice Seeds and Rice Reaper	Farmers
	Distribution of Fertilizer Discount Voucher	
	Distribution of *Binhi ng Palay*, Fertilizer, and NEB PLUS (Liquid Foliar Fertilizer)	
	Distribution of Farm Inputs	
	Training of Freshwater Aquaculture Livelihood Technologies - Grow-out Culture of Tilapia and Catfish	Fisherfolk
	Tilapia Fingerling Dispersal	
	Distribution of Fisheries Livelihood Equipment	
	Fuel Subsidy	
	Distribution of Spear Guns and Solar Lamps	IPs
Morong	Distribution of FRP Boats	Fisherfolk
	Distribution of Motor Boats and Fishing Paraphernalia	
	Awarding of Tri-bike and Livestock Under the Bottom-up Budgeting (BuB) Program	Farmers
Orani	Provision of Fishing Paraphernalia (Monofilament PE Net, East Net, Gill Net, Cast Net Life Vest, Solar Lamp, etc.)	Fisherfolk
	Pond Preparation Inputs and Organic Pest Control	
	Dissemination of Genetically Enhanced (GET EXCEL) Tilapia and Improved Brackish Water Enhanced Selected Tilapia (iBEST)	
	Distribution of 30-Foot Fiber Glass Banca	
	Distribution of 6.5 HP, 12 HP, 16 HP Marine Engines, and Banca	
	Post-Harvest Equipment	
	Bangus-Fry and Fingerling, Tilapia Fingerling, and Carp Fingerling Dispersal	
	Fish Vending Equipment	
	Smoke House	
	Nipa Hut	

Orion	Coffee Pressing Shared Service Facility with Eight (8) Equipment, Skills Training and Seminar on Costing and Pricing	Bilolo Upland Farmers Association, Inc.
	Establishment of Orion Fish Processing Plant	Fisherfolk
	Distribution of Fiber Glass Boats, Life Vest, and Other Fishing Paraphernalia	
	Distribution of Fishing Net and Paraphernalia	
Pilar	Distribution of Fishing Implements and Other Paraphernalia	
	Tilapia Fingerling, Bangus Fingerling, and Vannamei Fingerling Dispersal	Fisherfolk
	Distribution of Fish Vending Equipment	
	Fish Deboning Seminar	Women
	Distribution of Seeds, Farm Tools, and Organic Fertilizers	Farmers and/or Farm Owners
	Training on Edible Landscaping and Container Gardening	
	Vitamin Supplementation and Deworming of Livestock	
Samal	Distribution of Fishing Paraphernalia (BuB)	Fisherfolk
	Distribution of BFAR Intervention (Fishpond Inputs, Gill Nets, Cast Net and *Baklad* Nets)	
	Post-Harvest Training (Smoking, Deboning, and Value Addition)	
	Collaboration with DSWD Climate Change Adaption and Mitigation-Cash for Work Program (10-Day Mangrove Planting Activity)	
	Distribution of Fingerlings (*Ulang* and Tilapia)	
	Distribution of Post-Harvest Equipment for Fish Smoking (Smokehouse and Other Materials)	
	Fuel Subsidy (BFAR)	
	Distribution of Mussel Culture Equipment (Techno	

Source: City and Municipal LGUs and OPA.

Table 65. Livelihood trainings provided by OPA, 2022-2023.

Year	Title	No. of Participants	Name of Association
2022	Livelihood Training on Fish Processing (Smoking and Deboning)	12	N/A
	Livelihood Training on Fish Processing (Smoking, Deboning and Fish Bottling)	15	Samal OFW Federation
	Livelihood Training on Fish Processing (Smoking, Deboning and Fish Bottling)	22	Fishermen's Wives
	Livelihood Training on Meat Processing (Siomai, Tocino and Longganisa Making)	20	Samal OFW Federation
	Livelihood Training on Meat Processing (Siomai, Tocino and Longganisa Making)	15	Selected OFWs of Samal
	Skills Training on Coconut-based Products (Virgin Coconut Oil, Cold Pressed Virgin Coconut Oil, Coconut Fudge, Molido Candy and Coconut Jam)	15	Bilolo Upland Farmers Association Inc. (BUFAI) Officers and Members

	Skills Training on Coconut-based Products (Virgin Coconut Oil Products)	20	Binukawan Bicol Marketing Cooperative (BBMC) Officers and Members
	Livelihood Training on Fish Processing (Smoking, Deboning and Fish Bottling)	5	*Tita* Nat's Food Products Workers
	Livelihood Training on Fish Processing (Smoking, Deboning and Fish Bottling)	41	Parents and Students (4Ps)
	Livelihood Training on Fish and Meat Processing	19	Selected Municipal Coop Officers
	Livelihood Training on Fish Processing (Smoking, Deboning and Fish Bottling)	13	Polaris Livelihood Community Association
2023	Livelihood Training on Tahong Processing and Milkfish Deboning	20	Tortugas Canning Association
	Livelihood Training on Milkfish Deboning, Fish Smoking and Fish Bottling (Milkfish in Oil and in Tomato Sauce)	22	*Barangay* Presidents of Solo Parents of Orani
	Skills Training on Fish Processing: Milkfish Deboning, Fish Smoking, Spicy Dilis Making, Milkfish in Oil and Tuyo Gourmet	22	Abucay OFW Family Circle Federation
	Skills Training on Fishery Value-Added Products	20	Selected Students
	Hands-on Training on Tilapia Utilization	20	*Gintong Biyaya* Farmers Assoc. Inc. (GBFAI), Mt.View Alas-asin Cabcaben Farmers Assoc. (MACFA)
	Hands-on Training on Tilapia Utilization	15	*Samahang Magbubukid ng* Gen. Lim
	Hands-on Training on Tilapia Utilization	20	Calaylayan Small Water Irrigation System Assoc.
	Hands-on Training on Tilapia Utilization	15	Sungoy-Bambang Irrigators Assoc.
	Hands-on Training on Tilapia Utilization	20	Tiis Farmers Assoc.
	Livelihood Training on Fish Processing	31	Solo Parents and 4Ps Members
	Livelihood Training on Fish Processing	30	Orion OFW Family Circle Federation
	Livelihood Training on Coconut Based Products	16	Agrarian Beneficiaries Assoc.
	Livelihood Training on Fish Processing	12	Latter Day Saints Members
	Skills Training on Fishery Postharvest Technology	21	Red Tide Affected
	Skills Training on Fishery Postharvest Technology	26	*Samahang Mananahong ng* Sitio Bakawan
	Skills Training on Fishery Postharvest Technology	21	Red Tide Affected (*Samahan ng Kababaihan Nag Kakaisa Tungo sa Kaunlaran sa Pulo (SKKKP)*)
	Livelihood Training on Pineapple Processing	15	Bacong Agrarian Reform Beneficiaries
	Livelihood Training on Fish Processing	25	Almacen Fishermen Coop
	Livelihood Training on Meat Processing	20	Samal OFW Family Circle Association
	Skills Training on Fishery Postharvest Technology	27	Tortugas Canning Association
	Livelihood Training on Fish Processing	25	BMLCA
	Livelihood Training on Meat Processing	20	Fisherfolk Assoc.
	Skills Training on Milkfish Processing	25	Marcos Venture *Masaganang Ani* Agri-Aquaculture Marketing Coop. (MVMA)

Source: OPA.

Under the *Pangkabuhayan sa Pagbangon at Ginhawa* (PPG) program, which aims to assist individuals and families affected by calamities, DTI Bataan awarded *negosyo* kits to 83 micro-entrepreneurs in October 2020 and *sari-sari* store packages worth Php 10,000 each to 34 families affected by a fire incident in Samal in November 2020. In June 2022, DTI awarded Php 15,000.00 worth of livelihood start-up items to indigenous peoples (IPs) in Bayan-bayanan, Dinalupihan and Upper Biaan, Mariveles also under the PPG program. The same recipients received training on bread and pastries processing from the Technical Education and Skills Development Authority (TESDA).

Implications and Recommendations

The national and local governments are continuously implementing livelihood programs that benefit especially the marginalized sector and communities in the province. The implementation of these livelihood programs carefully considers the needs and preferences of the beneficiaries based on their skills and line of work to ensure the sustained flow of income to identified beneficiaries. It is, however, important to evaluate the sustainability of these livelihood and their impacts on the living conditions of the beneficiaries.

The government should continue to monitor the implementation of the various livelihood programs and determine how strategies and actions can be further improved for a more positive and long-lasting impact. This entails the establishment of a system in identifying beneficiaries and a mechanism to stocktake on the appropriate and sustainable livelihood programs that can be implemented in the province.

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Provincial Employment Service Office (PESO). Livelihood programs.
Provincial Social Welfare and Development (PSWDO). Livelihood programs.
Provincial Veterinary Office (PVO). Livelihood programs.

Rice fields in Saguing, Dinalupihan and Duhat, Orion, Bataan Province.

Pollution Reduction and Waste Management

030 Pollution management plans

Description

This indicator accounts the presence of specific policies, plans and programs for pollution reduction and waste management. It further looks into the commitment of local government to implement the plans through allocation of human and financial resources.

Rationale

Specific strategies and action plans are essential to address issues on pollution and waste management. These action plans must be implemented through the commitment of facilities and equipment, as well as financial and human resources.

Data Requirements

- Availability of pollution management plans and their scope (water, air, land)
- Monitoring programs
- Budget for pollution and waste management
- Staff allocation for pollution and waste management
- Adequacy of equipment/facilities

Results

The municipal/city LGUs in the province have worked on the finalization and approval of their respective Ten-Year Solid Waste Management Plans (SWMPs) from 2017 to 2021, in compliance with R.A. 9003, or the Ecological Solid Waste Management Act of 2000. The number of LGUs with approved Ten-Year SWMPs[3] increased from four (4) in 2016 to (31%) to 13 or 100% of the LGUs in the province in 2021 (**Figure 47** and **Table 66**).

The SWMP guides the LGUs in implementing an ecologically sound solid waste management system over a ten-year planning period, which includes strategies for source reduction; collection and disposal; diversion (e.g., recycling and composting); IEC; enforcement of SWM ordinances and policies, among others.

The province monitors the compliance of the city and municipalities on solid waste management through the quarterly meetings of the Provincial Solid Waste Management Board (PSWMB). The DENR and DILG also monitor SWM compliance of *barangays*, municipalities, and city through the Environmental Compliance Audit (ECA), where LGUs are required to submit quarterly SWM-related data.

[3]Ten-Year Solid Waste Management Plans are reviewed and approved by the National Solid Waste Management Commission.

Figure 47. LGUs with approved Ten-Year Solid Waste Management Plan in the Province of Bataan, 2016-2021.

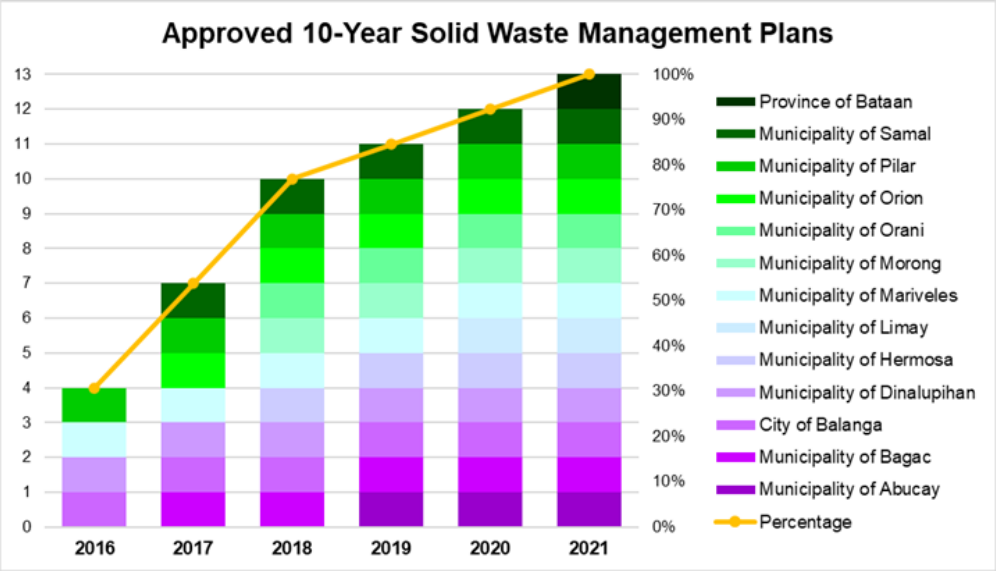


Table 66. Status of Ten-Year Solid Waste Management Plan by LGU, Province of Bataan.

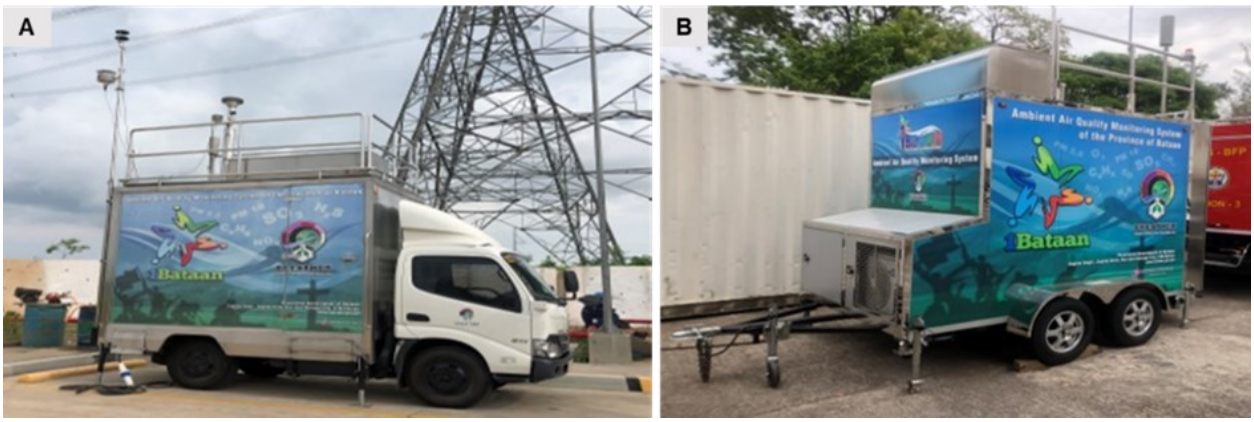
LGU	Status	NSWMC Resolution
Municipality of Abucay	Approved	No. 1252 series of 2019
Municipality of Bagac	Approved	No. 973 series of 2017
City of Balanga	Approved	No. 481 series of 2016
Municipality of Dinalupihan	Approved	No. 149 series of 2015
Municipality of Hermosa	Approved	No. 1173 series of 2018
Municipality of Limay	Approved	No. 501-A series of 2020
Municipality of Mariveles	Approved	No. 483 series of 2016
Municipality of Morong	Approved	No. 1083 series of 2018
Municipality of Orani	Approved	No. 1084 series of 2018
Municipality of Orion	Approved	No. 974 series of 2017
Municipality of Pilar	Approved	No. 138 series of 2015
Municipality of Samal	Approved	No. 975 series of 2017
Province of Bataan	Approved	No. 1460 series of 2021

As one of the major tributaries of Manila Bay, DENR Bataan led the development of the Area-Based Management Plan (ABMP) for Talisay River System (2018-2022) in 2017. Encompassing the City of Balanga and Municipality of Pilar and in line with the updated Operational Plan for the Manila Bay Coastal Strategy (OPMBCS), the Bataan CLSUZP, and BSDS, the ABMP identifies strategies and actions for the management of liquid and solid wastes, informal settlers and illegal structures, soil loss, and habitat and biodiversity.

The DENR and LGUs of Balanga City and Pilar are the lead implementers of the ABMP with support from relevant national agencies (i.e., DOH, DPWH, DepEd, and DILG).

In 2020, the National Economic and Development Authority (NEDA) spearheaded the formulation of the Manila Bay Sustainable Development Master Plan (MBSDMP), which identifies priority measures to reduce pollution load and improve solid waste management by 2040 in the 40 cities and 173 municipalities in 14 provinces in three (3) regions surrounding Manila Bay, including the Province of Bataan.

Water quality monitoring of (A) Orani River, (B) Pangulisanin River, and (C) Talisay River.



Air quality monitoring system (AQMS) of the Province of Bataan consisting of (A) mobile and (B) trailer-type units.

Since 2017, the province through the PG-ENRO is implementing the Provincial Environmental Monitoring Program, which includes a monthly water quality monitoring of selected rivers using handheld multi-parameter water quality checker and real-time ambient air quality monitoring in various stations using mobile and trailer-type air quality monitoring systems (AQMS).

For water quality monitoring, pH, dissolved oxygen (DO), temperature, total dissolved solids (TDS), and ammonia are measured on-site using the water quality checker while water samples are collected from the downstream and upstream stations for fecal coliform analysis. Results of water quality monitoring are evaluated using Class C (classification for agricultural purposes) standards based on DENR Administrative Order (DAO) No. 2016-08 or "Water Quality Guidelines and General Effluent Standards of 2016." PG-ENRO also conducts water quality assessments upon the request of the component LGUs and other clients for baseline information or for verification of water pollution-related complaints. PG-ENRO prepares a semi-annual water quality monitoring report, which is communicated to DENR-PENRO/CENRO and concerned LGUs. Water quality monitoring results are also reported in the quarterly meetings of the Provincial Technical Working Group (TWG) for the Manila Bay Clean-Up and Rehabilitation Program. Results for specific water quality assessments are provided to the requesting party within three (3) to five (5) working days after the conduct of *in situ* readings.

The ambient air quality monitoring (AQMS) of the province measures a total of ten (10) parameters, including six (6) criteria pollutants under the Philippine Clean Air Act (R.A. 8749) (**Table 67**). The AQMS also measures hydro-meteorological parameters, such as wind speed, wind direction, relative humidity, and ambient temperature. It also automatically generates the Air Quality Index (AQI)—a numerical index with corresponding qualitative, color-coded description of ambient air quality.

Results of the AQMS are evaluated using the National Ambient Air Quality Guideline Values and the World Health Organization (WHO) Guideline Values. Possible sources of air pollutants are also identified based on wind direction data, which are plotted on a wind rose using open-source software such as Wind Rose Plots for Meteorological Data (WRPLOT) and Google Earth. The AQMS results are communicated with concerned LGU/s, agencies, and stakeholders, for appropriate action based on PG-ENRO's recommendations. Air quality monitoring results, especially the AQI, are also shared to the public through the 1Bataan Facebook page.

The Provincial Environmental Monitoring Program complements the quarterly water quality monitoring of selected river mouths and coastal waters, and the Balanga City air quality monitoring station of the DENR-EMB Region 3.

The regional and provincial offices of DENR also deploy Environmental Monitoring Officers/ Assistants (EnMOs/As) and Estero Rangers (ERs) for field monitoring and inspection of priority river systems in the province, including pollutant sources along these water bodies and violators of R.A. 9003 and R.A. 9725 (Philippine Clean Water Act).

Table 67. Parameters monitored by the AQMS of the Province of Bataan.

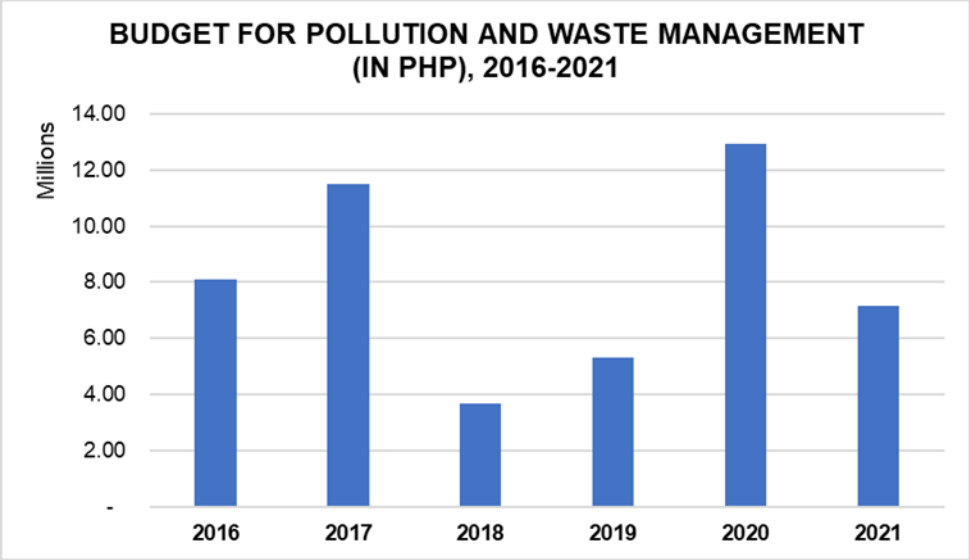
Parameter	Criteria Pollutant (Yes/ No)	Mobile AQMS	Trailer AQMS
$PM_{2.5}$	Yes	X	X
PM_{10}	Yes	X	X
Carbon monoxide (CO)	Yes	X	X
Nitrogen dioxide (NO_2)	Yes	X	
Ozone (O_3)	Yes	X	X
Sulfur dioxide (SO_2)	Yes	X	X
Benzene (C_6H_6)	No		X
Hydrogen sulfide (H_2S)	No	X	X
Total non-methane hydrocarbon (TNMHC)	No	X	X
Methane	No	X	
Air Quality Index (AQI)	No	X	

The PGB allocates budget for pollution and waste management every year, which ranged from Php 3,700,000.00 to Php 12,931,160.00 for 2016-2021 (**Figure 48**). The budget allocation covers the implementation of regular programs and activities including the Provincial Health Office (PHO)'s Environmental Sanitation Program and PG-ENRO's Coastal Clean-Up, Environmental Monitoring, and Solid Waste Management Programs. The annual budget allocation is sourced from the General Fund and the 20% Development Fund.

Pollution management-related programs and services particularly for solid waste management also have budget allocations at the city/ municipality levels, as part of their mandated functions under the Local Government Code of 1991 (R.A. 7160) and R.A. 9003 (**Figure 49**).

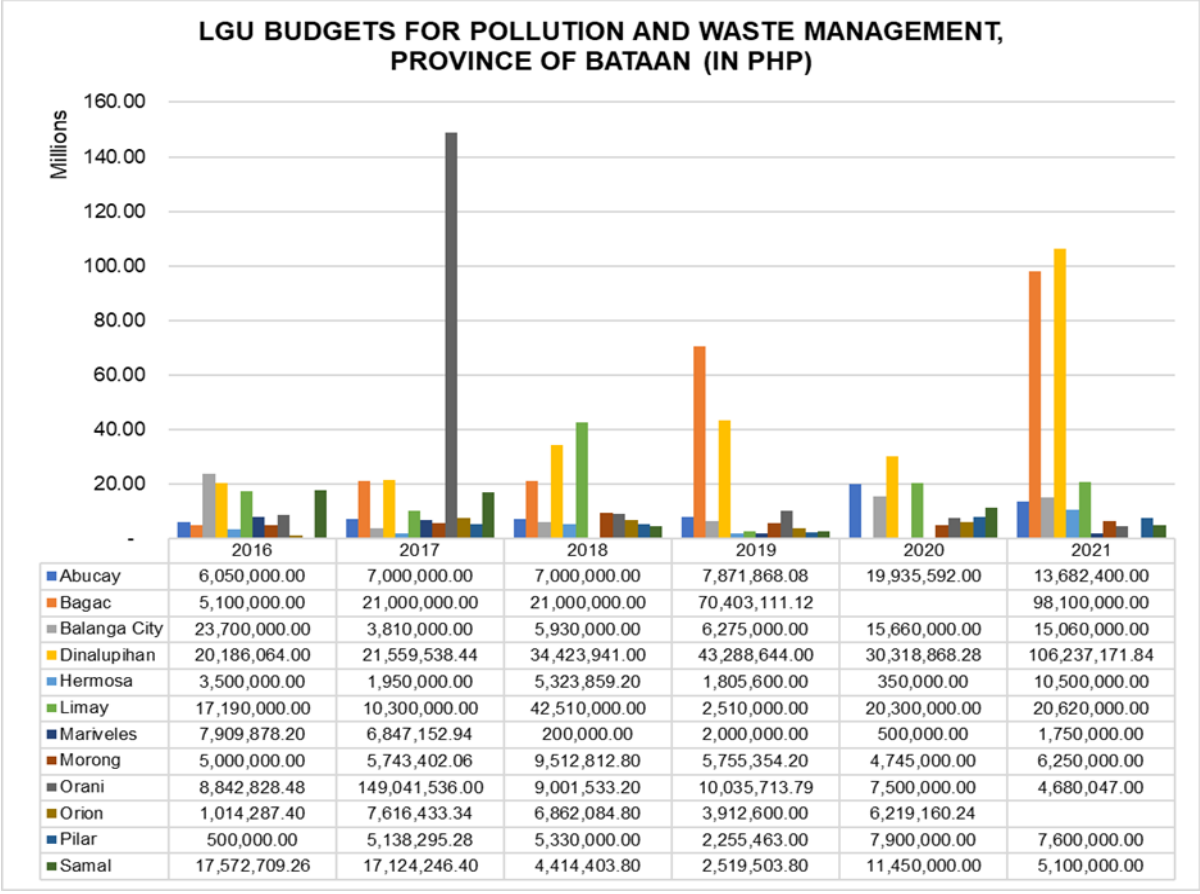
Budget allocation varies annually and increases when capital expenses are programmed for the fiscal year. Capital expenditures include purchase of garbage trucks and equipment, establishment of materials recovery facility (MRF), and development of disposal facility. Annual operational costs for solid waste management include fuel, repair and maintenance, hauling/tipping fees (for LGUs with outsourced waste disposal), IEC campaigns, supplies and materials for clean-up drives, street sweeping, and waste collection.

Figure 48. Annual budget of the PGB for pollution and waste management, 2016-2021.



Source: Provincial Budget Office.

Figure 49. Budget for pollution and waste management by LGU, Bataan Province, 2016-2021.



	2016	2017	2018	2019	2020	2021
Abucay	6,050,000.00	7,000,000.00	7,000,000.00	7,871,868.08	19,935,592.00	13,682,400.00
Bagac	5,100,000.00	21,000,000.00	21,000,000.00	70,403,111.12		98,100,000.00
Balanga City	23,700,000.00	3,810,000.00	5,930,000.00	6,275,000.00	15,660,000.00	15,060,000.00
Dinalupihan	20,186,064.00	21,559,538.44	34,423,941.00	43,288,644.00	30,318,868.28	106,237,171.84
Hermosa	3,500,000.00	1,950,000.00	5,323,859.20	1,805,600.00	350,000.00	10,500,000.00
Limay	17,190,000.00	10,300,000.00	42,510,000.00	2,510,000.00	20,300,000.00	20,620,000.00
Mariveles	7,909,878.20	6,847,152.94	200,000.00	2,000,000.00	500,000.00	1,750,000.00
Morong	5,000,000.00	5,743,402.06	9,512,812.80	5,755,354.20	4,745,000.00	6,250,000.00
Orani	8,842,828.48	149,041,536.00	9,001,533.20	10,035,713.79	7,500,000.00	4,680,047.00
Orion	1,014,287.40	7,616,433.34	6,862,084.80	3,912,600.00	6,219,160.24	
Pilar	500,000.00	5,138,295.28	5,330,000.00	2,255,463.00	7,900,000.00	7,600,000.00
Samal	17,572,709.26	17,124,246.40	4,414,403.80	2,519,503.80	11,450,000.00	5,100,000.00

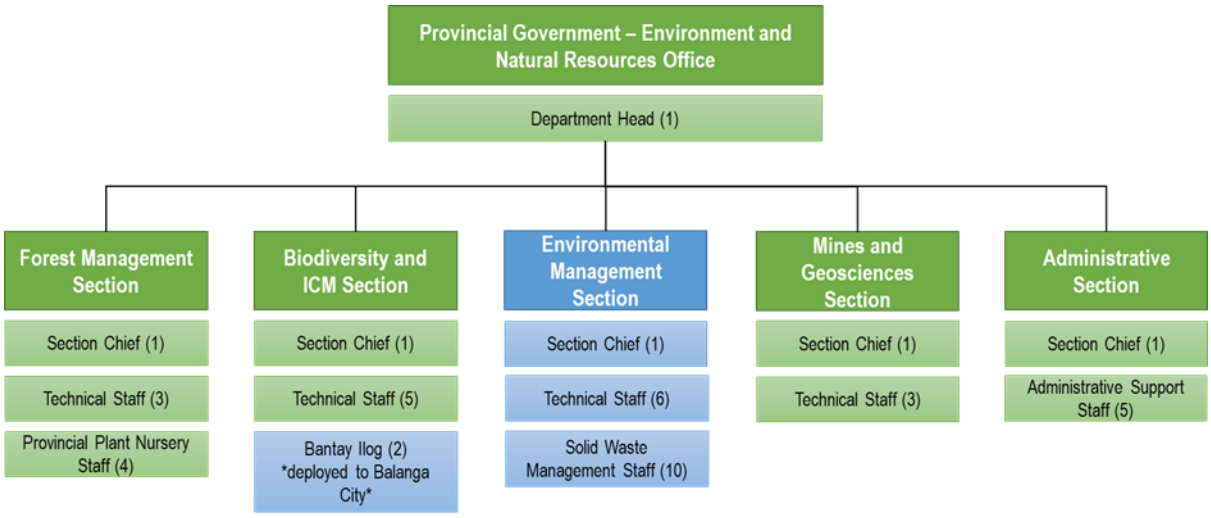
Source: Provincial Budget Office.

The PG-ENRO is the main department of the province that delivers services and implements programs related to pollution and waste management. At present, the PG-ENRO has 19 personnel assigned to perform functions related to pollution and waste management, under the Environmental Management Section and Biodiversity and Integrated Coastal Management Sections (**Figure 50**). The city, municipalities, and *barangays* also allocate staff for SWM, specifically waste collection and disposal (**Table 68**).

The Provincial Government has one (1) mini dump truck and four (4) buggies for waste collection in its service areas. The province also provides support to the city and municipalities on SWM particularly on the establishment of MRFs. From 2018 to 2019, the PGB has donated MRF machineries and equipment to seven (7) LGUs in the province.

The city and municipalities have their respective garbage collection vehicles (e.g., dump truck, compactor, buggy) and garbage disposal equipment (e.g., bulldozer, backhoe, payloader). Some *barangays* also have their own dump truck or compactor while most of the *barangays* use buggy, *kulong-kulong* or trike with cart for waste collection. **Table 69** shows the current inventory of equipment for solid waste management in the city/municipalities.

Figure 50. Organizational structure of PG-ENRO Bataan as of 2021.



Note: Blue color indicates staff allocated for pollution and waste management.

Table 68. Current inventory of SWM personnel by city/municipality, Province of Bataan.

LGU	Position/ Designation	Number	LGU	Position/ Designation	Number
Abucay	Foreman	1	Mariveles	Administrative Staff	4
	Drivers	5		Foreman	3
	Helpers	12		Garbage Truck Driver	9
	Bulldozer Operator	1		Garbage Truck Crew	35
	Mechanic	1		Payloader Operator	1
	MRF Segregator	20		Caretaker	3
	Watchman	1		Ground Crews	8
	Utility	14		Housekeepers	5
	Total	55		Street Cleaners	11

Bagac	Drivers	2		**Total**	**79**
	Helpers	8	**Morong**	Department Head	1
	Mechanic	1		Administrative Staff	7
	Total	**11**		Helpers/ Garbage Collector/Utility	29
Balanga City	CENRO Department Head	1		Mechanic	1
	Administrative Staff	4		**Total**	**38**
	Foreman	2	**Orani**	Office Staff	2
	Heavy Equipment Operator	29		Drivers	5
	Truck Helper	54		Garbage Collectors	27
	Street Sweeper	21		MRF Maintenance	6
	Grasscutter Operator	3		Sweeper/Utility	20
	MRF Helper	1		**Total**	**60**
	River Cleaner	7	**Orion**	Foreman	1
	Task Force Kalikasan	7		Heavy Equipment Operator	2
	Total	**129**		Dump Truck Driver	4
Dinalupihan	Administrative Staff	6		Helper/Utility	16
	Driver	5		Street Sweepers	6
	Waste Collector	16		Garbage Fee Collector	2
	Operator	1		**Total**	**31**
	Total	**27**	**Pilar**	Driver	2
Hermosa	Driver	2		Garbage Collector	2
	Garbage Collector	6		Street Sweepers	2
	Street Sweeper	1		**Total**	**6**
	Total	**7**	**Samal**	Drivers	4
Limay	OIC MENRO	1		Helpers	1
	Truck Driver	1		Operator	12
	Truck Helper	4		Mechanic	1
	Street Sweeper	10		14 K (Links to Barangays)	14
	Heavy Equipment Operator	1		Sorters	16
	Caretaker	1		Environmental Marshals	10
	Total	**12**		**Total**	**48**

Source: Ten-Year Solid Waste Management Plan of the Province of Bataan 2020-2030.

Table 69. Inventory of SWM equipment by city/municipality, Province of Bataan.

LGU	Equipment	Quantity	Present	LGU	Equipment	Quantity	Present
Abucay	Dump truck (4 cu.m.)	10	Serviceable	Mariveles	Dump truck (12 cu.m.)	20	Serviceable; High maintenance
	Elf truck (4 cu.m.)	1	Serviceable		Brick-making machine*	1	Serviceable
	Chariot/trike with cart	8	Serviceable		Vertical paddle-type mixer*	1	Serviceable
	Backhoe	1	Serviceable		Collapsible brick molds*	100	Serviceable
	Grader	1	Serviceable		Sand	1	Serviceable
	Bulldozer	1	Serviceable		Multi-purpose granulator*	1	Serviceable
Bagac	Dump truck (10 cu.m.)	3	For repair		Bottle crusher*	1	Serviceable
	Trike with cart/kulong-kulong	6	Serviceable	Morong	Dump truck (10 cu.m.)	2	Serviceable
	Backhoe loader*	1	For repair	Orani	Dump truck (5 cu.m.)	9	Serviceable
Balanga City	Dump truck (7 cu.m.)	13	Serviceable		Brick-making machine*	1	Serviceable
	Garbage compactor (4 cu.m.)	7	Serviceable		Vertical paddle-type mixer*	1	Serviceable
	Elf truck (4 cu.m.)	1	Serviceable		Collapsible brick molds*	100	Serviceable
	Bulldozer	1	Serviceable		Sand	1	Serviceable
	Backhoe	1	Serviceable		Multi-purpose granulator*	1	For repair
	Garbage	10	Serviceable		Bottle	1	Serviceable
	Bike	7	Serviceable	Orion	Dump truck	4	Serviceable
	Shredder	6	Serviceable		Mini dump	1	Serviceable
	Bio-waste granulator*	1	Serviceable		Compactor	1	Serviceable
	Plastic granulator*	1	Serviceable		Bulldozer	1	Serviceable
	Bottle	1	Serviceable		Grader	1	Serviceable
	Vibrator separator*	1	Serviceable		Payloader	1	Serviceable
	Sand	1	Serviceable		Bobcat	1	Serviceable
	Mixer for eco-brick*	1	Serviceable	Pilar	Dump truck (4.8 cu.m.)	1	Serviceable
	Brick-making machine*	1	Serviceable		Mini dump truck (4	2	Serviceable
	Collapsible brick molds*	200	Serviceable		Bio-waste granulator*	1	Serviceable
	Charcoal briquette machine	1	Serviceable		Plastic granulator*	1	Serviceable

Dinalupihan	Dump truck (8 cu.m.)	4	Serviceable		Bottle crusher*	1	Serviceable
	Mini dump truck (4 cu.m.)	2	Serviceable		Vibrator separator*	1	Serviceable
	Brick-making machine*	1	Serviceable		Sand vibrator*	1	Serviceable
	Vertical paddle-type mixer*	1	Serviceable		Mixer for eco-brick*	1	Serviceable
	Collapsible brick molds*	100	Serviceable		Brick-making machine*	1	Serviceable
	Sand vibrator*	1	Serviceable		Collapsible brick molds*	200	Serviceable
	Multipurpose granulator*	1	Serviceable	Samal	Dump truck (15 cu.m.)	1	Serviceable
	Bottle crusher*	1	Serviceable		Mini dump truck (4.6 cu.m.)	4	Serviceable
	Bulldozer	1	Serviceable		Backhoe	1	Serviceable
Hermosa	Dump truck (3 cu.m.)	5	Serviceable		Loader/ Compactor	1	Serviceable
	Compactor	1	Serviceable		Bulldozer	1	Serviceable
Limay	Dump truck (2.8 tons)	6	Serviceable		Brick-making machine*	1	Serviceable
	Compactor (2 tons)	4	Serviceable		Vertical paddle-type mixer*	1	Serviceable
	Mini dump truck	1	Serviceable		Collapsible brick molds*	100	Serviceable
	Payloader	1	Serviceable		Sand vibrator*	1	Serviceable
	Bio-waste granulator*	1	Serviceable		Multi-purpose granulator*	1	Serviceable
	Plastic granulator*	1	Serviceable		Bottle crusher*	1	Serviceable
	Bottle crusher*	1	Serviceable	Limay (cont'd.)	Mixer for eco-brick*	1	Serviceable
	Vibrator separator*	1	Serviceable		Brick-making machine*	1	Serviceable
	Sand vibrator*	1	Serviceable		Collapsible brick molds*	200	Serviceable

*Donated by the Provincial Government of Bataan
Source: Ten-Year Solid Waste Management Plan of the Province of Bataan 2020-2030.

The province has a total of 211 MRFs, eight (8) of which are central/municipal MRFs (**Table 70**).

The City of Balanga and Municipality of Abucay operate their own sanitary landfill (SLF), where their respective central MRFs are also located (**Figure 51**). The ten (10) municipalities have a contract or memorandum of agreement (MOA) with Metro Clark Waste Management Corp. for the hauling and disposal of municipal solid wastes at the SLF in Capas, Tarlac. These LGUs are provided with bins for temporary storage in their residual containment areas (RCAs), prior to scheduled hauling by said service provider. The Provincial Government also has an on-going project under a Public-Private Partnership (PPP) scheme in constructing an Engineered Sanitary Landfill in Brgy. Capitangan, Abucay. This SLF will be a more economical option for waste disposal in the province and will cater to the wastes from the LGUs especially when the life span of the two existing SLFs ended.

Table 70. Inventory of MRFs by City/Municipality, Province of Bataan.

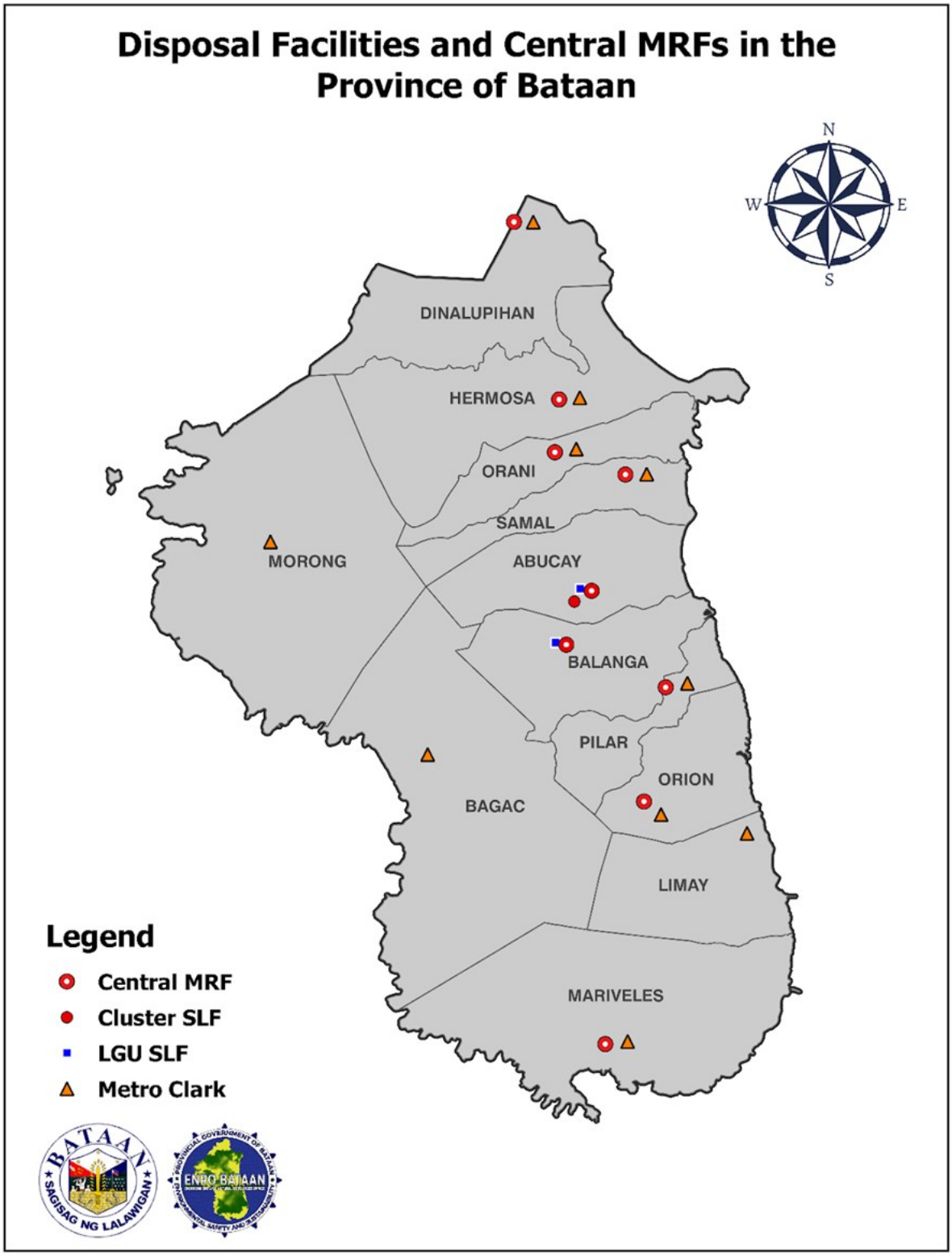
LGU	No. of MRFs	Remarks
Abucay	3	1 central (Brgy. Capitangan); 2 barangays
Bagac	10	9 barangays
Balanga City	28	1 central (Brgy. Munting Batangas); 25 barangays + city public market
Dinalupihan	42	1 central (Brgy. Pagalanggang); 41 barangays
Hermosa	24	1 central (Brgy. Mambog); 23 barangays
Limay	11	11 barangays
Mariveles	3	3 barangays
Morong	4	4 barangays
Orani	29	1 central (Brgy. Pag-asa); 29 barangays
Orion	24	1 central (Brgy. General Lim); 23 barangays
Pilar	20	1 central (Brgy. Alauli); 19 barangays
Samal	13	1 central (Brgy. San Juan); 12 barangays
TOTAL	211	

Source: Ten-Year Solid Waste Management Plan of the Province of Bataan 2020-2030.

Central MRFs in the Province of Bataan.

Solid waste disposal facilities of city and municipalities in the Province of Bataan.

Figure 51. Location map of existing central MRFs and disposal facilities in the Province of Bataan as of 2021.



For liquid waste management, the Freeport Area of Bataan (FAB) in Mariveles has a sewage treatment plant (STP) and caters to the liquid wastes of industries and establishments within the economic zone.

Large-scale piggery farms in Bataan have established dome-type biogas digesters for pig manure.

The city and municipalities also have a MOA with DENR-accredited service providers, such as Envirokonsult and Soliman EC, for the desludging, treatment, and disposal of septic tanks among households and commercial establishments.

Implications and Recommendations

The provincial and city/municipal LGUs have their respective approved Ten-Year Solid Waste Management Plans that guide the implementation of SWM strategies such as raising awareness at the household level and waste reduction at source. The establishment of the Bataan Engineered SLF in the municipality of Abucay through a public-private partnership arrangement is a significant step in advancing the province's system for solid waste management.

The Provincial Environmental Monitoring Program is a remarkable effort of the province in environmental quality monitoring and will be further enhanced through the procurement of new technology for air quality monitoring.
The various pollution and waste management-related initiatives of the provincial/city/municipal LGUs should be regularly evaluated to determine if these translate to good environment quality.

References

DENR Administrative Order (DAO) No. 2016-08.
DENR-PENRO. 2017. Area-Based Management Plan for Talisay River System (2018-2022).
NEDA. 2020. MBSDMP.
PG-ENRO. Ten-Year Solid Waste Management Plan of the Province of Bataan 2020-2030.
R.A. 7160.
R.A. 8749.
R.A. 9003.
R.A. 9725.

Viewpoints showing GNPower Mariveles Energy Center Ltd. Co. and GNPower Dinginin Ltd. Co.

031 Water quality

Description

This indicator measures the level to which coastal waters and river waters that discharge into the coastal area are within the water quality standards prescribed for the specific water use (e.g., drinking, swimming, boating, fishing, aquaculture, etc.).

Rationale

Criteria and standards for water quality are based on scientific information related to water use and potential risks to human health (e.g., transmit waterborne diseases), productivity (decrease fisheries productivity) and/or the ecosystem health (e.g., destruction and degradation of habitats). Different parameters provide indications of ecosystem health and potential threats to water use.

Data Requirements

Priority parameters

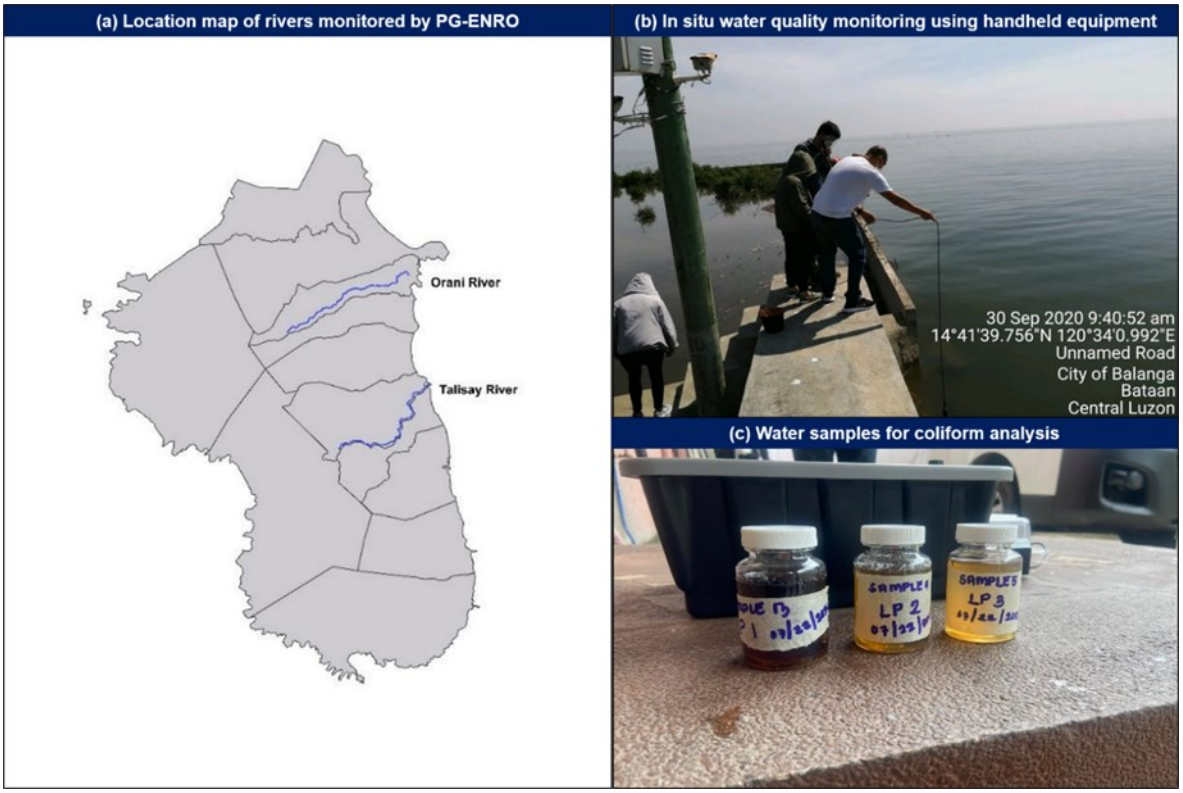
- Changes (temporal/spatial) in water transparency (secchi depth/total suspended solids) (marine/river/beach)
- Changes (temporal/spatial) in dissolved oxygen (DO) concentrations (marine/river/beach)
- Changes (temporal/spatial) in total/fecal coliform counts (marine/river/beach)

Secondary parameters

- Changes (temporal/spatial) in chlorophyll concentrations (marine/river/beach)
- Changes (temporal/spatial) in nutrient (nitrates, phosphates) concentrations (marine/river/beach)
- Changes (temporal/spatial) in biochemical oxygen demand (BOD) concentrations (marine/river/beach)
- Groundwater quality (nitrates and heavy metals)

Results

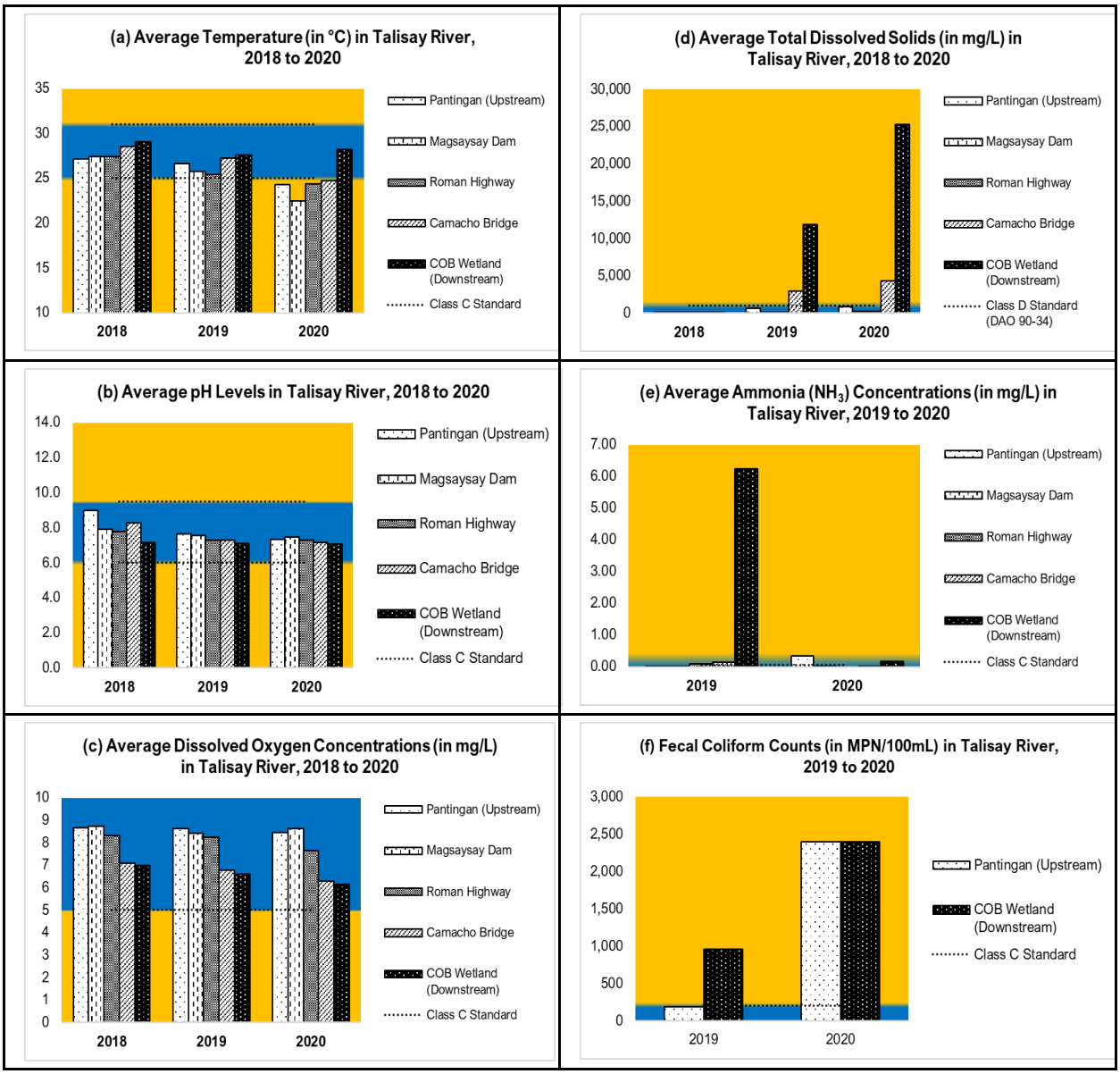
The PG-ENRO through its Provincial Environmental Monitoring Program conducts monthly (quarterly in 2020 due to COVID-19 lockdowns) monitoring of two (2) rivers draining into the Manila Bay, namely: Orani River, traversing the municipalities of Orani and Samal; and Talisay River, traversing the Municipality of Pilar and the City of Balanga. Physicochemical parameters (temperature, pH, DO, NH_3, TDS) are monitored in five (5) stations for each river. In addition, fecal coliform counts are measured in downstream and upstream stations in the two (2) rivers. Water quality monitoring results from 2018 to 2021 are shown in **Figures 52-53**.



Water quality monitoring conducted by PG-ENRO Bataan.

Results show that the overall water quality of Talisay and Orani Rivers are still within Class C, or suitable for agricultural purposes, based on the national standards (DAO 2016-08). Results further show that the upstream stations in the two (2) rivers have ammonia concentrations exceeding the Class C standard of 0.05 mg/L. The fecal coliform levels in the downstream stations of both rivers are above 2,400 MPN/100 mL or about ten (10) times higher than the Class C limit of 200 MPN/100 mL. The water quality monitoring results indicate contamination in the two (2) rivers which may be attributed to agricultural activities (e.g., poultry and piggery farms) located in the upstream and residential and commercial establishments including informal structures and settlements located in the downstream.

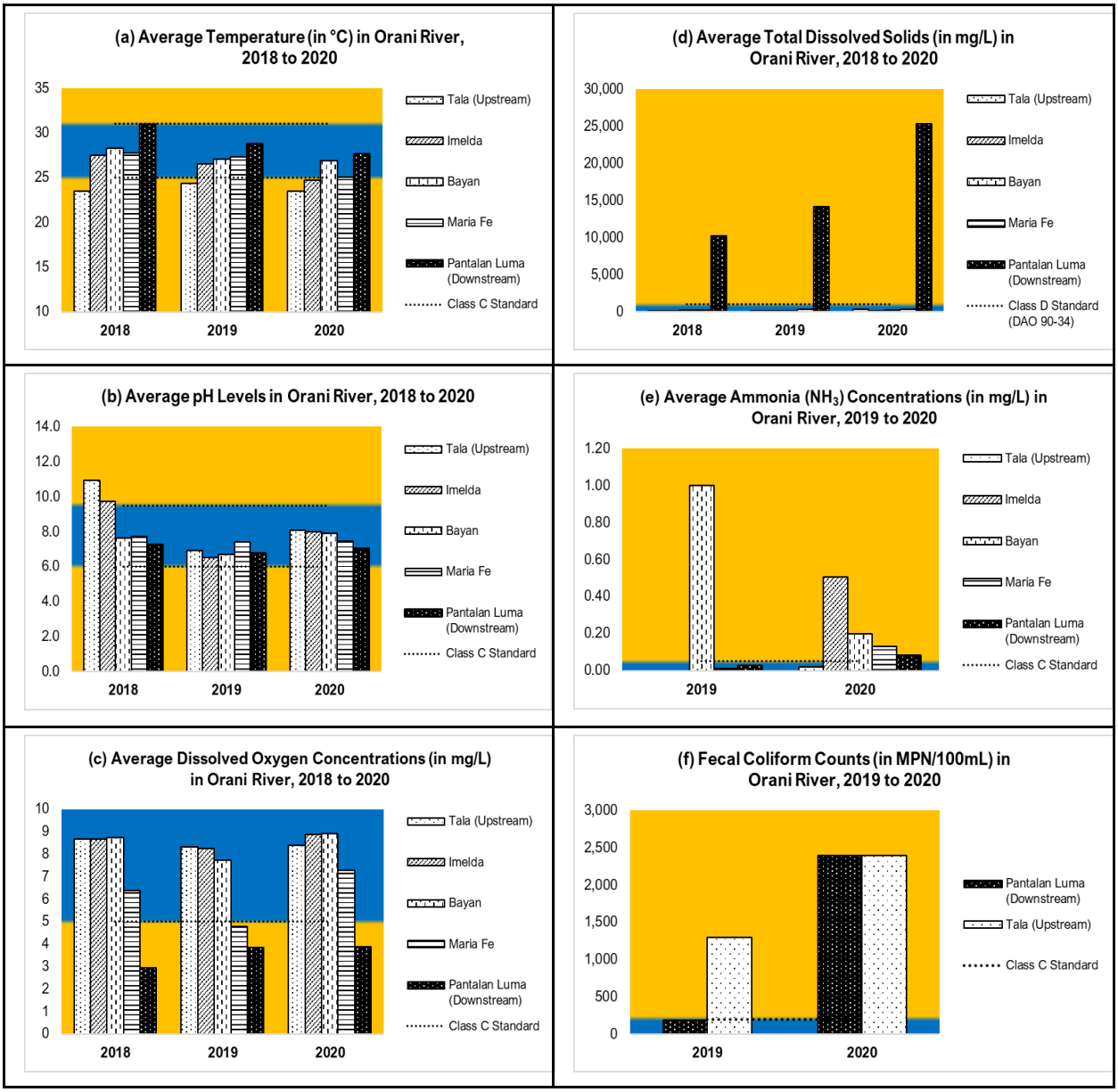
Figure 52. Water quality monitoring results for Talisay River, Bataan: (a) temperature; (b) pH; (c) dissolved oxygen (DO); (d) total dissolved solids (TDS); (e) ammonia (NH_3); and (f) fecal coliform.



Source: PG-ENRO.

Notes:
1. Results are compared with DENR Administrative Order No. 2016-08 Class C standards, except for (d).
2. Measurements falling within blue areas are within DENR standard. Measurements within orange areas do not meet the standard.

Figure 53. Water quality monitoring results for Orani River, Bataan: (a) temperature; (b) pH; (c) dissolved oxygen (DO); (d) total dissolved solids (TDS); (e) ammonia (NH_3); and (f) fecal coliform.

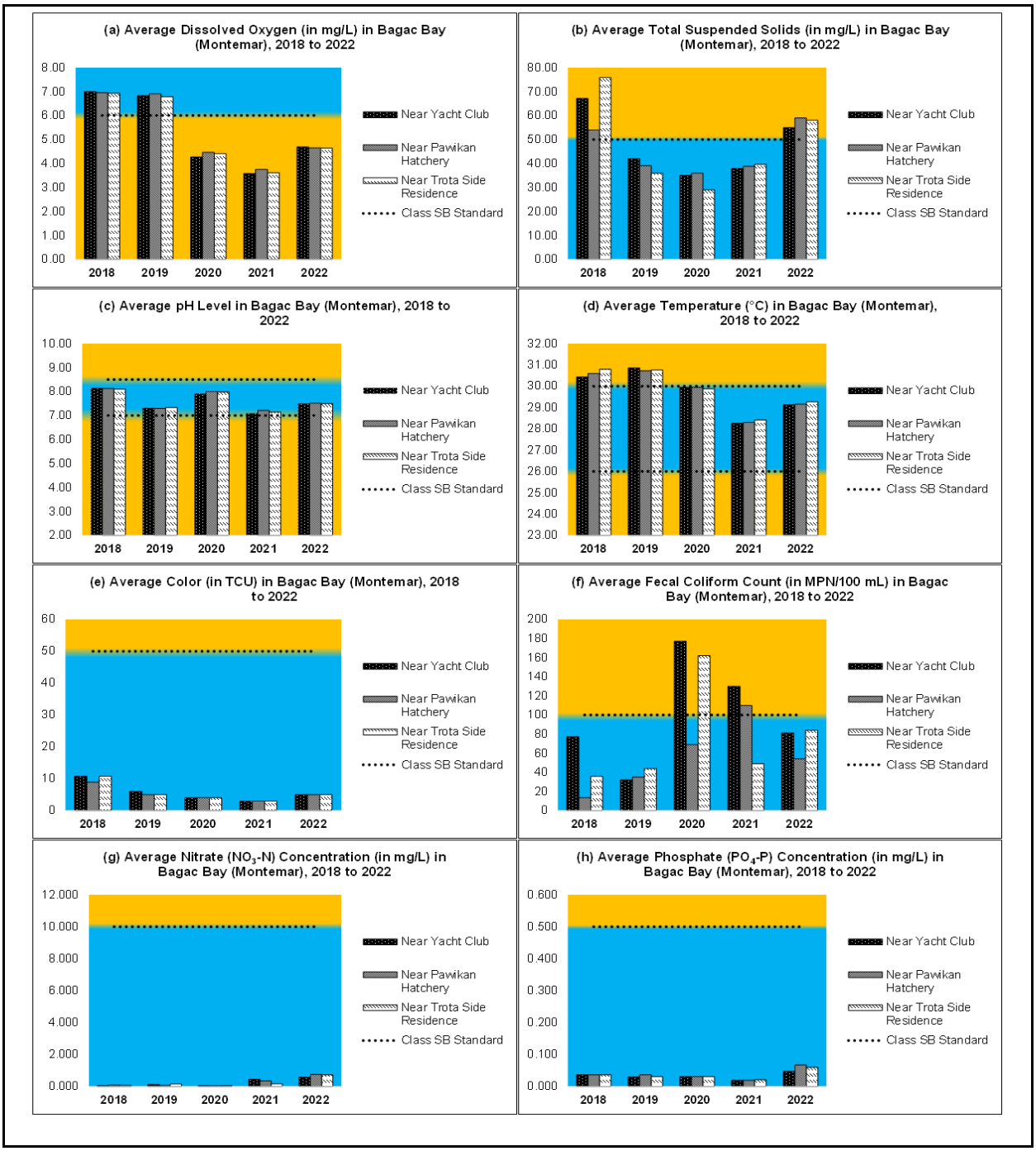


Source: PG-ENRO.

Notes:
1. Results are compared with DENR Administrative Order No. 2016-08 Class C standards, except for (d).
2. Measurements falling within blue areas are within DENR standard. Measurements within orange areas do not meet the standard.

DENR-EMB Region 3 also conducts coastal water quality monitoring in the Province of Bataan. Its sampling stations include Bagac Bay (along Montemar Beach Club); Morong Bay (along Juness Beach Resort); and Aguawan Beach in the municipality of Mariveles, which was declared by DENR in 2019 as the first swimmable beach in Manila Bay. Monitoring results from 2018 to 2022 are shown in **Figures 54**-**56**. While physicochemical parameters are generally within Class SB standards, fecal coliform counts in the three (3) coastal monitoring sites exceed Class SB standard of 100 MPN/mL. In 2020, peak measurements were recorded in Morong Bay (4,631 MPN/100 mL), and in Aguawan Beach (3,938 MPN/100 mL). Fecal coliform counts in these sites indicate that these areas are not fit for swimming.

Figure 54. Water quality monitoring results for Bagac Bay (Montemar), Bataan: (a) dissolved oxygen; (b) total suspended solids; (c) pH; (d) temperature; (c) color; (f) fecal coliform; (g) nitrates as NO_3-N; and (h) phosphates as PO_4-P.



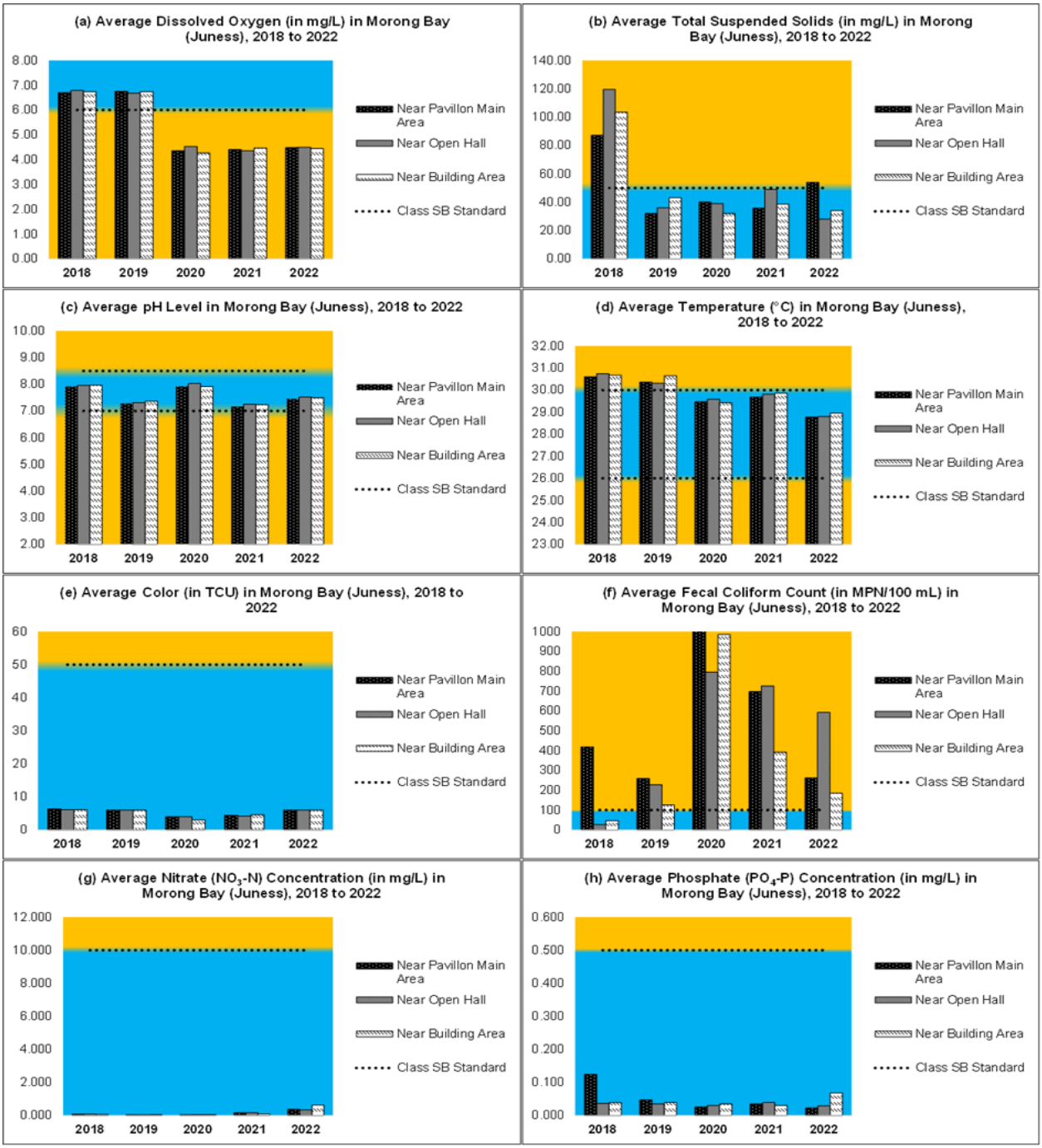
Source: DENR-EMB R3.

Notes:

Results are compared with DENR Administrative Order No. 2016-08 Class SB standards.

Measurements falling within blue areas are within DENR standard. Measurements within orange areas do not meet the standard.

Figure 55. Water quality monitoring results for Morong Bay (Juness), Bataan: (a) dissolved oxygen; (b) total suspended solids; (c) pH; (d) temperature; (c) color; (f) fecal coliform; (g) nitrates as NO_3-N; and (h) phosphates as PO_4-P.



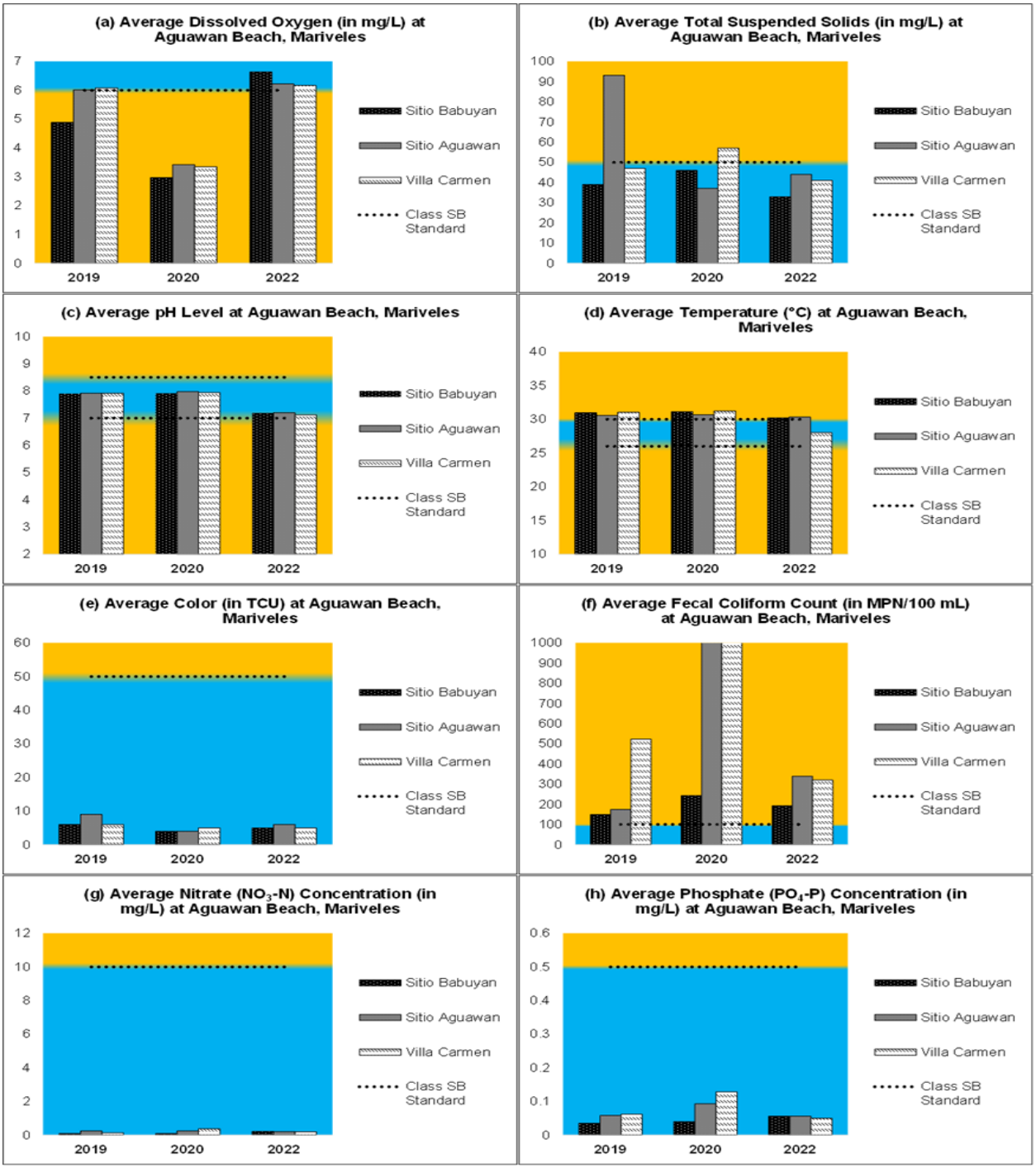
Source: DENR-EMB R3.

Notes:

Results are compared with DENR Administrative Order No. 2016-08 Class SB standards.

Measurements falling within blue areas are within DENR standard. Measurements within orange areas do not meet the standard.

Figure 56. Water quality monitoring results for Aguawan Beach, Mariveles, Bataan: (a) dissolved oxygen; (b) total suspended solids; (c) pH; (d) temperature; (c) color; (f) fecal coliform; (g) nitrates as NO_3-N; and (h) phosphates as PO_4-P.



Source: DENR-EMB R3.

Notes:

Results are compared with DENR Administrative Order No. 2016-08 Class SB standards.

Measurements falling within blue areas are within DENR standard. Measurements within orange areas do not meet the standard.

Implications and Recommendations

The complementary efforts of the province and DENR in environmental monitoring enabled more cost-effective assessments and cover more water and air quality stations in the province. These efforts should be continued and scaled up to cover other areas in the province.

It is recommended for the province to make use of its water quality monitoring data to address pollution incidents and hotspots in its inland and coastal waters. One (1) parameter of concern is fecal coliform. City and municipal LGUs should strengthen the monitoring and regulation of poultry and piggery farms in the upstream to prevent direct discharge of wastewater into the river systems. The Provincial Government should also endeavor to implement the priority measures identified in the MBSDMP, including the relocation of informal settler families and structures along the coasts and waterways that directly discharge untreated septage and sewage into the water. Continuing the implementation of sanitation programs such as the DOH's Zero Open Defecation Program, and ensuring proper septage management among tourist establishments are also recommended for the province.

References

DAO 2016-08.

DENR-Environmental Management Bureau (EMB) Region 3. Water quality monitoring results for Bagac Bay (Montemar), Morong Bay (Juness), and Aguawan Beach, Mariveles, Bataan.

PG-ENRO. Water quality monitoring results for Talisay and Orani Rivers.

River mouths of Talisay River and Orani River, Bataan Province

032 Air quality

Description

This indicator reports on the quality of air in terms of suspended particulates, sulfur oxide, nitrogen oxide, carbon oxide and volatile organic carbon.

Rationale

Air pollution is harmful to human health and the quality of the environment.

Data Requirements

- Changes in concentration of total suspended particulates (TSP)
- Changes in concentration of other air pollutants (particulate matter, sulfur oxide, nitrogen oxide, carbon monoxide, volatile organic carbon)

Results

Under the PGB's Provincial Environmental Monitoring Program, the two (2) units of air quality monitoring system (AQMS) were deployed in various locations in the province (**Figure 57**). From 2018 to the first half of 2019, short-term monitoring (1 month duration) was done. From 2019 to 2021, semi-permanent stations were established in the municipalities of Limay and Mariveles.

Results of ambient air quality monitoring are shown in **Figures 58-61**. The daily and/or annual average measurements for particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2) were compared with the Philippine Clean Air Act standards, as well as with the guideline values of the World Health Organization (WHO).

Short-term air quality monitoring results showed that the overall ambient air quality in the province is still good to moderate. About 59-96% of the total number of monitoring days are within WHO guideline values for PM_{10}, SO_2, and NO_2 (**Figures 59-61**). Meanwhile, daily $PM_{2.5}$ concentrations exceeded the WHO guideline value of 15 µg/m^3 for 61% of total number of monitoring days in 2018 to 2019 (**Figure 58**). However, these $PM_{2.5}$ values are still within the DENR's standard of 50 µg/m^3.

From January 2018 to June 2019, exceedances in PM_{10} and $PM_{2.5}$ were observed for seven (7) days, which could be attributed to the fire incident at the Balanga City Plaza in May 2018, ambulant barbecue vendors near Abucay Plaza in November 2018, and pipelaying activity along Brgy. Mabayo in Morong in April 2019.

Results of the long-term air quality monitoring in Mariveles Station showed that annual average concentrations of $PM_{2.5}$ and PM_{10} in 2019 exceeded WHO guideline values but were within national standards. Annual average SO_2 level in 2019 was also within Philippine standard, while annual mean for NO_2 in 2019 exceeded the WHO guideline value (**Figure 62**).

Annual average concentrations of $PM_{2.5}$, PM_{10}, and SO_2 exhibited an increasing trend from 2019 to 2021 (**Figure 62**). In 2021, PM_{10} and SO_2 levels exceeded national air quality standards. On the other hand, NO_2 concentration at Limay Station decreased from 11 $\mu g/m^3$ in 2019 to 2 $\mu g/m^3$, which was within the WHO guideline value.

Figure 57. Location map of ambient air quality monitoring stations in Bataan.

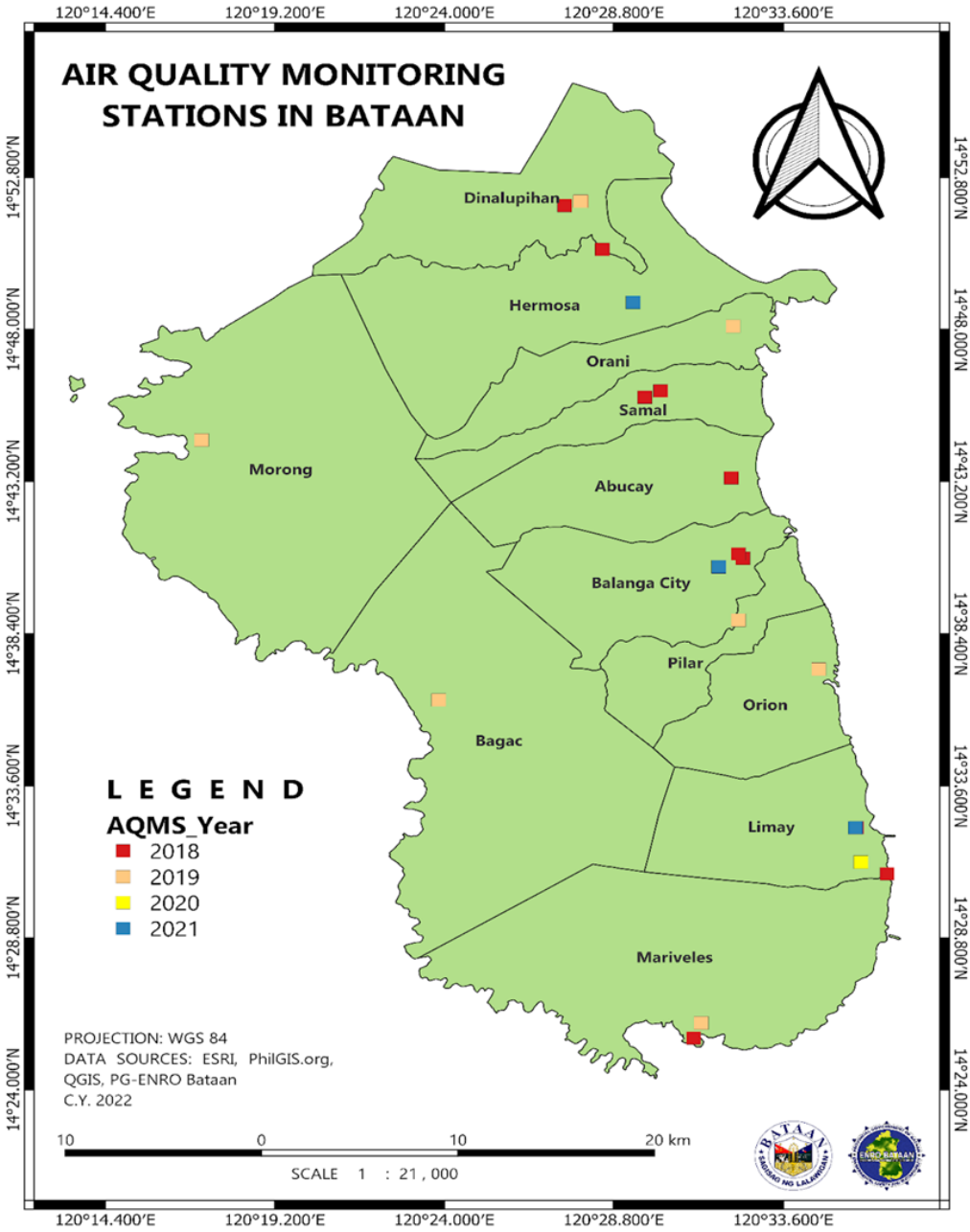
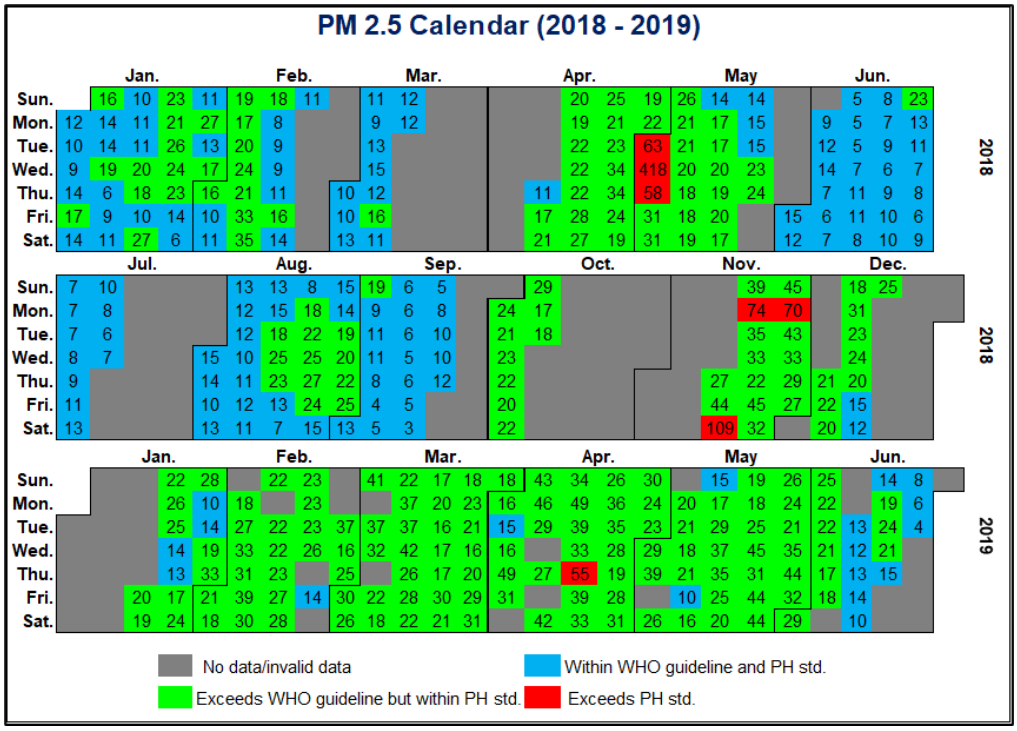
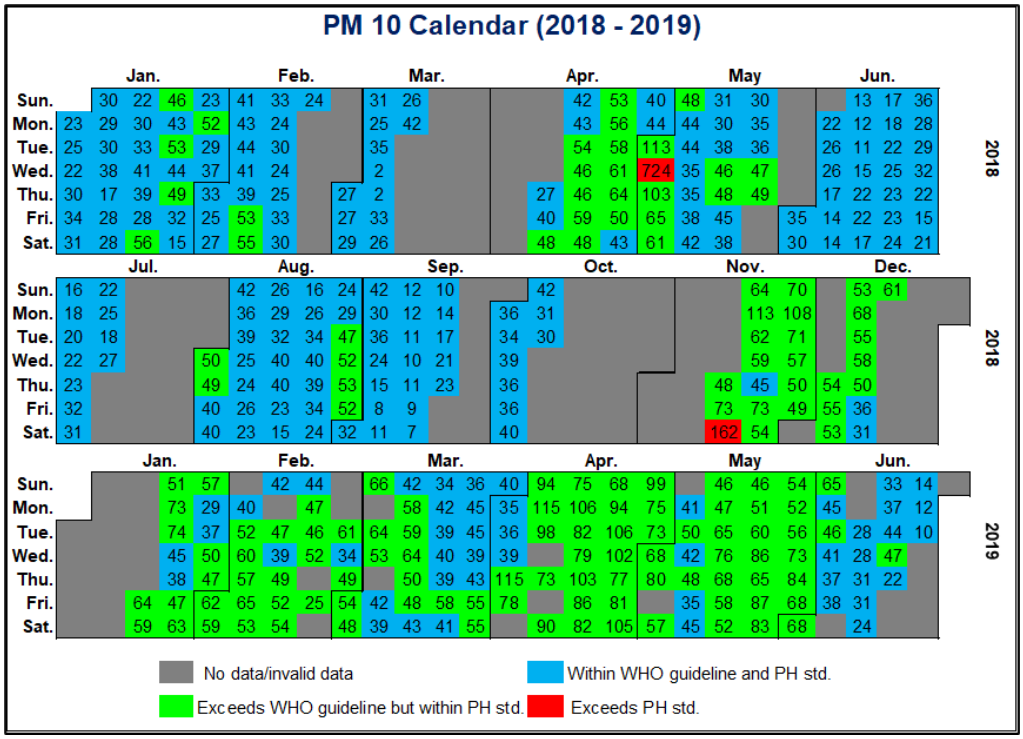


Figure 58. Daily average concentration of $PM_{2.5}$ (in µg/m^3) in Bataan, January 2018 to June 2019.



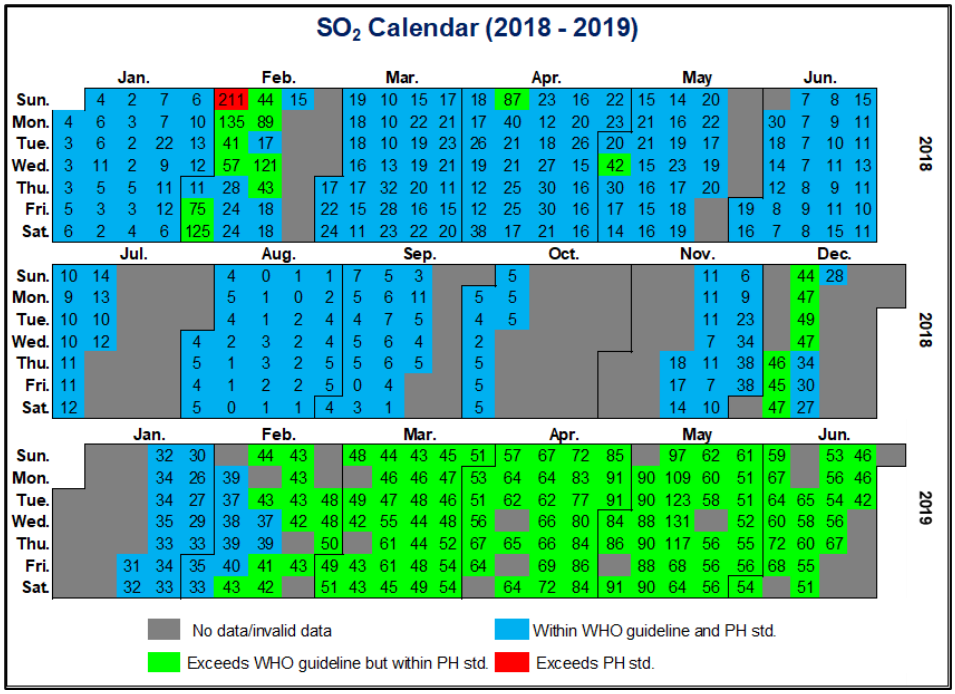
Source: PG-ENRO.

Figure 59. Daily average concentration of PM_{10} (in µg/m^3) in Bataan, January 2018 to June 2019.



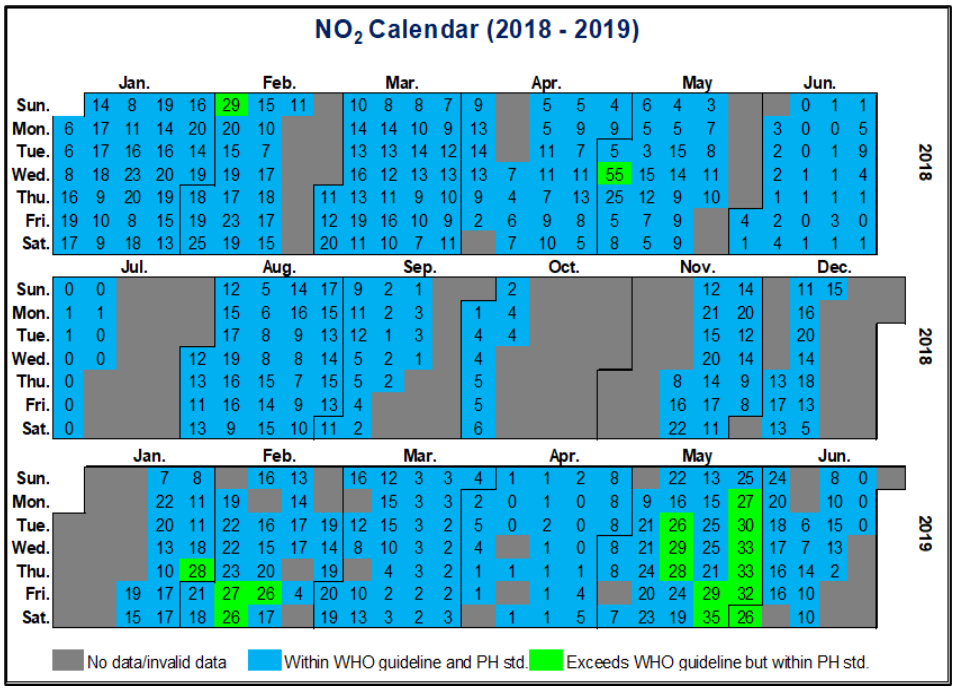
Source: PG-ENRO.

Figure 60. Daily average concentration of SO_2 (in µg/m^3) in Bataan, January 2018 to June 2019.



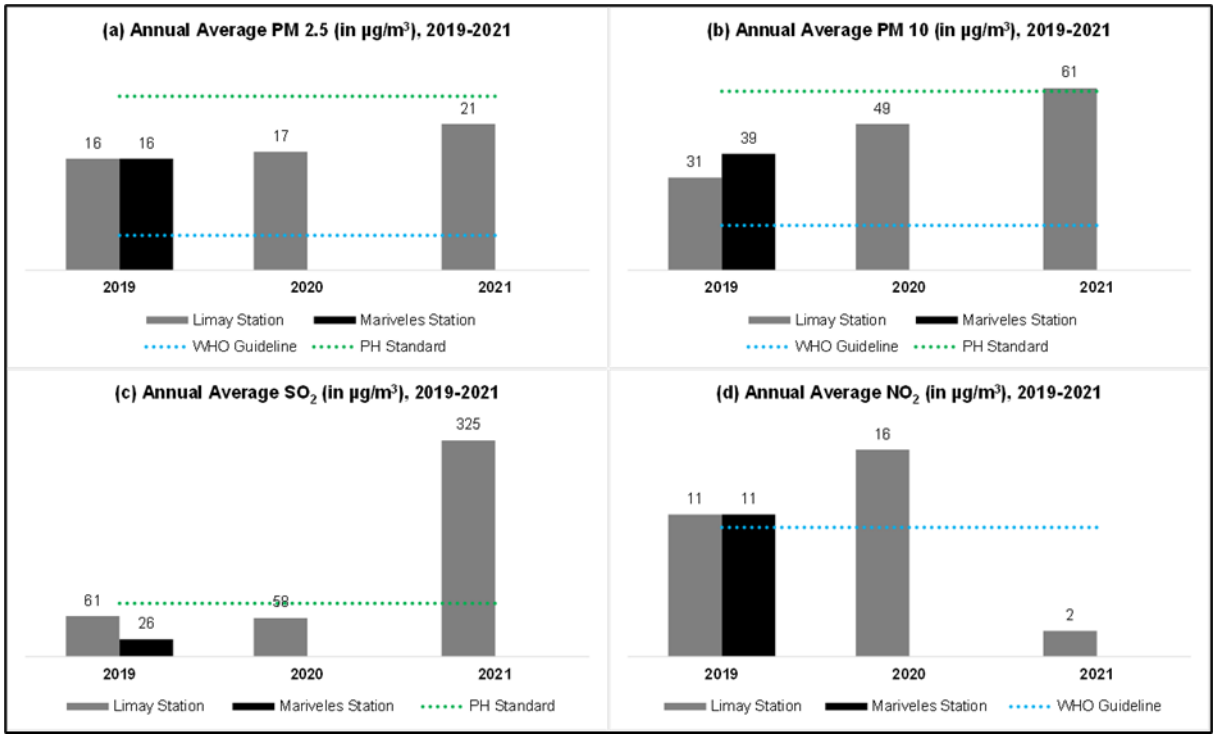
Source: PG-ENRO.

Figure 61. Daily average concentration of NO_2 (in µg/m^3) in Bataan, January 2018 to June 2019.



Source: PG-ENRO.

Figure 62. Annual average concentrations of criteria pollutants in Bataan, 2019-2021: (a) $PM_{2.5}$, (b) PM_{10}, (c) SO_{-2}, (d) NO_2.



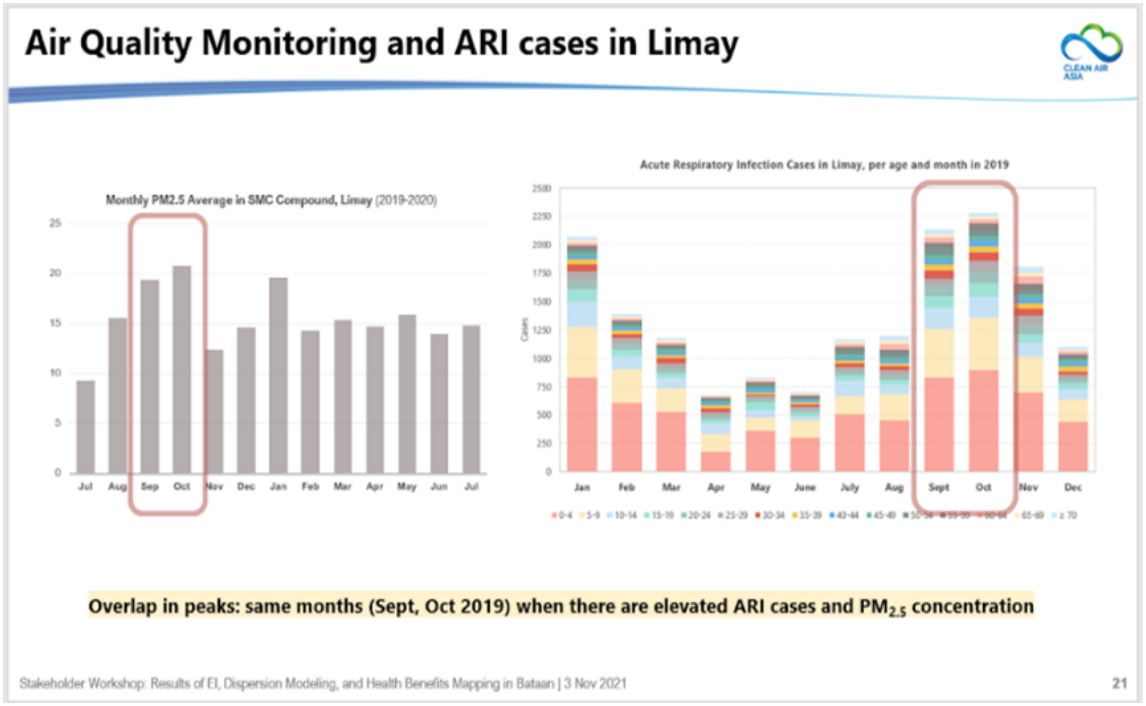
Source: PG-ENRO.

The ambient air quality monitoring data of the province for 2019 were used in the Pathways for Clean Air and Clean Energy (PCACE) project of Clean Air Asia, an international non-governmental organization leading the regional mission for improved air quality in Asian cities. For this project, Clean Air Asia performed (a) analysis of air quality; (b) emissions inventory; and (c) health impact assessment in the municipalities of Limay and Mariveles, Bataan while the PGB through the PG-ENRO assisted in data collection and stakeholder coordination. As part of the implementation of the project, a series of workshops was conducted from June 2020 to November 2021 involving the PGB, LGUs of Limay and Mariveles, DENR-EMB Central and Region 3 Offices, GNPower, San Miguel, Consolidated Power, and Petron.

Results of the PCACE project showed that the peaks in $PM_{2.5}$ concentrations in Limay in January, September, and October 2019 also coincided with elevated cases of acute respiratory infection (ARI) (**Figure 63**).

The study recommended that similar analysis be done for each emission source, in order to identify strategies for reducing the level of air pollutants in Limay and Mariveles.

Figure 63. Air Quality Monitoring and Acute Respiratory Infection (ARI) cases in Limay, Bataan.



Source: Clean Air Asia and PGB, PCACE Project.

Implications and Recommendations

Results of the air quality monitoring showed that the province still has good to moderate ambient air quality even in the industrialized municipalities of Limay and Mariveles. However, long-term monitoring results show an increasing trend in concentrations of criteria pollutants, which exceed WHO guideline values and at times Philippine standards.

On the one hand, it is recommended for the PG-ENRO to continue its air quality monitoring to cover more areas for longer time periods. Emissions inventory and source apportionment studies should also be done to support science-based air quality management policies in the province.

On the other hand, the provincial government should make use of its current data to address the point, mobile, and area sources of air pollution in the province. While regulation and control of emissions from industrial sources are mainly the purview of the DENR, the LGUs can help tackle air pollution by focusing on the vehicular emissions and emissions from open burning of domestic and agricultural wastes.

References

Clean Air Asia and PGB. 2021. Pathways for Clean Air and Clean Energy (PCACE)
PG-ENRO. Annual average concentrations of criteria pollutants in Bataan.
PG-ENRO. Daily average concentrations of $PM_{2.5}$, PM_{10}, SO_2, NO_2 (in µg/m^3) in Bataan.
PG-ENRO. Location map of ambient air quality monitoring stations in Bataan.

033 Sanitation and domestic sewerage

Description

This indicator reports the proportion of the population with access to sanitation and sewerage systems.

Rationale

The lack of sanitation facilities can affect human well-being and have negative impacts on the quality of the environment, especially when disposed untreated to the coastal and marine environment. Moreover, data on access to sanitation also monitors progress in meeting one of the Sustainable Development Goals (SDG) targets for environmental sustainability.

Data Requirements

- Population with access to improved sanitation
- Households connected to septic tanks
- Volume of septage collected/treated
- Population served by public sewerage system (collection)
- Location of sewerage treatment plants and discharge pipes
- Level of treatment and volume of sewage treated
- Volume of domestic wastewater generated, treated, recycled or reused

Results

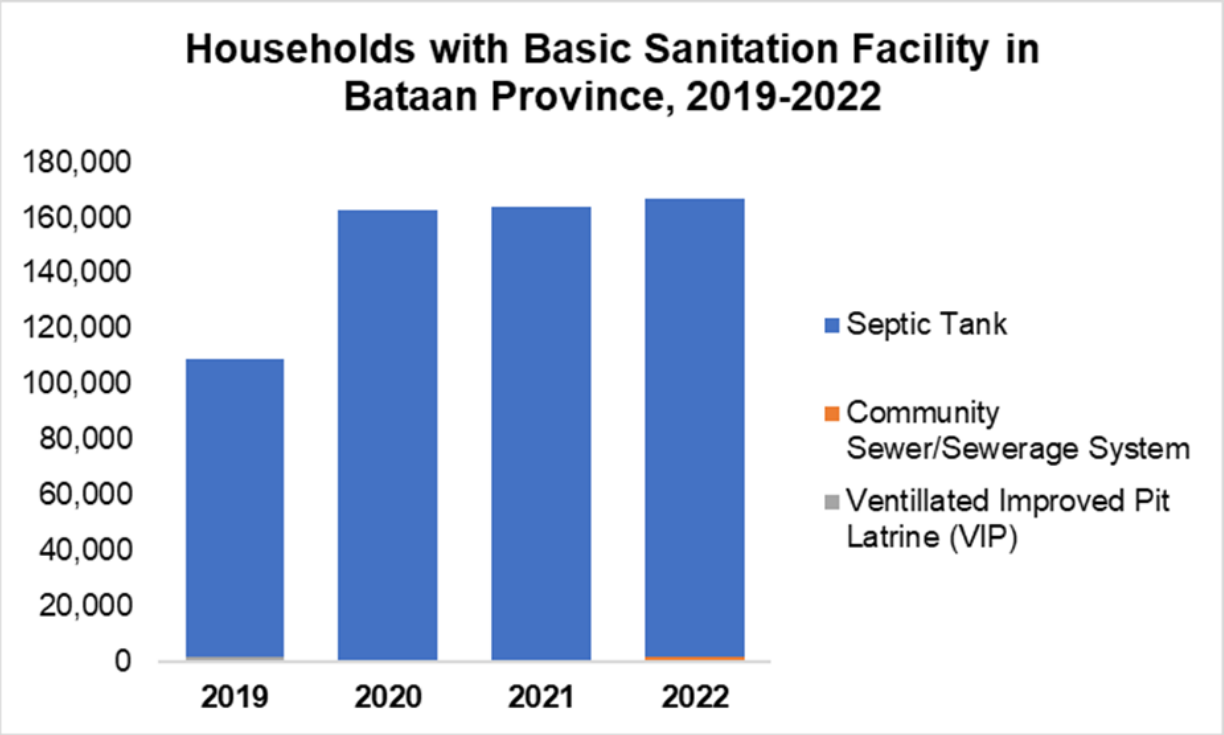
Figure 64 shows the total number of households with access to basic sanitation facilities in the Province of Bataan.[4] In 2019, a total of 107,074 households are connected to septic tanks while 1,633 households have ventilated improved pit latrine (VIP). By 2022, the number of households connected to septic tanks increased to 165,572. Additionally, 1,421 households are connected to community sewer/ sewerage system, and 52 households have VIP. The reported increase in access to basic sanitation facilities was a result of the toilet construction and distribution of porcelain pour flush toilet bowls projects of the city and municipalities, DOH, DENR, and DPWH.

As shown in **Figure 64**, septic tanks are mostly used for human excreta (feces and urine). Septic tanks are seldom desludged or regularly siphoned (i.e., every three to five years) because of economical and logistical constraints. At present, the province has one (1) sewage treatment plant located at the Freeport Area of Bataan (FAB) (**Figure 65**), which caters to locators within the special economic zone. Prior to the passage of the of local ordinances on septage management (**Table 71**), the province had only one DENR-accredited desludging service provider. Since 2017, more DENR-accredited service providers were able to cater to the growing demand for desludging and

[4] WHO/UNICEF defines basic sanitation facilities as improved sanitation facilities that are not shared with other households. Improved sanitation facilities include flush/pour flush to piped sewer systems, septic tanks or pit latrines; ventilated improved pit latrines, compositing toilets or pit latrines with slabs. (World Bank)

other septage management services in the province. The LGUs in Bataan have entered into a memorandum of agreement (MOA) or contract with third-party service provider (e.g., Envirokonsult) and the local water district for the desludging of government buildings, households, and commercial establishments in their respective areas.

Figure 64. Households in Bataan Province with access to basic sanitation facilities, 2019-2022.



Source: DOH FHSIS.

Figure 65. Location map of sewage treatment plant in the Freeport Area of Bataan (FAB).

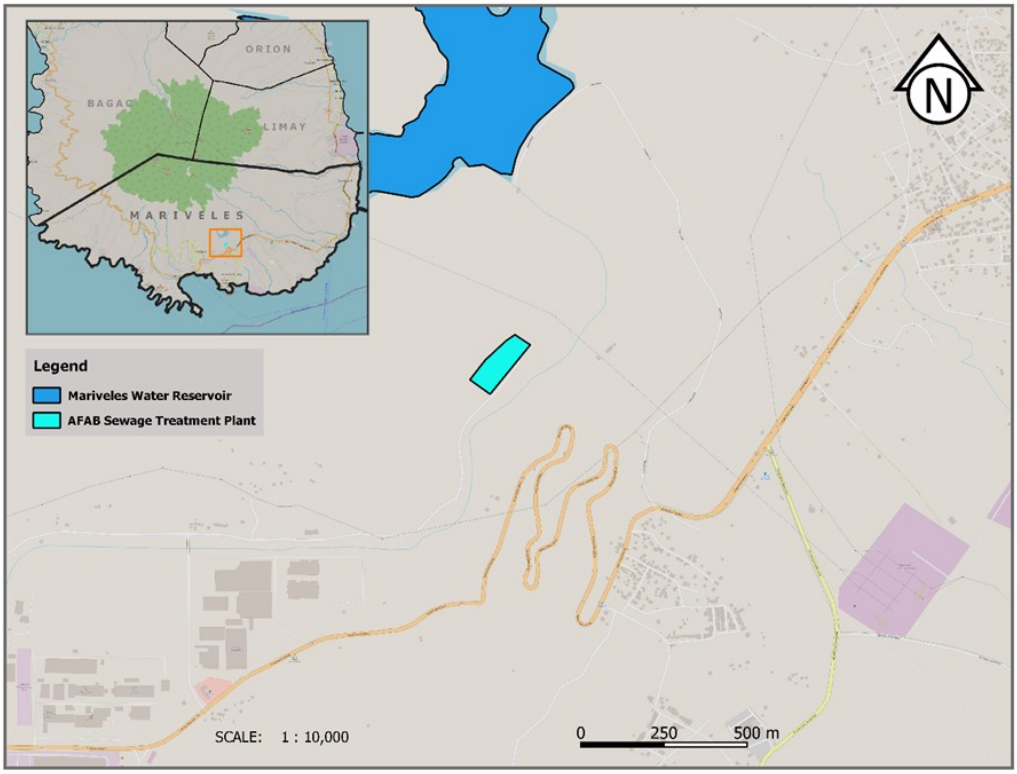


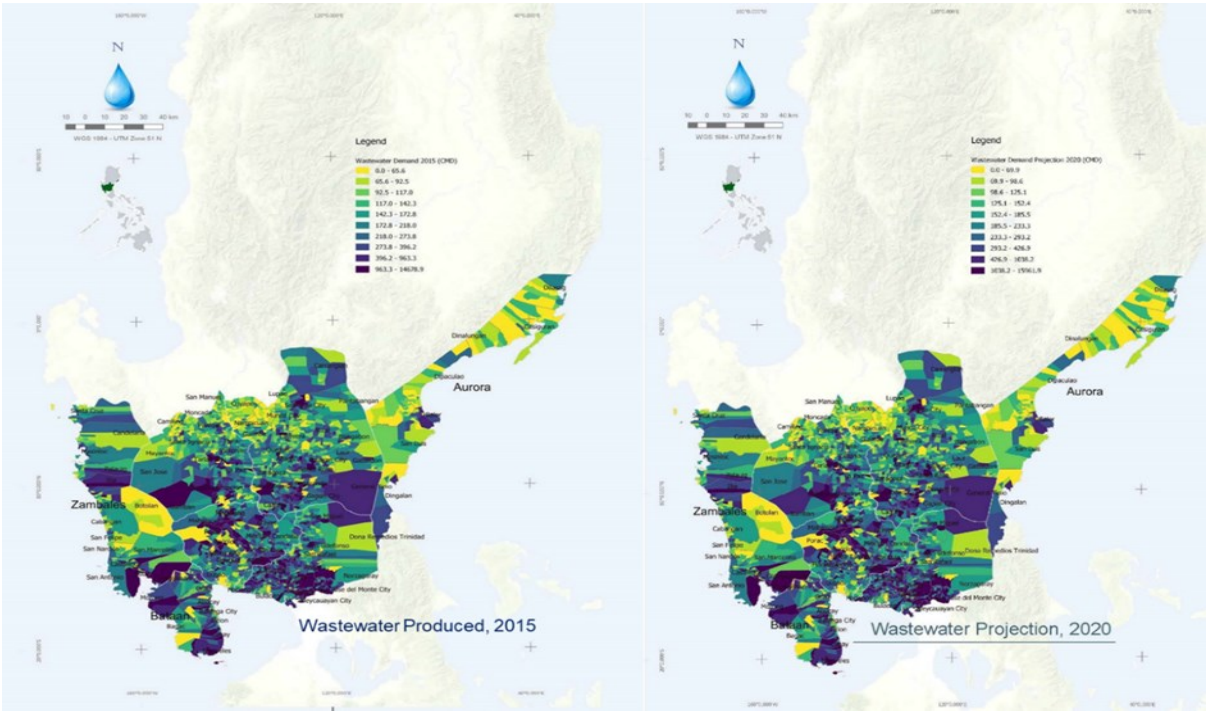
Table 71. List of local ordinances related to septage management in the Province of Bataan.

LGU	Policy/Legal Instrument	Title
Province of Bataan	Provincial Ordinance No. 01, Series of 2017	Sewage and Septage Ordinance of the Province of Bataan
	Provincial Ordinance No. 03, Series of 2019	Bataan Environment Code
Municipality of Abucay	Resolution No.32-A-2021	Resolution Granting the Authority to the Local Chief Executive Hon. Mayor Liberato P. Santiago, Jr. to Sign and Enter Into a Memorandum of Agreement in Behalf of the Local Government Unit with Soliman E.C. Septic Tank Disposal in Relation to the Collection, Transport, Treatment of Domestic Waste for Residential and Hazardous Waste for Commercial Establishment in the Municipality of Abucay
Municipality of Bagac	Municipal Ordinance No. 4, Series of 2016	Sewage and Septage Ordinance of the Municipality of Bagac, Province of Bataan
City of Balanga	City Ordinance No. 13, Series of 2017	Septage Ordinance of the City of Balanga, Bataan Province
Municipality of Dinalupihan	Municipal Ordinance No. 06-2017	An Ordinance Establishing a Proper Sewage Treatment and Septage Management System in the Municipality of Dinalupihan, Bataan, Prescribing Penalties for Violation Thereof and for Other Purposes
Municipality of Hermosa	Ordinance No. 24, Series of 2021	An Ordinance Amending Certain Provisions of Municipal Ordinance No. 7, Series of 2015 Otherwise Known as the “Municipality of Hermosa Septage Management Ordinance”

Municipality of Limay	Resolution No. 2019-106-A	Resolution Adopting the Provincial Ordinance No. 01-Series of 2017 Also Known as "Sewage and Septage Ordinance of the Province of Bataan"
Municipality of Mariveles	Municipal Ordinance No. 2020-176	Establishing a Proper Sewerage Treatment and Septage Management System in the Municipality of Mariveles, Bataan, Prescribing Penalties for Violation Thereof and for Other Purposes.
Municipality of Morong	Municipal Ordinance No. 104, Series of 2017	An Ordinance Establishing a Proper Sewage Treatment and Septage Management System in the Municipality of Morong, Bataan, Prescribing Penalties for Violation Thereof and for Other Purposes
Municipality of Orani	Ordinance No. 10	An Ordinance Establishing a Proper Sewage Treatment Septage. Management System for the Municipality of Orani, Bataan Prescribing Penalties for Violation Thereof and for Other Purposes
Municipality of Orion	Municipal Ordinance No. 17-020-096	An Ordinance Establishing a Proper Sewage Treatment and Septage Management System in the Municipality of Orion, Prescribing Penalties for Violation Thereof and for Other Purposes
Municipality of Pilar	Ordinance No. 7, Series of 2016	An Ordinance Establishing a Proper Sewage Treatment and Septage Management System in the Municipality of Pilar, This Province, Prescribing Penalties for Violation Thereof and for Other Purposes
Municipality of Samal	Municipal Ordinance No. 21-17	An Ordinance Amending Municipal Ordinance No.17-005, An Ordinance Establishing Septage and Sewerage Management System in the Municipality of Samal, Province of Bataan.

According to the Central Luzon Water Supply and Sanitation Databook and Regional Roadmap published by NEDA, Bataan has medium to high volume of wastewater generated, which is estimated to be about 80% of the total water demand. Tourist (e.g., Municipality of Morong); and industrial areas, (e.g., Municipalities of Limay and Mariveles) produce more wastewater than the rest of the province. As shown in **Figure 66**, wastewater generation in the province increased from 2015 to 2020 due to population growth, which is directly proportional to water demand. In 2015, estimated domestic wastewater generation was around 73,022.40 cubic meters per day (CMD), which increased to 81,923.81 CMD in 2020.

Figure 66. Map showing wastewater produced in Central Luzon, Philippines, including Bataan Province.



Source: Central Luzon Water Supply and Sanitation Databook and Regional Roadmap.

Implications and Recommendations

The province currently does not have a centralized sewage treatment plant due to the existing combined drainage system while private industries have STPs within their premises. Local ordinances have been enacted for septage management in the province and DENR -accredited service providers for desludging have been increasing since 2017. Several LGUs had entered into an agreement with accredited service provider for the treatment and safe disposal of treated septage in their areas.

While access to improved sanitation is increasing, it is recommended for the province to enhance its septage and sewage management systems to ensure the regular desludging of septic tanks and proper septage treatment and disposal. At the city/municipal level, the institutional arrangements and regulatory requirements for septage management must also be strengthened and harmonized (i.e., building official, sanitary inspector, and MENRO). Doing so will provide a more holistic approach to domestic sanitation in the province.

References

DOH. FHSIS.
FAB. Location map of sewage treatment plant at FAB.
NEDA. 2021. Central Luzon Water Supply and Sanitation Data-book and Regional Roadmap.
PG-ENRO and City and Municipal LGus. List of local ordinances related to septage management in the Province of Bataan.

Meeting conducted by EnviroKonsult regarding septage management services among LGUs.

034 Municipal Solid Waste

Description

This indicator measures the tonnage of solid waste generated, the proportion being recycled or reused and volume received in dumpsites or sanitary landfills.

Rationale

Improper waste management has negative impact on human and ecological health as well as the aesthetic and recreational values of coastal areas.

Data Requirements

- Volume of solid waste generated
- Volume of solid waste received in landfills/ dumpsites
- Volume of solid waste received at materials recovery facilities

Results

Results of the 2020 Waste Analysis and Characterization Study (WACS) of the city/ municipalities showed that waste generation in the province amounted to 331,873.57 kg/day, or 331.87 metric tons per day (tpd). In terms of composition, 45.17% or 150 tpd of the total waste generation were biodegradable; 27.48% or 91 tpd were residuals; 25.50% or 85 tpd were recyclables; and 1.85% or 6 tpd were special wastes. For residual wastes, higher volume of residuals with potential for diversion is generated compared to residuals for outright disposal (**Table 72** and **Figure 67**).

Households or residential areas contributed to 83.53% of the total waste generated in the province or about 277 tpd. Non-household sources comprised the remaining 14.47% of the generated wastes in the province. Among non-household sources, commercial sources had the highest waste generation (about 30 tpd or 8.90% of total) followed by industrial sources (15 tpd or 4.53%), institutional sources (6 tpd or 1.94%), and agricultural sources (4 tpd or 1.09%) (**Table 73** and **Figure 68**).

Dinalupihan and Balanga City had the highest total waste generation (above 60 tpd) followed by Limay and Hermosa (above 30 tpd) and Mariveles and Orion (above 20 tpd). The rest of the municipalities generated less than 20 tpd of solid wastes (**Figure 69**).

Table 72. Total waste generation in Bataan by city/municipality and by composition, CY 2020.

LGU	Bio-degradable (kg/day)	Recyclable (kg/day)	Residual Waste (kg/day)			Special Waste (kg/day)	Total Waste Generated (kg/day)	% of Total
			With Potential for Diversion	For Disposal	Subtotal			
Abucay	4,577.79	2,300.96	2,170.61	463.48	2,634.09	142.90	9,655.74	2.91%
Bagac	6,334.07	3,035.77	1,081.09	1,000.84	2,081.93	12.61	11,464.39	3.45%
Balanga City	30,327.48	12,871.97	9,295.65	7,461.02	16,756.67	393.48	60,349.60	18.18%
Dinalupihan	33,937.55	25,473.54	3,362.51	3,206.27	6,568.78	1,949.58	67,929.45	20.47%
Hermosa	17,194.51	7,540.26	3,169.20	7,390.03	10,559.22	475.74	35,769.73	10.78%
Limay	12,158.90	7,434.45	2,652.80	7,645.23	10,298.03	219.81	30,111.20	9.07%
Mariveles	6,251.14	4,356.94	15,925.18	1,444.58	17,369.76	1,029.77	29,007.61	8.74%
Morong	7,487.40	1,628.71	933.32	2,175.70	3,109.02	39.25	12,264.38	3.70%
Orani	7,867.07	4,924.90	4,002.21	1,168.36	5,170.56	1,381.14	19,343.67	5.83%
Orion	11,205.84	6,583.33	1,659.83	5,847.50	7,507.33	242.38	25,538.89	7.70%
Pilar	6,982.74	6,001.37	2,650.89	2,446.45	5,097.34	75.35	18,156.80	5.47%
Samal	5,595.73	2,460.11	1,916.01	2,130.95	4,046.96	179.32	12,282.12	3.70%
TOTAL	149,920.23	84,612.32	48,819.29	42,380.40	91,199.69	6,141.33	331,873.57	100.00%
% of Total	45.17%	25.50%	14.71%	12.77%	27.48%	1.85%	100.00%	

Figure 67. Composition of waste generated in the Province of Bataan, CY 2020.

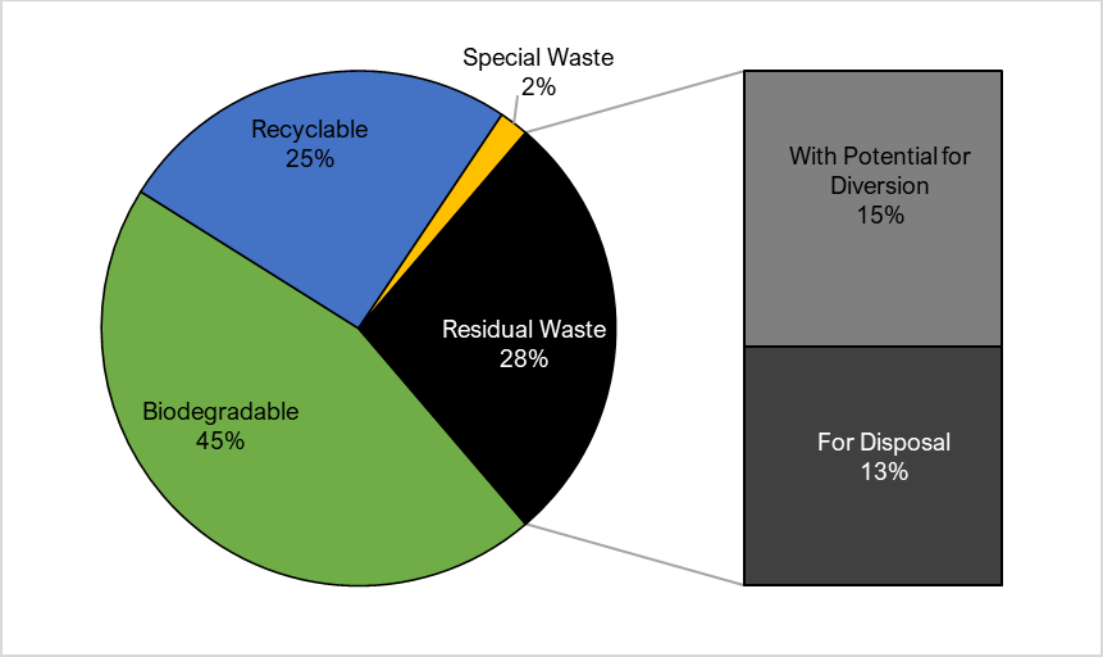


Table 73. Total waste generation in Bataan by city/municipality and by source, CY 2020.

LGU	Quantity of Waste Generated, Per Sector (kg/day)					Total Waste Generated (kg/day)	% of Total
	Residential	Commercial	Institutional	Agricultural	Industrial		
Abucay	8,915.15	677.83	62.76	-	-	**9,655.74**	**2.91%**
Bagac	11,023.01	272.85	168.53	-	-	**11,464.39**	**3.45%**
Balanga City	53,439.57	3,452.00	1,671.68	965.59	820.75	**60,349.60**	**18.18%**
Dinalupihan	54,465.83	12,899.80	502.68	27.17	33.96	**67,929.45**	**20.47%**
Hermosa	30,844.24	3,448.20	590.20	851.32	35.77	**35,769.73**	**10.78%**
Limay	27,928.13	1,508.57	111.41	391.45	171.63	**30,111.20**	**9.07%**
Mariveles	10,845.95	3,492.52	789.01	-	13,880.14	**29,007.61**	**8.74%**
Morong	11,711.26	493.03	60.10	-	-	**12,264.38**	**3.70%**
Orani	13,987.41	2,170.36	1,876.34	1,274.75	34.82	**19,343.67**	**5.83%**
Orion	24,802.52	446.04	120.24	101.57	68.52	**25,538.89**	**7.70%**
Pilar	17,159.92	592.98	403.90	-	-	**18,156.80**	**5.47%**
Samal	12,086.84	98.26	97.03	-	-	**12,282.12**	**3.70%**
TOTAL	277,209.81	29,552.44	6,453.86	3,611.85	15,045.60	331,873.57	100.00%
% of Total	83.53%	8.90%	1.94%	1.09%	4.53%	100.00%	

Figure 68. Waste generation sources in the Province of Bataan, CY 2020.

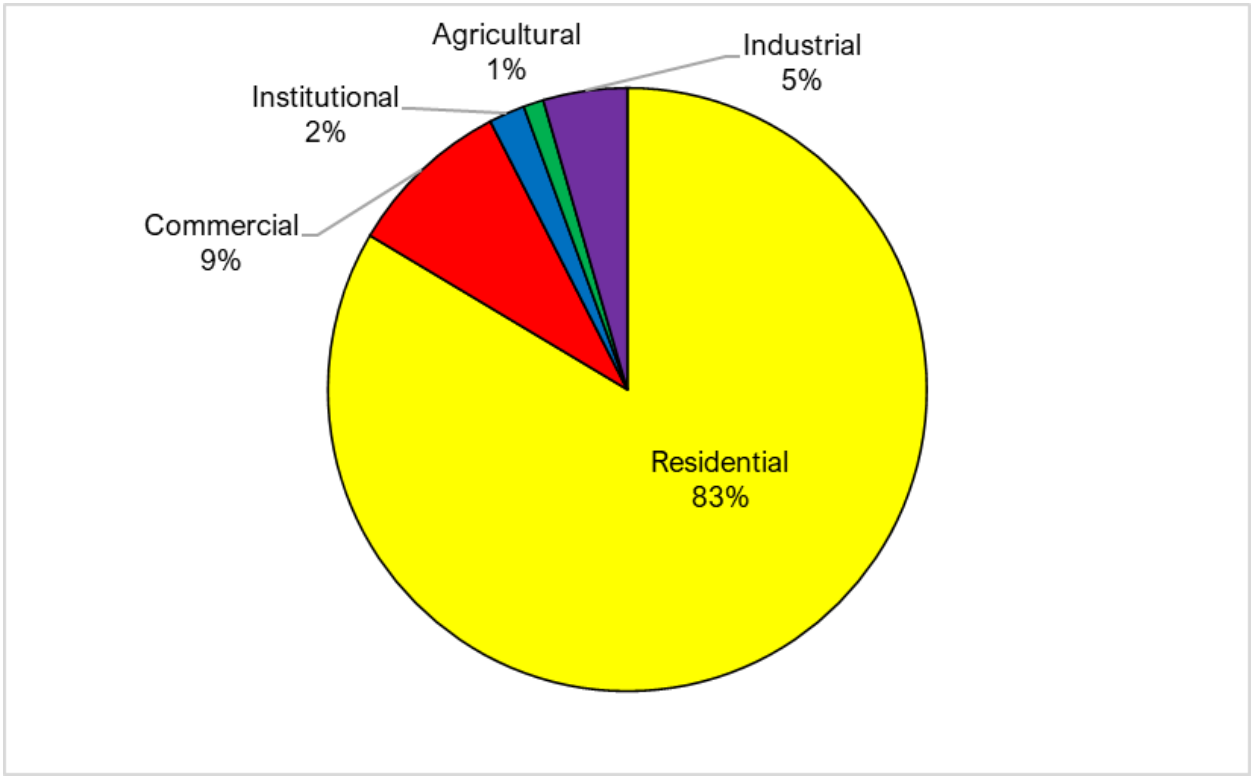
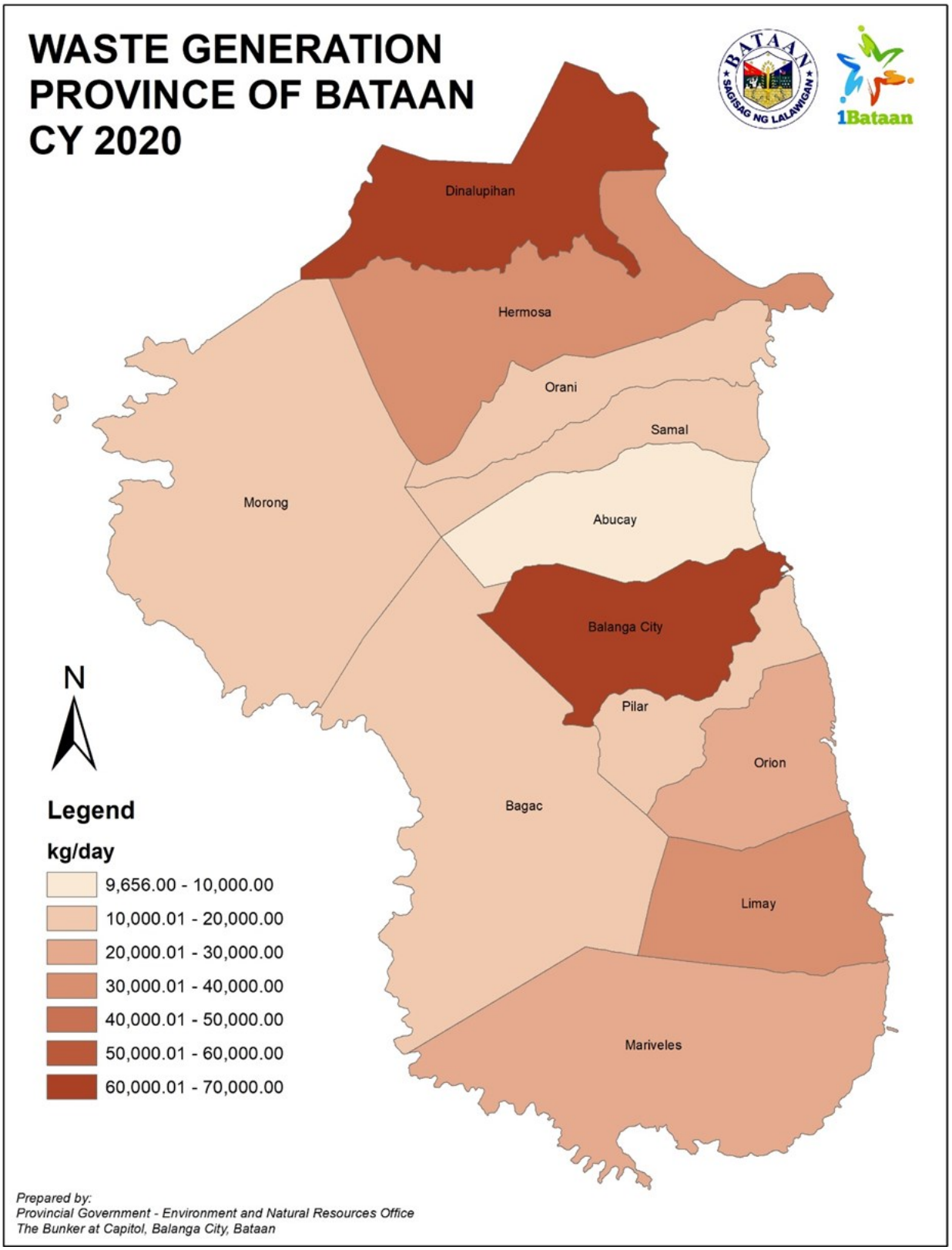


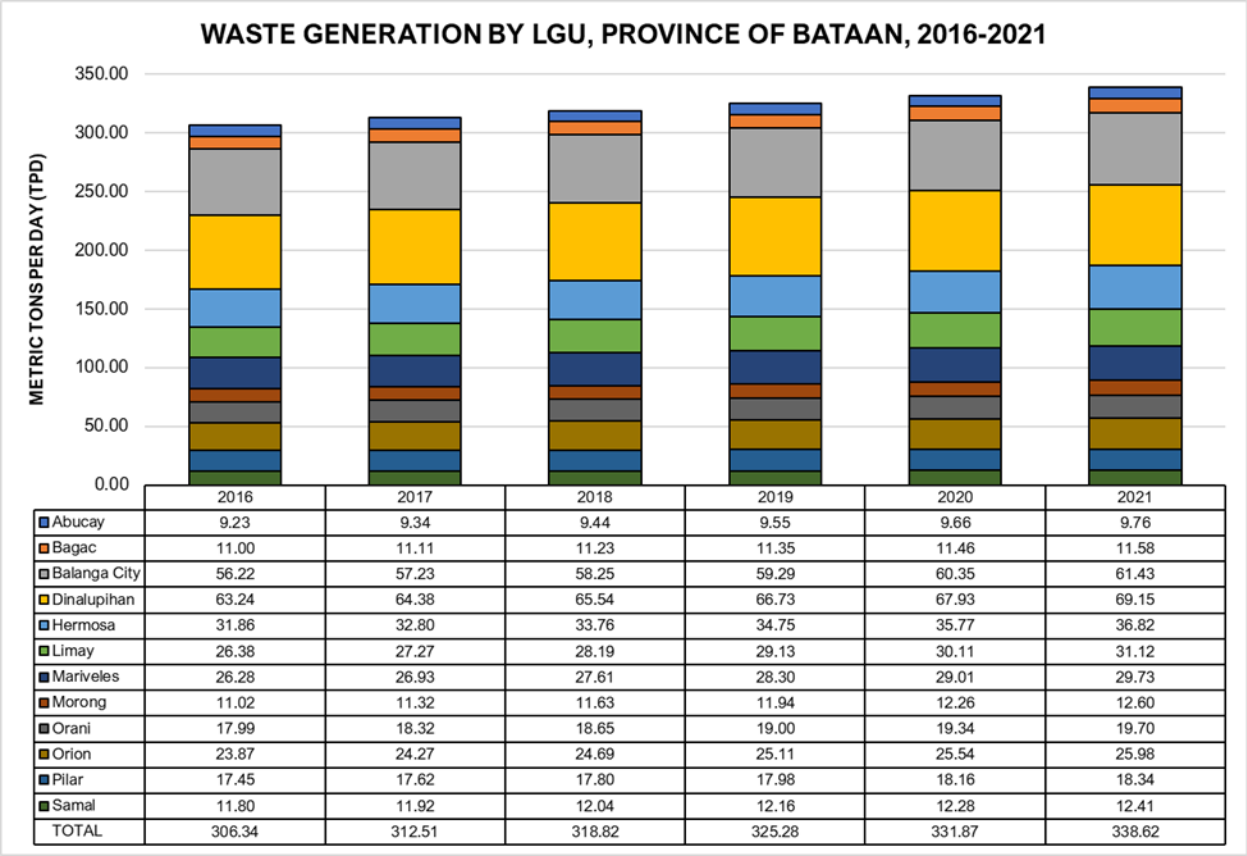
Figure 69. Waste generation map of the Province of Bataan, CY 2020.



Based on the WACS, it was estimated that in 2021, the province generated a total of 338.62 tpd (**Figure 70**). The volume of waste generated in the province has been continually increasing since 2016 primarily due to increasing population (**Figure 70**).

Despite the increasing waste generation, there has been an observed decline in the volume of solid waste disposal from the LGUs in the recent years. As shown in **Figures 71-72**, the overall proportion of municipal solid wastes received by disposal facilities decreased from 43.20% in 2016 (about 132 tpd) to 21.80% in 2021 (about 74 tpd).

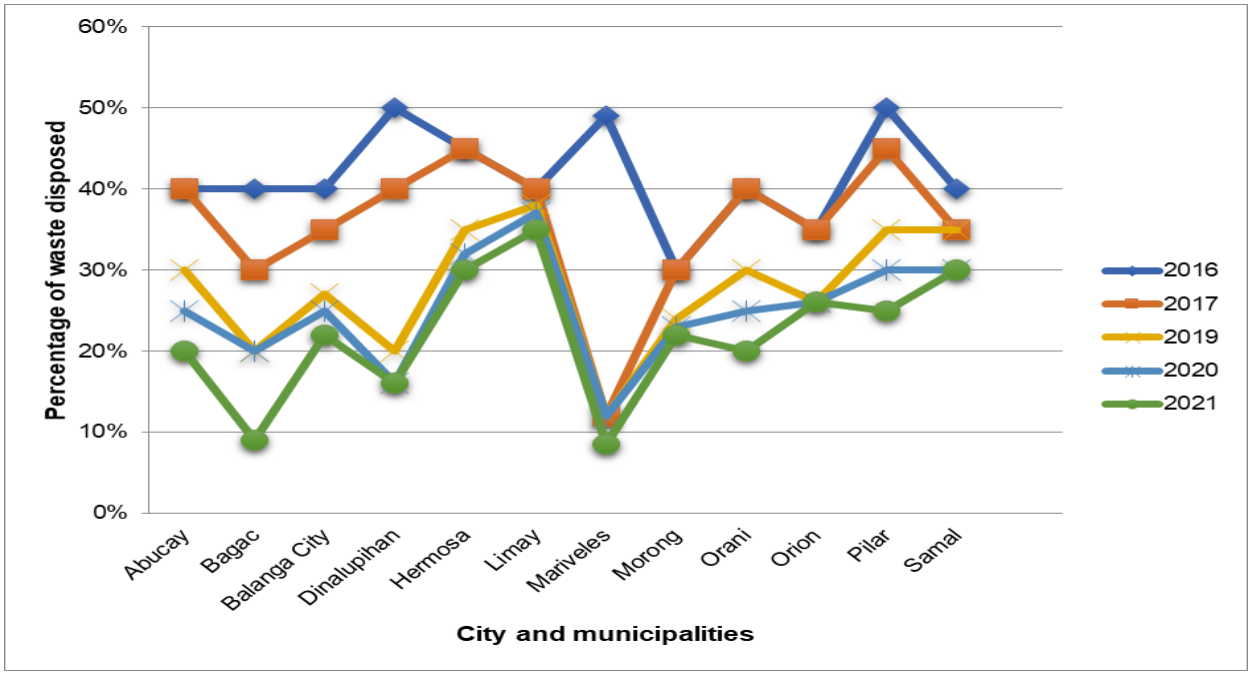
Figure 70. Volume of waste generated by city/municipality in Bataan Province, 2016-2021.



	2016	2017	2018	2019	2020	2021
Abucay	9.23	9.34	9.44	9.55	9.66	9.76
Bagac	11.00	11.11	11.23	11.35	11.46	11.58
Balanga City	56.22	57.23	58.25	59.29	60.35	61.43
Dinalupihan	63.24	64.38	65.54	66.73	67.93	69.15
Hermosa	31.86	32.80	33.76	34.75	35.77	36.82
Limay	26.38	27.27	28.19	29.13	30.11	31.12
Mariveles	26.28	26.93	27.61	28.30	29.01	29.73
Morong	11.02	11.32	11.63	11.94	12.26	12.60
Orani	17.99	18.32	18.65	19.00	19.34	19.70
Orion	23.87	24.27	24.69	25.11	25.54	25.98
Pilar	17.45	17.62	17.80	17.98	18.16	18.34
Samal	11.80	11.92	12.04	12.16	12.28	12.41
TOTAL	306.34	312.51	318.82	325.28	331.87	338.62

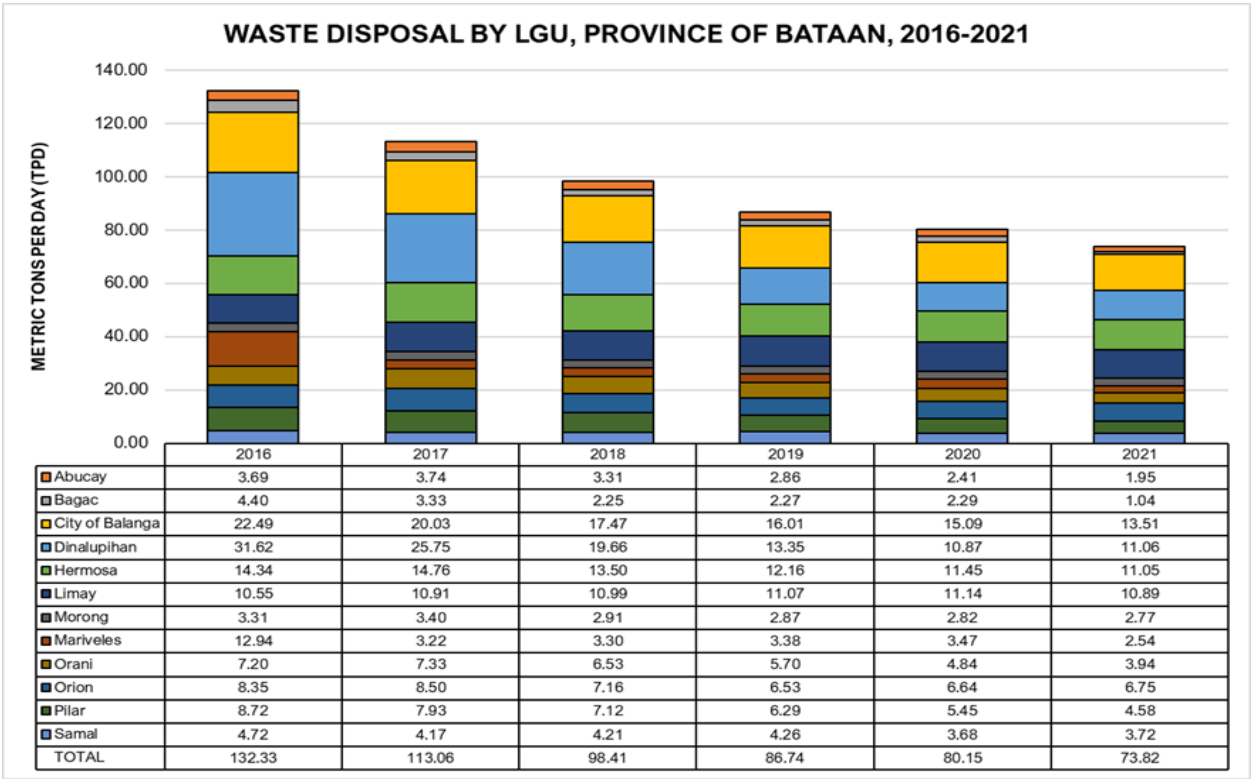
Source: PG-ENRO.

Figure 71. Quantity of waste disposed by city/municipality in Bataan Province, 2016-2021.



Source: PG-ENRO.

Figure 72. Volume of waste disposed by city/municipality in Bataan Province, 2016-2021.



	2016	2017	2018	2019	2020	2021
Abucay	3.69	3.74	3.31	2.86	2.41	1.95
Bagac	4.40	3.33	2.25	2.27	2.29	1.04
City of Balanga	22.49	20.03	17.47	16.01	15.09	13.51
Dinalupihan	31.62	25.75	19.66	13.35	10.87	11.06
Hermosa	14.34	14.76	13.50	12.16	11.45	11.05
Limay	10.55	10.91	10.99	11.07	11.14	10.89
Morong	3.31	3.40	2.91	2.87	2.82	2.77
Mariveles	12.94	3.22	3.30	3.38	3.47	2.54
Orani	7.20	7.33	6.53	5.70	4.84	3.94
Orion	8.35	8.50	7.16	6.53	6.64	6.75
Pilar	8.72	7.93	7.12	6.29	5.45	4.58
Samal	4.72	4.17	4.21	4.26	3.68	3.72
TOTAL	132.33	113.06	98.41	86.74	80.15	73.82

Source: PG-ENRO.

At present, there are no more open or controlled dumpsites in the province. In compliance with the directives of the National Solid Waste Management Commission (NSWMC) through the DENR-EMB and as part of the implementation of R.A. 9003, all LGUs in the province have implemented the Safe Closure and Rehabilitation Plans (SCRPs) of open /or controlled dumpsites in their areas and dispose their solid wastes in a sanitary landfill (SLF). Abucay and Balanga City have LGU-owned and operated SLFs while the other LGUs have contracts with Metro Clark Waste Management Corp. for the disposal of their wastes in an SLF in Capas, Tarlac.

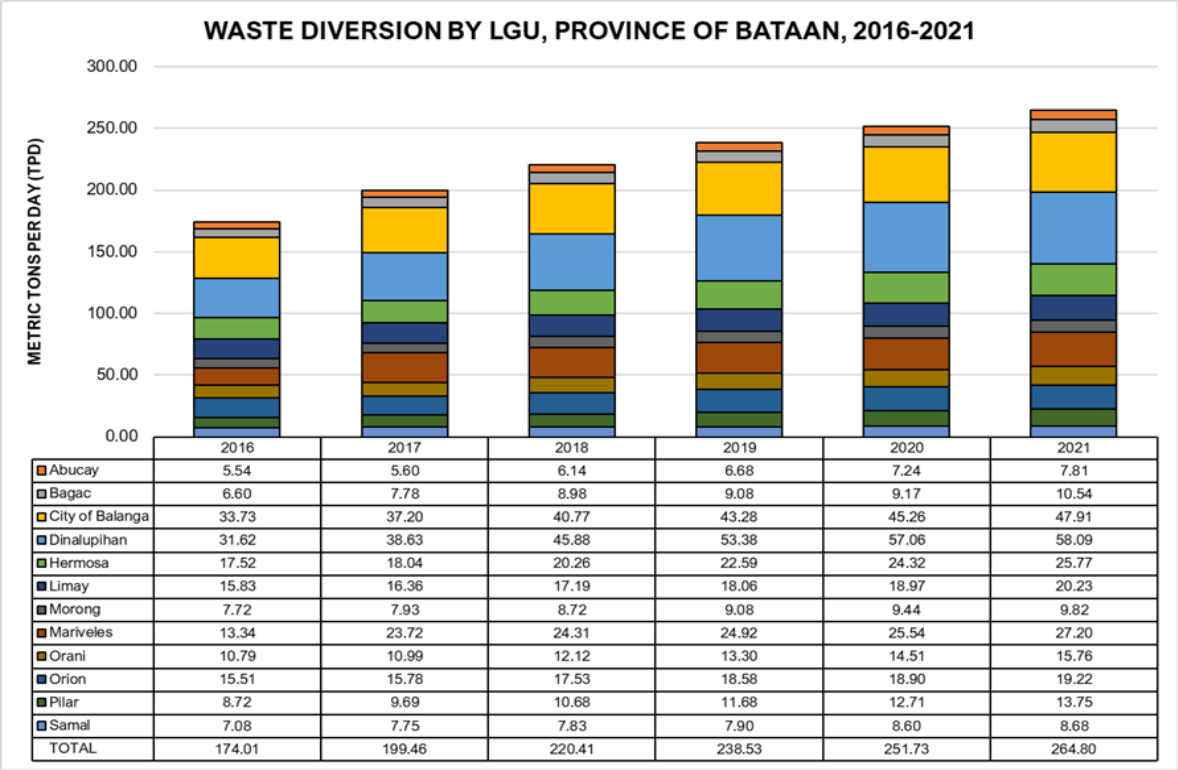
There is generally an increasing proportion of municipal solid wastes in the province that are diverted (i.e., recycled and/or composted). From about 174 tpd or 56.80% in 2016, the city/ municipalities collectively diverted as much as 265 tpd or 78.20% of generated solid wastes in 2021 (**Table 74** and **Figure 73**), which complies with the LGU-mandated minimum diversion rate of 50-60% as directed by the NSWMC and the DENR. Based on the WACS, the province targets to divert about 85% of its generated solid wastes by 2030.

Table 74. Quantity of waste diverted by city/municipality in Bataan Province, 2016-2021.

LGU	Quantity of Waste Diverted					
	kg/day	Percentage	kg/day	Percentage	kg/day	Percentage
	2016		2017		2018	
Abucay	5,540.91	60.00%	5,602.99	60.00%	6,137.92	65.00%
Bagac	6,597.71	60.00%	7,777.98	70.00%	8,982.27	80.00%
Balanga City	33,733.24	60.00%	37,197.36	65.00%	40,774.50	70.00%
Dinalupihan	31,620.63	50.00%	38,629.24	60.00%	45,880.41	70.00%
Hermosa	17,524.76	55.00%	18,038.84	55.00%	20,256.00	60.00%
Limay	15,830.39	60.00%	16,362.08	60.00%	17,193.49	61.00%
Mariveles	13,340.55	50.77%	23,715.50	88.05%	24,309.08	88.05%
Morong	7,717.05	70.00%	7,925.46	70.00%	8,720.89	75.00%
Orani	10,792.69	60.00%	10,990.56	60.00%	12,124.73	65.00%
Orion	15,512.71	65.00%	15,777.74	65.00%	17,528.57	71.00%
Pilar	8,723.08	50.00%	9,691.65	55.00%	10,678.76	60.00%
Samal	7,080.57	60.00%	7,747.64	65.00%	7,825.44	65.00%
Total	174,014.29	56.80%	199,457.03	63.82%	220,412.07	69.13%
	2019		2020		2021	
Abucay	6,684.13	70.00%	7,241.81	75.00%	7,811.14	80.00%
Bagac	9,076.40	80.00%	9,171.51	80.00%	10,541.91	91.00%
Balanga City	43,281.80	73.00%	45,262.20	75.00%	47,913.83	78.00%
Dinalupihan	53,380.63	80.00%	57,060.74	84.00%	58,090.05	84.00%
Hermosa	22,587.72	65.00%	24,323.42	68.00%	25,773.32	70.00%
Limay	18,062.29	62.00%	18,970.05	63.00%	20,229.65	65.00%
Mariveles	24,917.53	88.05%	25,541.20	88.05%	27,197.38	91.47%
Morong	9,075.82	76.00%	9,443.57	77.00%	9,824.56	78.00%
Orani	13,296.79	70.00%	14,507.75	75.00%	15,758.65	80.00%
Orion	18,581.33	74.00%	18,898.78	74.00%	19,221.65	74.00%
Pilar	11,684.71	65.00%	12,709.76	70.00%	13,754.20	75.00%
Samal	7,904.01	65.00%	8,597.48	70.00%	8,683.81	70.00%
Total	238,533.16	73.33%	251,728.27	75.85%	264,800.15	78.20%

Source: PG-ENRO.

Figure 73. Volume of waste diverted by city/municipality in Bataan Province, 2016-2021.



	2016	2017	2018	2019	2020	2021
Abucay	5.54	5.60	6.14	6.68	7.24	7.81
Bagac	6.60	7.78	8.98	9.08	9.17	10.54
City of Balanga	33.73	37.20	40.77	43.28	45.26	47.91
Dinalupihan	31.62	38.63	45.88	53.38	57.06	58.09
Hermosa	17.52	18.04	20.26	22.59	24.32	25.77
Limay	15.83	16.36	17.19	18.06	18.97	20.23
Morong	7.72	7.93	8.72	9.08	9.44	9.82
Mariveles	13.34	23.72	24.31	24.92	25.54	27.20
Orani	10.79	10.99	12.12	13.30	14.51	15.76
Orion	15.51	15.78	17.53	18.58	18.90	19.22
Pilar	8.72	9.69	10.68	11.68	12.71	13.75
Samal	7.08	7.75	7.83	7.90	8.60	8.68
TOTAL	174.01	199.46	220.41	238.53	251.73	264.80

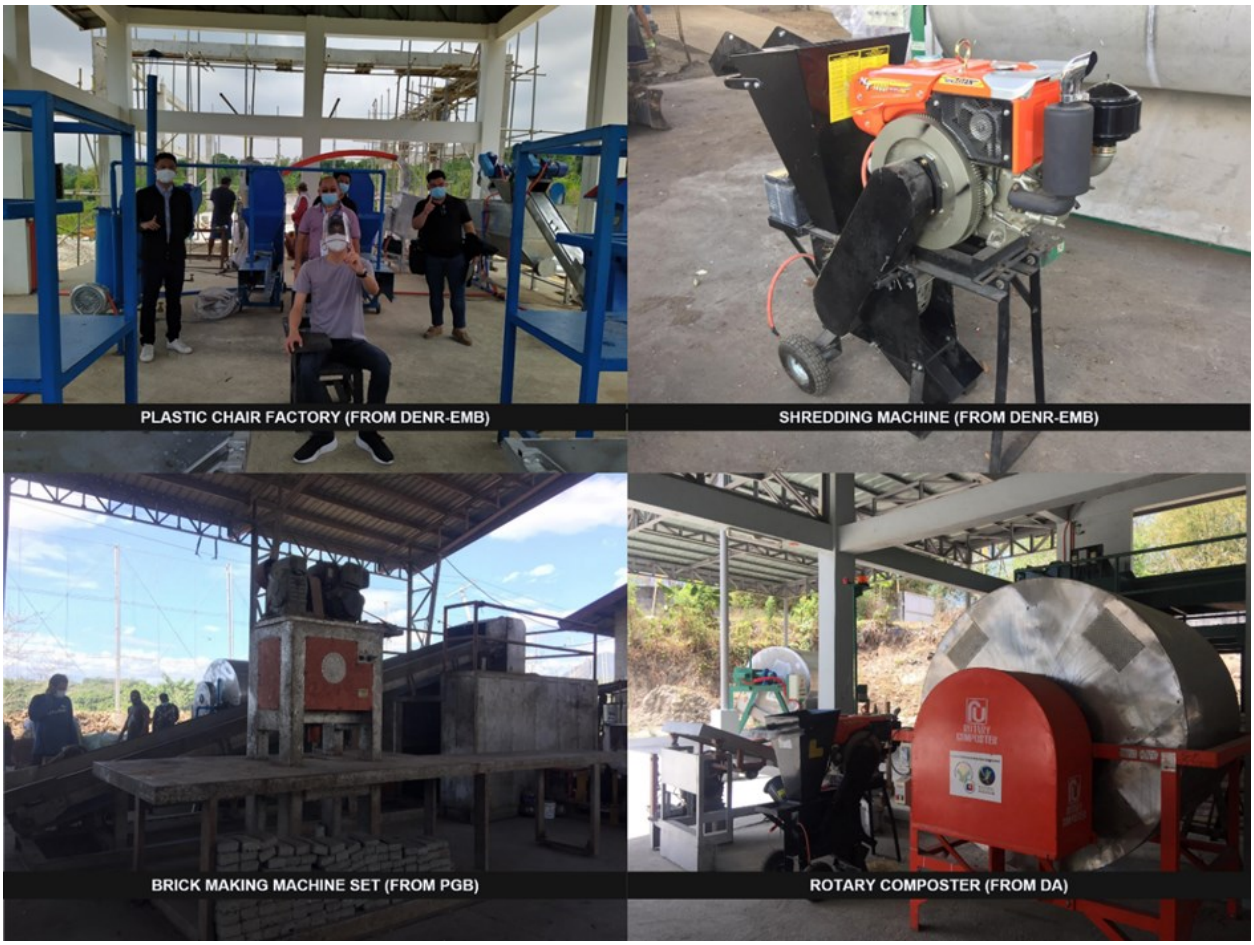
Source: PG-ENRO.

The increasing waste diversion rate in the province can be attributed to the implementation of "No Segregation, No Collection" policy for households and non-household sources and the LGUs' investments in SWM facilities and equipment, including materials recovery facilities (MRFs). The province has a total of 211 MRFs, eight (8) of which are centralized municipal MRFs. At the minimum, the MRFs at the *barangay* and municipal levels provide areas for segregation of recyclables, biodegradables, and residuals with potential for diversion. MRFs with available composting area process biodegradable wastes into soil conditioner while MRFs with available equipment and manpower process biodegradable, recyclable, and residual wastes to produce paver blocks/eco-bricks, compost, coco-wool/coco-mats, and handicrafts.

In recent years, the city and municipalities in the province have received various machineries and equipment from the PGB, DENR, and DA to enhance the functionality of their respective MRFs. In 2021, the PGB also received a Plastic Chair Factory from the DENR-EMB Central Office for the processing of residual plastic wastes (plastic bags and foil packs) into plastic arm chairs.

Solid wastes are also diverted when households, institutions, commercial establishments, and industries sell their recyclables to ambulant buyers and junkshops. There are 82 operating junkshops in the province (**Table 75**). These junkshops buy recyclables (paper, plastic sheets, plastic and glass bottles, tin and aluminum cans, galvanized iron, copper, and other metals) at a per-kilo or per-piece rate depending on the material. The junkshop operators sell the recyclables to aggregators and recyclers located outside the province (e.g., Pampanga, Valenzuela, and Navotas). The recycled materials are either exported or sold to local industries.

The paper mill of Bataan 2020, Inc. located in the municipality of Samal uses paper wastes for the production of some of its paper products. The Yienson Manufacturing Corporation located in Brgy. San Ramon, Dinalupihan recycles plastic wastes (e.g., polyethylene bags) into pellets, which are exported as raw materials. The plastic wastes for recycling, however, are sourced from other countries (e.g., Japan and China) as it does not utilize locally generated plastic waste.



Machineries and equipment donated to MRFs in the Province of Bataan.

Table 75. Inventory of junkshops in the Province of Bataan.

LGU	No. of Junkshops
Abucay	1
Bagac	7
Balanga City	8
Dinalupihan	0 (ambulant buyers only)
Hermosa	7
Limay	15
Mariveles	8
Morong	3
Orani	9
Orion	9
Pilar	8
Samal	7

Implications and Recommendations

Bataan Province has made significant strides in complying with the provisions of R.A. 9003. All of its component LGUs have established facilities or contracted out services for the disposal and recycling of municipal solid wastes. With the expected increase in population and therefore waste generation, it is recommended for the LGUs in the province to ensure sustainable operations of their MRFs and SLFs. Upstream interventions, such as source reduction and regulation of single-use plastics and disposable packaging, are also recommended.

The Provincial Government of Bataan should also continue to perform its role as a supportive entity in solid waste management by allowing the clustering of municipalities for waste recycling and disposal. It should strengthen partnerships with the private sector and the community for the composting of biodegradable wastes and recycling—even upcycling—of recyclable and residual wastes, in order to meet the diversion targets of the province and achieve a circular economy.

References

PG-ENRO. Ten-Year Solid Waste Management Plan of the Province of Bataan 2020-2030
R.A. 9003.

035 Industrial, agricultural and hazardous waste

Description

This indicator measures the quantity of agricultural, industrial, and hazardous wastes being generated and properly managed within the local government's jurisdiction.

Rationale

Agricultural, commercial, institutional and industrial sectors generate income and employment but they also generate wastes that may affect human health and livelihoods in communities. Hazardous and toxic wastes (e.g., oily waste, pesticide residues; cleaning compounds; hospital wastes; etc.) are byproducts of various goods, services, processes and systems that customers/citizens demand. The proper management of these wastes is a major challenge to local governments and to sustainable development.

Data Requirements

- Volume of industrial and agricultural wastes generated, handled, treated and disposed
- Volume of hazardous and toxic waste generated, handled, treated and disposed

Results

In 2021, about 210 tons of hazardous waste were generated in the province, including wastes with cyanide, acid, and alkali wastes from industries. The volume of hazardous wastes stored in the same year was about 10,062 tons (**Table 76**). As shown in **Table 76**, the volume of hazardous waste stored includes those from previous years, and thus the higher volume compared to total hazardous wastes generated in 2021. From the cumulative volume of hazardous wastes stored, around 28% or 2,860 tons were treated and disposed in 2021. The remaining 72% are kept in the DENR-EMB-approved storage facilities of the industries or accredited third-party hazardous waste hauler and treater.

Table 76. Volume of hazardous waste generated, stored, treated, and disposed, CY 2021, Bataan Province.

ID	Type	Volume Generated (tons/year)	Volume Stored (tons/year)	Volume Treated and Disposed (tons/year)
A101	Wastes with cyanide	1.0245	0.7000	1.5095
B201	Sulfuric acid	44.1000	0.1480	44.1000
B202	Hydrochloric acid	0.0000	0.0200	0.0200
B203	Nitric acid	0.0000	0.0000	0.0000
B204	Phosphoric acid	0.0000	0.0000	0.0000
B205	Hydrofluoric acid	0.0000	0.0000	0.0000
B206	Mixture of sulfuric and hydrochloric acid	0.0000	0.0000	0.0000
B207	Other inorganic acid	1.0000	0.2400	0.0000
B208	Organic acid	0.0000	0.0000	3.5000
B299	Other acid wastes	0.0000	0.0800	0.0000
C301	Caustic soda	0.0000	9,515.1200	2,811.2400
C302	Potash	0.0000	0.0000	0.0000
C303	Alkaline cleaners	0.0000	0.0040	0.0000
C304	Ammonium hydroxide	0.0000	0.0000	0.0000
C305	Lime slurries	164.1000	546.1000	0.0000
C399	Other alkali wastes	0.0000	0.0000	0.0000
Total		210.2245	10,062.4120	2,860.3695

Source: DENR-EMB R3.

In compliance with the NSWMC Resolution No. 1364, Series of 2020, on “Adopting the Interim Guidelines on the Management of COVID-19 Related Health Care Waste,” the province contracted out the services of Cleanway Environmental Management Systems, Inc. (CEMSI) for the hauling of infectious wastes generated from district hospitals, quarantine and isolation facilities, and vaccination sites. In 2021, a total of 17,552 kg of infectious wastes including sharp medical items (e.g., needles in syringes for injections) and personal protective equipment (PPE) were generated (**Table 77**). Infectious wastes generated and collected were temporarily stored in the MRFs of the healthcare facilities and pre-treated with chlorine solution prior to hauling by CEMSI and transfer to a DENR-accredited Treatment, Storage, and Disposal (TSD) facility located in the province of Tarlac for treatment and final disposal.

Hauling of infectious wastes by Cleanway Environmental Management Systems, Inc.

Table 77. Infectious waste generated, stored, and hauled, CY 2021, Bataan Province.

Month	Infectious Waste Generated and Stored (kg)	Infectious Waste Hauled (kg)
April	908	908
May	42	0
June	743	785
July	2,024	2,024
August	2,954	2,954
September	1,547	1,547
October	3,288	3,288
November	3,408	3,408
December	2,638	2,638
Total	17,552	17,552

Source: PG-ENRO.

Implications and Recommendations

With the onset of the COVID-19 pandemic and with the improvements in the municipal waste management system, LGUs in Bataan Province were able to share in the responsibility for the proper handling and disposal of healthcare wastes not only from households, but also from healthcare facilities.

With the rationalization of membership in the Multipartite Monitoring Team (MMT) of industries, the provincial government's participation in the monitoring of industrial wastes became more limited. It is therefore recommended for the province to further strengthen its partnership with the DENR-EMB Region 3 in ensuring the proper management of industrial/hazardous wastes. It should also look into private sector partners for the hauling of such wastes, if not the establishment of a TSD facility.

At present, data on hazardous wastes generated from agricultural activities (e.g., disposal of pesticide containers used in agriculture) including the total volume of wastes generated from agricultural activities are lacking. The province in partnership with relevant agencies and other sectors (e.g., private, academe) may consider this in future data gathering and monitoring initiatives to serve as basis in management of agricultural wastes.

References

DENR-EMB R3. Volume of hazardous waste generated, stored, treated and disposed in Bataan Province.
National Solid Waste Management Commission (NSWMC) Resolution No. 1364, Series of 2020.
PG-ENRO. Infectious waste generated, stored, and hauled in Bataan Province.