BATANGAS STATE UNIVERSITY

The National Engineering University

UNIVERSITY CLIMATE CHANGE ACTION PLAN

Leading Innovations, Transforming Lives, Building the Nation

Dr. TIRSO A. RONQUILLO
University President

As we unfold the pages of our University Carbon and Climate Action Plan (UCCAP), not only are we aligning with the UN Sustainable Development Goals but also showcasing a reflection of our shared responsibility and commitment towards sustainable development and the future well-being of our planet.

I wish to convey my profound appreciation of the relentless efforts of our UCCAP Task Force and every individual who played a part in crafting this comprehensive roadmap. The expertise and dedication coupling every strategy in this document are emblematic of the high standards and values we champion at Batangas State University, The National Engineering University.

This UCCAP provides the reader with some details on campus profiles, greenhouse gas mitigation approaches, and adaptation strategies. Beyond the facts and figures, this is BatStateU's collective pledge to foster an environmentally-resilient University. It stands as a symbol of our ambition not only to impart knowledge but also to live by it, setting an example for our students and the broader community.

Looking ahead, this UCCAP is more than just a plan—it is the University's compass that will guide our institutional efforts in confronting the challenges posed by climate change, ensuring that Batangas State University remains at the forefront of sustainability and environmental stewardship. We are charting a course to inspire other institutions to join us in this crucial endeavor.

In harmony with the UN's vision for a sustainable future, let this UCCAP remind us of our interconnectedness with nature and our duty to safeguard it. As we embark on this journey, may we remain steadfast in our resolve, driven by innovation, and united in purpose.

ACRONYMS AND ABBREVIATIONS

CALABARZON	Calamba, Laguna, Batangas, Rizal, Quezon
CCET	Climate Change Expenditures tagging
GHG	Greenhouse Gases
LCCAP	Local Climate Change Action Plan
LGU	Local Government Unit
NCCAP	National Climate Change Action Plan
PDZ	Permanent Danger Zone
NDRRMP	National Disaster Risk Reduction and Management Plan
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PSF	People's Survival Fund
RCP	Representative Concentration Pathway RCP
SDG	Sustainable Development Goals
SDO	Sustainable Development Office
UCCAP	University Climate Change Action Plan
UN	United Nation
UNFCCC	United Nation Framework Convention on Climate Change

GLOSSARY OF TERMS

Adaptation	Measures taken to adjust and prepare for the impacts of climate change to reduce vulnerability and build resilience in the face of changing climate conditions.
Carbon footprint	The total amount of greenhouse gases that are emitted into the atmosphere each year by a person, family, building, organization, or company.
Carbon Offsetting	The practice of compensating for one's carbon emissions by supporting projects or activities that remove or reduce an equivalent amount of carbon dioxide from the atmosphere.
Carbon Neutral	Achieving a balance between the amounts of greenhouse gas emissions produced and removed from the atmosphere, effectively resulting in no net increase in atmospheric carbon dioxide levels.
Carbon Sequestration	The process of capturing and storing carbon dioxide from the atmosphere, often through natural means like afforestation and reforestation, or through technological methods
Climate Change	Refers to the long-term alteration of Earth's average weather patterns, including shifts in temperature, precipitation, and extreme weather events, primarily driven by human activities, such as burning fossil fuels and deforestation.
Global Warming	The increase in Earth's average surface temperature is caused by the enhanced greenhouse effect, primarily due to human activities, which results in various environmental impacts.
Green Building	Designing, constructing, and operating buildings with a focus on energy efficiency, sustainability, and reduced environmental impact.
Greenhouse Gases	Gases, such as carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and fluorinated gases, trap heat in the Earth's atmosphere and contribute to the greenhouse effect, leading to global warming.
Energy Efficiency	The practice of using less energy to accomplish the same tasks, achieved through the use of energy-efficient technologies and behaviors, ultimately reducing greenhouse gas emissions
Mitigation	Actions and strategies implemented to reduce or prevent the emission of greenhouse gases and minimize climate change impacts. This includes promoting renewable energy, energy efficiency, and sustainable practices.
Renewable Energy	Energy generated from sources that are naturally replenished, such as solar, wind, hydro, geothermal, and biomass, with minimal greenhouse gas emissions and reduced environmental impact.
Stakeholders	Individuals or groups with an interest or influence in the development and implementation of the Climate Change Action Plan, such as students, faculty, staff, administrators, community members, and policymakers.
Sustainable Transportation	Transportation systems and practices that minimize environmental impacts and reduce emissions, such as promoting public transit, biking, walking, and electric vehicles.
Waste Reduction	Initiatives aimed at minimizing the generation of waste, promoting recycling, composting

EXECUTIVE SUMMARY

The University Climate Change Action Plan (UCCAP) for Batangas State University aims to address climate change challenges and align the university with legal mandates and frameworks while implementing various mitigation and adaptation initiatives. As part of global efforts to combat climate change, Batangas State University is committed to reducing its carbon footprint and enhancing its resilience to climate-related impacts. This action plan is driven by legal mandates and frameworks, including international agreements like the Paris Agreement and national legislation addressing climate change.

Batangas State University, located in the province of Batangas, Philippines, is a leading educational institution offering diverse academic programs and research opportunities. The university's commitment to sustainability and environmental stewardship makes it an ideal candidate for implementing a robust climate change action plan. BatStateU location on the island of Luzon exposes it to various climate-related risks, including extreme weather events, rising sea levels, and changing precipitation patterns. Understanding the university's physical and geographic aspects is crucial for devising effective climate change strategies. BSU's demographic profile consists of a diverse student body, faculty, and employees. Projections indicate a steady increase in the population, necessitating comprehensive climate change planning to accommodate future growth sustainably.

BatStateU has already undertaken several environmental mitigation-related initiatives, including energy-efficient infrastructure, waste reduction programs, renewable energy adoption, and sustainable transportation practices. These actions set a foundation for the UCCAP's success.

The UCCAP development followed a consultative and collaborative process, involving stakeholders from across the university community. A dedicated Climate Core Team was formed, consisting of experts in climate science, sustainability, education, and administration. This team played a central role in formulating and executing the plan.

In addressing mitigation, Batangas State University adopts a multi-faceted approach to reduce greenhouse gas emissions. This includes transitioning to renewable energy sources, optimizing energy consumption and integrating climate-friendly technologies into research and education.

This UCCAP also incorporates adaptation approaches to strengthen the university's resilience against climate impacts. Strategies include climate-sensitive infrastructure development, climate resilient development, water management, agricultural adaptation, coastal protection, environmental sustainability and public awareness and capacity building.

By encouraging more teachers, students, and staff to work on climate solutions from a range of interdisciplinary perspectives and to include alumni and benefactors in climate solutions, Batangas State University is setting the groundwork for the future from 2022–2025. Energy efficiency and conservation activities are predicted to result in a 5% decrease in overall demand by 2026–2030 and the potential to sequester 2000 more tons of carbon dioxide over time. By using fossil fuel-powered heating and cogeneration systems, Batangas State University expects to reduce on-campus fuel combustion by 60%–80% and accelerate the reduction of indirect, off-campus emissions from sources by 2031–2040. This will help the university get closer to its goal of becoming carbon neutral. Batangas State University will become carbon neutral and climate positive by 2040 onwards..

The University Climate Change Action Plan for Batangas State University outlines a comprehensive strategy to tackle climate change challenges effectively. By aligning with legal mandates, incorporating adaptation and mitigation approaches, and leveraging the expertise of its Climate Core Team, BSU demonstrates its commitment to a sustainable and resilient future for its campus community and the broader society. The plan sets an example for other educational institutions to take proactive steps in combating climate change

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

I. BACKGROUND

The Philippines, as an archipelagic nation located in Southeast Asia, is particularly vulnerable to the impacts of climate change due to its geographical location and topography. The country's unique environmental setting, which includes coastal areas, mountains, forests, and numerous islands, makes it highly susceptible to extreme weather events such as typhoons, storm surges, flooding, landslides, and droughts.

Historically, the Philippines has experienced various natural disasters, but in recent decades, the frequency and intensity of these events have increased, partly due to the effects of climate change. Rising sea levels and warmer ocean temperatures have contributed to the intensification of tropical storms, resulting in more destructive typhoons and storm surges.

Moreover, deforestation, illegal logging, and unplanned urbanization have exacerbated the impact of climate change by reducing natural buffers against extreme weather events, such as mangrove forests and wetlands that can help mitigate flooding and storm surges.

Recognizing the urgent need to address climate change, the Philippine government has taken steps to adapt and build resilience. Some of the key actions and policies include:

The Climate Change Act of 2009: This landmark legislation created the Climate Change Commission (CCC) and mandated the formulation of a National Climate Change Action Plan (NCCAP). The NCCAP outlines the country's strategies for adaptation and mitigation, including disaster risk reduction and management.

National Disaster Risk Reduction and Management Plan (NDRRMP): This comprehensive plan integrates climate change adaptation and disaster risk reduction measures, focusing on preparedness, response, and recovery.

People's Survival Fund (PSF): Established in 2012, the PSF provides funding for local adaptation projects aimed at enhancing the resilience of vulnerable communities to climate change impacts.

Mangrove Reforestation and Conservation Programs: Recognizing the importance of mangrove forests as natural defenses against storm surges and coastal erosion, the government has initiated various programs to protect and restore mangrove ecosystems.

Renewable Energy Development: The Philippines has been investing in renewable energy sources like solar, wind, and geothermal power to reduce reliance on fossil fuels and decrease greenhouse gas emissions.

Disaster Preparedness and Early Warning Systems: The government has been working to improve disaster preparedness and early warning systems, enabling communities to respond effectively to extreme weather events.

Climate Change Education and Advocacy: The Philippine government, in partnership with civil society organizations, promotes climate change education and awareness campaigns to empower citizens to take action.

Climate change adaptation in the Philippines requires a concerted effort from the government, private sector, civil society, and local communities to build a more resilient and sustainable future in the face of a changing climate.

Section 1. Legal Mandates and Bases

Given that there are multiple sectors affected by climate change, it is essential that all levels of government including State Universities and Colleges participate in the processes of planning for urban resilience and climate smart cities in order to increase the likelihood that the desired objectives will be realized. The following serves as the legal mandates and bases in crafting the UCCAP of Batangas State University.

1. RA 9729 or the Climate Change Act allowed mainstreaming of climate change into government formulation of programs and projects, plans and strategies, and policies, creation of Climate Change Commission, and establishment of Framework Strategy and Program for climate change. Mainstreaming of Climate Change into Government Policy Formulation. In RA 9279, local government units (LGUs) are tasked to serve as frontline agencies in the formulation, planning, and implementation of climate change action plans in their respective areas. Following this, the Batangas State University Climate Change Action Plan (UCCAP) 2022-2029 will start its implementation in 2023 after the university has finished its vulnerability Assessment that is being undertaken using the ICLEI-ACCCRN process and the GHG Management Framework requirements by the USAID B-LEADERS Project (on-the same process with LCCAP). The plan outlines the specific programs and strategies for adaptation and mitigation for a ten-year period and provides key actions that enhance the adaptive capacity and resilience of communities to climate change.

2. Republic Act No. 8749, otherwise known as the Philippine Clean Air Act of 1999, is a comprehensive air quality management policy and program which aims to achieve and maintain healthy air for all Filipinos

3. The Republic Act (RA) 9003, otherwise known as the Ecological Solid Waste Management Act of 2000, provides the necessary policy framework, institutional mechanisms and mandate to the local government units (LGUs) to achieve 25% waste reduction through establishing an integrated solid waste management plan based on 3Rs (reduce, reuse and recycling).

4. Republic Act (RA) 9275, otherwise known as Philippine Clean Water Act of 2004 aims to protect the country's water bodies from pollution from land-based sources (industries and commercial establishments, agriculture and community/household activities). It provides for a comprehensive and integrated strategy to prevent and minimize pollution through a multi-sectoral and participatory approach involving all the stakeholders.

5. Republic Act No.9512 on National Environmental Awareness and Education Act, 2008 provides for the promotion of environmental awareness through environmental education which shall encompass environmental concepts and principles, environmental laws, the state of international and local environment, local environmental best practices, the threats of environmental degradation and its impact on human well-being, the responsibility of the citizenry to the environment and the value of conservation, protection and rehabilitation of natural resources and the environment.

6. National Climate Change Action Plan (NCCAP) that outlines a long-term program and strategies for climate change adaptation with the national development plan for 2011 to 2028 and focused on seven thematic priority areas: food security; water sufficiency; ecosystem and environmental stability; human security; climate-smart industries and services; sustainable energy; and

knowledge and capacity development. The NCCAP recognizes that certain activities cut across strategic priorities and sectors. These include gender and development, technology transfer, research and development, information, education and communication (IEC), and capacity building.

7. The United Nations (UN) General Assembly 2030 Agenda for Sustainable Development which is a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom.

8. Article 2, Section 16 of the 1987 Constitution of the Philippines - The State shall protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature.

9. The Green Public Procurement Roadmap (2017) along with the Green Public Procurement Technical Specification for Common Priority Products provides guidance to government offices in achieving complete implementation of green procurement in all sectors of the government.

10. Philippine Green Building Code, a referral code of the National Building Code (P.D. 1096). The GB Code seeks to improve the efficiency of building performance through a framework of acceptable set of standards that will enhance sound environmental and resource management that will counter the harmful gases responsible for the adverse effects of climate change, throughout the building's life-cycle including efficient use of resources, site selection, planning, design, construction, use, occupancy, operation and maintenance, without significant increase in cost. This GB Code is a set of regulations setting minimum standards for compliance and not intended to rate buildings.

11. Joint Memorandum Circular No. 2015-01 dated March 24, 2015, re: Revised guidelines for Climate Change Expenditures tagging (CCET) amending JMC No. 2013-01.To track, monitor and report climate change programs, projects and activities to enable oversight and line department managers to monitor climate change-related expenditures; and To define and clarify responsibilities of national government agencies, the Department of Budget and Management (DBM), and the Climate Change Commission (CCC)relative to the climate change expenditure tagging at the various stages of the budgeting process.

Section 2. The Framework

The frameworks as presented below provides a basis for the national and local program on climate change. It identifies key result areas to be pursued in key climate-sensitive sectors in addressing the adverse effects of climate change both under adaptation and mitigation.

1. 2015 Paris Agreement. The Agreement is a legally binding international treaty. It entered into force on 4 November 2016. Today, 194 Parties (193 States plus the European Union) have joined the Paris Agreement. The Agreement includes commitments from all countries to reduce their emissions and work together to adapt to the impacts of climate change, and calls on countries to strengthen their commitments over time. The Agreement provides a pathway for developed nations to assist developing nations in their climate mitigation and adaptation efforts while creating a framework for the transparent monitoring and reporting of

countries' climate goals. The Paris Agreement provides a durable framework guiding the global effort for decades to come. It marks the beginning of a shift towards a net-zero emissions world. Implementation of the Agreement is also essential for the achievement of the Sustainable Development Goals.

2. The Sustainable Development Goals are a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. The 17 Goals were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to achieve the Goals.

3. Kyoto Protocol operationalizes the United Nations Framework Convention on Climate Change by committing industrialized countries and economies in transition to limit and reduce greenhouse gases (GHG) emissions in accordance with agreed individual targets.

4. The United Nations Framework Convention on Climate Change (UNFCCC) established an international environmental treaty to combat "dangerous human interference with the climate system", in part by stabilizing greenhouse gas concentrations in the atmosphere.

5. Bali Action Plan. As part of the Bali Action Plan, adopted in 2007, all developed country Parties have agreed to "quantified emission limitation and reduction objectives, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances.

Section 3. Scope and Content

The University Climate Change Action Plan (UCCAP) is expected to be updated every ten (10) years coinciding with the updating of the Land Use Development Investment Plan (LUDIP) and subjected for review every three (3) years to ensure consistency with the local plans. This plan covers the period 2022 to 2032.

The remaining sections of Part 1: Background outlines other background information relevant to this plan such as the University Profile, the planning process, and the institutions primarily responsible for the creation of this plan.

Part 2: Mitigation outlines how the university can best manage its emissions given its resources and the policies that have been made available to address these.

Part 3: Adaptation presents how the university can best manage risks and protect vulnerable populations from the anticipated impacts of climate change

Appendices provide information on related studies, plans and outputs that were either conducted as part of the planning process for this UCCAP, or were used as reference documents in the drafting of this plan.

3.1 Batangas Province

Batangas is a province in the Philippines situated in the CALABARZON region occupying the central section of Luzon. Its capital is the City of Batangas. The province has a land area of 3,119.75 square kilometers or 1,204.54 square miles. Its population as determined by the 2020 Census was 2,908, 494. This represented 18.69% of the total population of the CALABARZON region, 4.69% of the overall population of the Luzon Island group, or 2.67% of the entire population of the Philippines. Based on these figures, the population density is computed at 864 inhabitants per square kilometer or 2,237

inhabitants per square mile. The population of Batangas grew from 681,414 in 1960 to 2,694,335 in 2015, an increase of 2,012,921 people. The latest census figures in 2015 denote a positive growth rate of 2.41%, or an increase of 316,940 people, from the previous population of 2,377,395 in 2010. Batangas is bordered, clockwise from the North, by Cavite, Laguna, Quezon, Tayabas Bay, Verde Island Passage, and South China Sea.

3.2. Brief Profile of Batangas State University

Batangas State University is a Level IV state university in the province of Batangas, Philippines. It has 11 campuses strategically located around Batangas Province as shown in Figure 1. It has 5 constituent campuses namely the Pablo Borbon, Alangilan, JPLPC - Malvar, Lipa, and ARASOF-Nasugbu. Under the Pablo Borbon campus there are 3 extension campuses namely the San Juan, Lemery, and Rosario campuses. In addition, the Alangilan campus has extension campuses namely the Lobo, Mabini and Balayan campuses.

Established in 1903, the university is strategically located at the 2nd largest economic region in the country, which puts it at a prime position not only as a premier provider of higher and advanced learning, but also as a viable economic development zone. As one of the country's model higher education institutions recognized by the Commission on Higher Education (CHED), BatStateU is the first and thus far the only state university with engineering, IT and computer Science programs accredited by the Accreditation Board for Engineering and Technology (ABET)- Engineering Accreditation Commission and Computing Accreditation Commission. With 15 development centers, it is recognized by the Regional Development Council of Region IV-A as the Regional Center for Technology Business Incubation and Development, and as the Regional Center for Science, Technology, Engineering and Environment Research.

The university's Electronic Engineering program is designated by CHED as a National Center of Excellence, and its Electrical Engineering, Mechanical Engineering, Development Communication, and Teacher Education programs are National Centers of Development. It has also maintained high academic standards in architecture, industrial technology, computing sciences, business, agriculture, allied health and the social sciences. It received ISO 9001-2015 certification from TUV Rheiland Philippines Inc., and is host to the first China Philippines Silk Road Institute in the country.

Through the proclamation No. 947, President Rodrigo Roa Duterte designated the BatStateu Knowledge, Innovation and Science Technology or KIST Park as a Special Economic Zone.It is the first KISK park registered by the Philippine Economic Zone Authority or PEZA

Developing a climate action plan for Batangas State University is crucial to address climate risks, demonstrate leadership, engage stakeholders, and promote sustainability. By taking proactive measures, the university can contribute to the resilience of its campus, community, and the broader region while empowering its students and staff to become responsible stewards of the environment.

The University Climate Change Action Plan holds an immense potential for promoting sustainability and addressing climate change. By leveraging their unique position, universities can drive transformative change, create a more sustainable future, and inspire others to follow suit. Building upon the foundation of previous efforts, these institutions can become beacons of hope in the global fight against climate change.

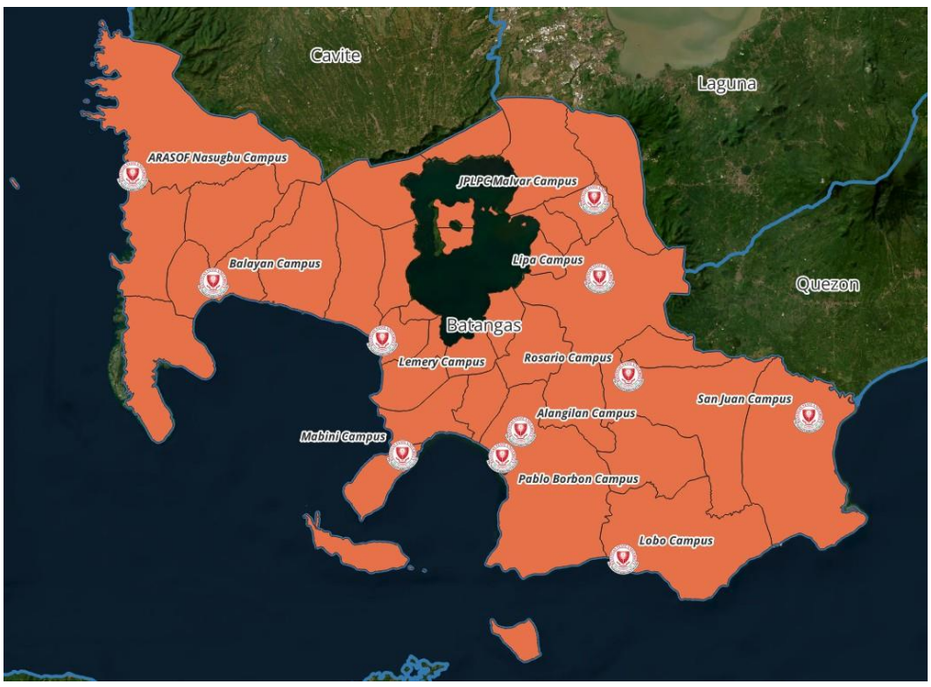


Figure 1. Map of the Eleven (11) Campuses of Batangas State University

3.2.1. Brief Profile of the City where the BatStateU Pablo Borbon Campus and the Alangilan Campus are located.

Batangas State University Pablo Borbon and Alangilan constituent campuses are located both in the City of Batangas. Batangas City is the second most populous city in the Province of Batangas where Batangas State University- Pablo Borbon and Alangilan constituent campuses are situated The city registered a population of 329,874 with an annual population growth rate of 1.46%. Given that the population maintains its growth rate of 1.46%, the population of the city will double in 47 years which will be in 2062.

Batangas City has a total land area of 28,541.44 hectares (285.41 square kilometers). The town is subdivided into 105 barangays where 48 are classified as urban while the remaining 57 as rural. The largest barangay in terms of land area is Barangay Talahib Pandayan, encompassing approximately 2,029 hectares of land. On the other hand, Barangay 16 is the smallest barangay with roughly 1.5 hectares of land. Batangas State University Pablo Borbon Campus is situated in Barangay 20. Moreover, the Alangilan campus is located at Barangay Alangilan.

a. Description of the land cover and topography of the area where the Pablo Borbon and the Alangilan are located.

Twenty-four percent (24%) of which is currently built-up areas and the remaining 76% are distributed among other land uses such as agricultural, agroforestry, forest management area, sanitary landfill, tourism and waterways. The City's designated land for agricultural development which covers 7,743.84 hectares (27.13%) is suitable only for the growing of mangoes, coconuts, bamboo, corn, sugar cane, upland rice, coffee, and other fruit bearing trees.

There is no large-scale production of any agricultural crop in Batangas City. The forest resources of Batangas City are not of commercial quantity, except for bamboo, which is in demand for its usage in the construction of fish pens. Likewise, Batangas City's general topography is largely flat to gently sloping, with more than 73% of the City's land area having a slope below 15%.

In terms of residential and commercial development, increases of both uses have been observed for the past decade. The expansion of residential development grew by 62% while commercial areas grew by 35%. On the other hand, areas allotted for cemeteries and memorial parks also expanded from 4.90 hectares in 2008 to 14.64 hectares in 2018. These developments are primarily the reason for the decrease of agricultural use by more than 40% for the past 10 years. Moreover, the progression of land use and urbanization marked the economic growth of the city.

Batangas City has two (2) distinct climatic types based on the modified Coronas classification used by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) Type I and III. Type I is characterized by two (2) distinct seasons: dry from the months of November to April and wet during the rest of the year. Type I climate type generally prevails over the mainland areas of the city where the University is located. Occurrences of storm surges in the city are infrequent, with most of storm surges only being secondary hazards brought about by strong winds from tropical cyclones/typhoons that traverse the City annually, mostly affecting the City's 21 barangays. The storm surge occurrences in the city are normally associated with strong typhoons that come during the onset of the southwest monsoon months (June-November).

Further, Batangas City is traversed by several streams that converge at the Calumpang River, which in turn flows into the Batangas Bay. Indeed, the said river divides the city into two land masses: the northern portion, which is made up of 49 barangays (24 of which are in the Poblacion where Batangas State University - Pablo Borbon and BatStateU Alangilan constituent campuses are situated); and the southern portion, which is made up of 56 barangays including Isla Verde. The Calumpang River is a perennial body of water that stretches 8.10 kilometers from the municipal boundary of Ibaan to the mouth of the Calumpang River in Barangay Malitam. It has a catchment area of roughly 472.00 square kilometers. The Poblacion's south eastern limit is formed by the river, which runs into Batangas Bay about two (2) kilometers south of Batangas Port

b. Vulnerabilities and risks (landslides, earthquakes, floods, volcanic eruptions, underground caves and karst, erosion, and the like)

Landslides

Batangas City's general topography is largely flat to gently sloping, as such, the City's geo-hazard risk is generally considered to have low susceptibility to landslides. Landslide Overlay Zone are areas in the City that have been identified as highly susceptible to landslides and where specific regulations are provided in order to minimize its potential negative effect on developments. Generally, developments in these areas should be minimized or completely avoided. However, given the information and technological advancements in architecture and engineering, resilient and adaptive measures can be incorporated into the architectural and structural design of the existing and future developments, as specified in the zoning ordinance. Some of the places within the city have high to medium susceptibility to landslides as per the Landslide Susceptibility Map. Since Batangas State University Pablo Borbon and BatState U Alangilan constituent campuses are not located near any form of mountain ranges, the susceptibility of landslides possibly occurring is low or close to none. However, landslides, rock falls and other types of mass movements may still occur in mountainous or hilly areas. Liquefaction manifested by sand boils or lateral spreading may affect low lying, waterlogged, sandy areas near the coasts or banks of river.

Earthquake

Earthquakes are not known to happen regularly in the City; but because of its tectonic, geomorphic and geographical characteristics, the City can potentially experience extreme damages consequent to earthquakes, extreme weather events and similar disturbances in the natural environment. In case of an Earthquake happening with an approximate Magnitude of 8.5, the most affected barangays were the areas at the mouth of Calumpang River, Barangays Wawa and Malitam, wherein Batangas State University Pablo Borbon is near and the coastal barangays of Cuta and Sta. Clara. In case of the occurrence of land movement, strong ground shaking may cause extensive damage to or even the collapse of houses, buildings, bridges and other infrastructures

Collapsed structures usually account for most of the casualties during a strong earthquake as falling objects may also cause injuries. Batangas is one of the seismically active areas in the Philippines. Instrumental monitoring of earthquakes for the past century has detected many small to large magnitude earthquakes near Batangas generated by Manila Trench and Lubang Fault. The Manila Trench is an earthquake generator located offshore of Luzon Island, roughly parallel to the Philippine Archipelago in the north but veers close to land at the southern tip of Occidental Mindoro. Another offshore generator is Lubang Fault, located between Mindoro Island and Batangas, which is also the locus of small to large magnitude earthquakes. It is represented in the map by a thin dash line to indicate that the fault line's known location is approximate. The fault line is underwater and estimated to start off the tip of the Calatagan Peninsula and runs across Balayan and Batangas Bays all the way to just off the City of Calapan in Oriental Mindoro.

Floods

Floods occur naturally and can happen almost anywhere. They may not even be near a body of water, although river and coastal flooding are two of the most common types. Heavy rains, poor drainage, and even nearby construction projects can put you at risk for flood damage. Flood maps help mortgage lenders determine insurance requirements and help communities develop strategies for reducing their risk. The mapping process helps the community understand the flood risk and make more informed decisions about how to reduce or manage the risk. According to the Flood Hazard Map presented by the Local Government of Batangas City, some places, especially Pallocan Kanluran which are near to the Calumpang River have High Flood Hazard Level which can reach higher than 1.5 meters. Places like Sta. Clara, Malitam and Libjo can also experience flooding from within 0.5 meters up to 1.5 meters or even higher. More so, several places such as Barangay 1, 5, 8, 9 and 20 have low to medium susceptibility of flooding. Also, some of the national and local roads and bridges in Batangas City are considered highly susceptible to flooding.

With that, Batangas State University Pablo Borbon and BatStateU Alangilan constituent campuses has low to medium susceptibility of flood hazard. Significantly, flood occurrence within the campus is mainly located near Gate 1 and the area within that zone. The flooding can reach up to 1.5 meters if the rain is severe according to the Flood Hazard Map released by the local government of the city.

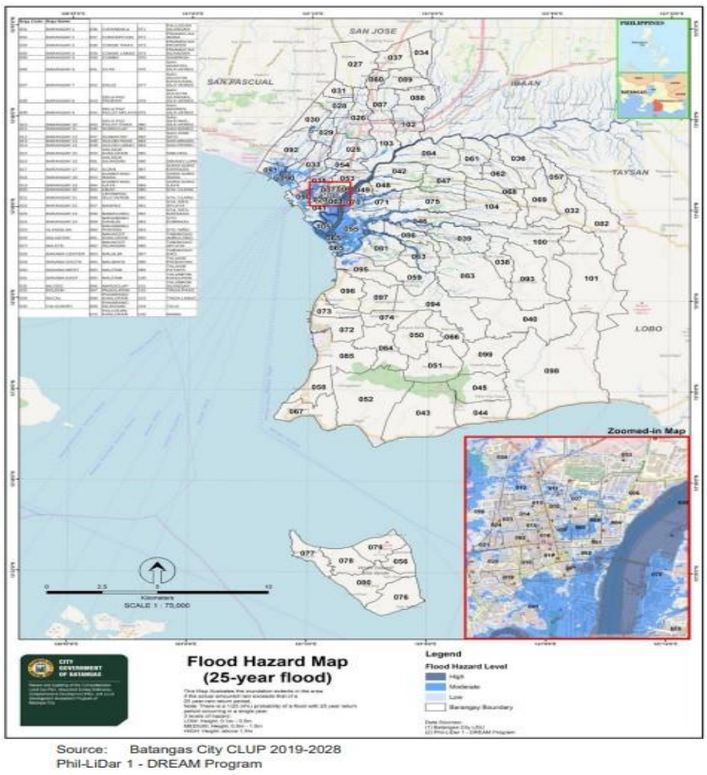


Figure 2.Flood Hazard Map of Batangas City (25-year flood)

Volcanic Eruption

Volcanic eruptions are frequently preceded by an increase in volcanic tremor and significant variations in near-surface radon concentrations at distances up to tens of kilometers from the event, especially when magmatic intrusions, deformations, and earthquakes affect the summit and/or flanks of the volcano.

The nearest volcano to BatStateU - Pablo Borbon and BatStateU Alangilan is the Taal Volcano. Taal Volcano is part of a caldera system in southern Luzon Island and is one of the Philippines' most active volcanoes. Since 3,580 BCE, it has erupted 35 times, with VEI ratings ranging from 1 to 6, with the bulk of eruptions being VEI 2. Within the Main Crater, the caldera features a lake with an island that also holds a lake. In base surge scenarios, BatStateU-Pablo Borbon and BatSTateU Alangilan are considered safe since both are not situated on the zones prone to this unfortunate event.

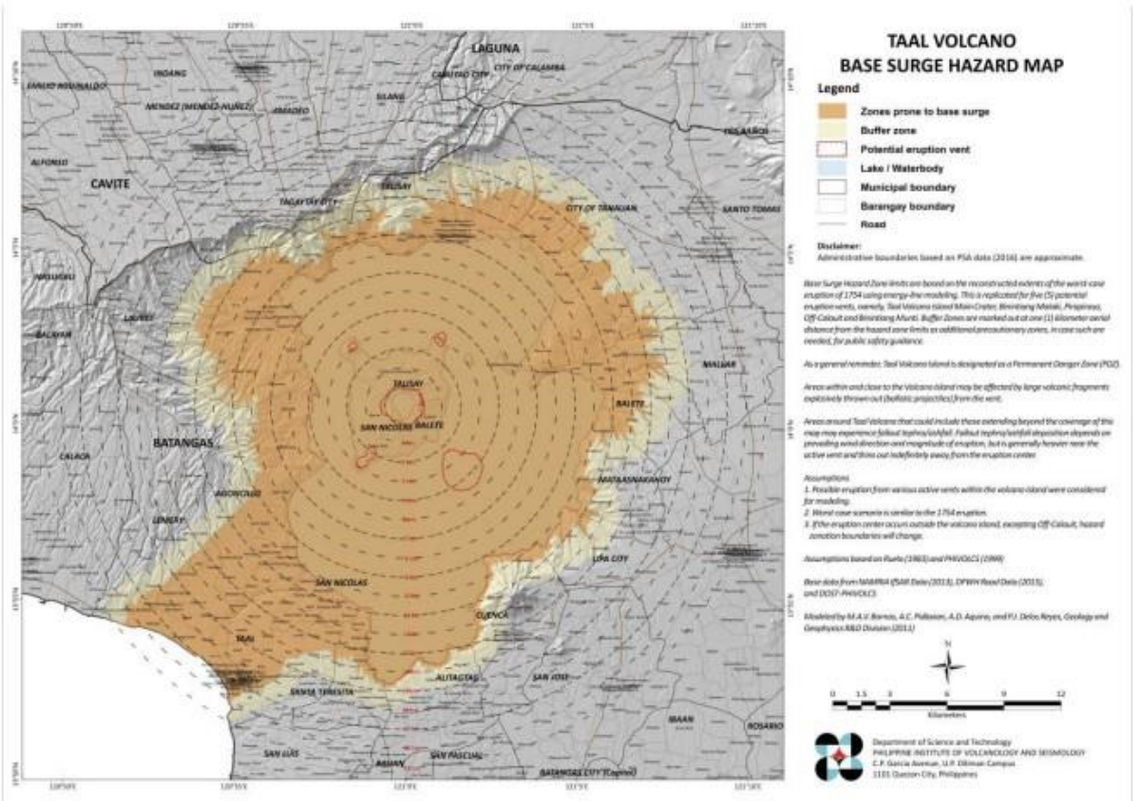


Figure 3.Taal Volcano Base Surge Hazard Map

3.2.2. Brief Profile of the Municipality where the BatStateU ARASOF Nasugbu Campus is located.

Batangas State University ARASOF Nasugbu campus is a constituent campus located in the Municipality of Nasugbu. Nasugbu is a coastal municipality in the province of Batangas. The municipality has a land area of 278.51 square kilometers or 107.53 square miles which constitutes 8.93 percent of Batangas's total area. Its population as determined by the 2015 Census was 134,113. This represented 4.98 percent of the total population of Batangas province, or 0.93 percent of the overall population of the CALABARZON region. Based on these figures, the population density is computed at 482 inhabitants per square kilometer or 1,247 inhabitants per square mile.

a. Description of the land cover and topography of the area where the Nasugbu is located.

Nasugbu is bounded on the north by the municipalities of Maragondon, Magallanes and Alfonso in the province of Cavite; on the east by the Batangas municipalities of Laurel, Calaca, and Balayan; on the south by the Batangas municipalities of Lian and Tuy; and on the west by the South China Sea. Entering the town proper via the national highway, one passes fields of sugar cane, corn, and rice fields; hills and mountains. The terrain slopes downwards to the South China Sea. Because of its rolling terrain and coastline location, agriculture (sugarcane, rice, corn, vegetables, coconut, fruits), and aquaculture are Nasugbu's main industries. The town of Nasugbu is characterized by variation in topographic relief. Areas located on the eastern side of the Poblacion and lining the shores on the Western side are predominantly level to gently sloping.

Due to the prevalent nature of its terrain and coastal nature, agriculture with crops like sugarcane rice corn vegetables, coconuts, fruits and aquaculture have become Nasugbu's main source of livelihood and main economic activity. Nasugbu has a naturally warm climate which falls under the first type of classification, Type 1, characterized by two pronounced seasons: dry from November to April and wet for the rest of the year. The annual average temperature is 27 degrees Celsius. January is the coolest month having an average temperature of 25.8 degrees Celsius, while April is the warmest month registering an average temperature of 29 degrees Celsius.

b. Vulnerabilities and Risks (Floods, Earthquakes, Volcanic Eruptions, Underground Caves and Karst, Erosion, Landslides, and the like)

Municipality of Nasugbu is exposed to seven (7) natural hazards: typhoon, tsunami, storm surge, landslide, Flooding is most susceptible to typhoons, flooding and landslides due to typhoons and windstorms, and potentially, tsunami. Of these, the most frequent hazard encountered are typhoons. While there has not been an occurrence of tsunami, this is something that the municipality must prepare for especially in this era of climate change. Other hazards posing danger to the municipality are dengue, fire, and volcanic eruption.

Typhoons. The geographic location of Nasugbu, Batangas makes it prone to tropical cyclones which may occur in the months of June to December. However, with the climate change manifestation, a tropical cyclone may also occur during the months of January to May. The typhoon which may landfall in or within the vicinity of Nasugbu may also be triggered by other weather disturbances like Habagat or Southwest Monsoon, Low Pressure Area and Inter-tropical Convergence Zone (ITCZ). Based on historical records, the typhoon left most devastation in the lives and properties of the communities. Some of the devastating typhoons that occurred in the Municipality from 2009 to 2016 were TY Ondoy in 2009, TY Odette 2013, TY Glenda and TY Mario in 2014. Barangay Bucana (Latitude: 14.07029 and Longitude: 120.632203), where the BatStateU ARASOF-Nasugbu is located, is only 8 meters / 26.25 feet above sea level, so if the sea rises two (2) meters in the nearby areas, it will be affected.

Flooding. The Flood Susceptibility Map of Nasugbu by the Mines and Geoscience Bureau identified areas with high susceptibility to flooding namely Barangays Balaytigue, Catandaan, Looc, Pantalan, and Poblacion 5.

Tsunami. The Phivolcs Tsunami Hazard Map shows Nasugbu to be the most vulnerable if a tsunami does occur due to a significant movement of the Manila Trench. The map shows inundation or flooding of as high as 6 meters (almost 20 feet) reaching well into the town's poblacion.

Earthquakes. Batangas Province, where Nasugbu is located, is one of the seismically active areas in the Philippines. Instrumental monitoring of earthquakes for the past century has detected many small to large-magnitude earthquakes near Batangas generated by the Manila Trench and Lubang Fault. The Manila Trench is an earthquake generator located offshore west of Luzon Island, roughly parallel to the philippine archipelago in the north but veers very close to land at the southern tip of Occidental Mindoro. Another offshore earthquake generator is Lubang Fault, located between Mindoro Island and Batangas, which is also the locus of small to large-magnitude earthquakes. Other active faults on land are present in Southern Luzon, such as the Valley Fault System and the Philippine Fault. The current series of earthquakes in Batangas can be attributed to the movement of an unnamed local fault in the vicinity of the Tingloy-Mabini area.

3.2.3. Brief Profile of the Municipality where the Batangas State University JPLPC-Malvar Campus is located.

Batangas State University JPLPC-Malvar campus is a constituent campus located in the Municipality of Malvar. **Malvar**, officially the **Municipality of Malvar** (Tagalog: *Bayan ng Malvar*), is a 2nd class municipality in the province of Batangas, Philippines.

Located 37 kilometers (23 mi) from Batangas City and 68 kilometers (42 mi) south of Manila and accessible by the STAR Tollway, Malvar is surrounded by Tanauan City to the north, Santo Tomas City to the east, Lipa City to the south and Balete to the west. With the expansion of Metro Manila, Malvar is now part of the Manila conurbation (which reaches Lipa City).

a. Description of the land cover and topography of the area where the Malvar is located.

Malvar is a landlocked municipality in the coastal province of Batangas. The municipality has a land area of 33.00 square kilometers or 12.74 square miles which constitutes 1.06% of Batangas's total area. Its population as determined by the 2020 Census was 64,379. This represented 2.21% of the total population of Batangas province, or 0.40% of the overall population of the CALABARZON region. Based on these figures, the population density is computed at 1,951 inhabitants per square kilometer or 5,053 inhabitants per square mile.

b. Vulnerabilities and Risks (landslides, earthquakes, floods, volcanic eruptions, underground caves and karst, erosion, and the like.

The land area where Batangas State University JPLPC – Malvar is located can be evaluated in terms of seismic, volcanic and hydro – meteorological hazards. The Seismic and Volcanic Hazard are based on the assessment of Philippine Institute of Volcanology and Seismology. The Hydro-Meteorological Hazard is based on the assessment of Mine and Geoscience Bureau and Philippine Atmospheric, Geophysical and Astronomical Services Administration. Table 19 shows the complete hazard assessment of the campus.

The area is prone to ground shaking and is initially safe in terms of ground rupture (17.4 km from West Valley Fault), liquefaction and tsunami. These findings must be considered in designing structures to be built in the area to be compliant to National Building Code and National Structural Code of the Philippines to avoid damages to property and life.

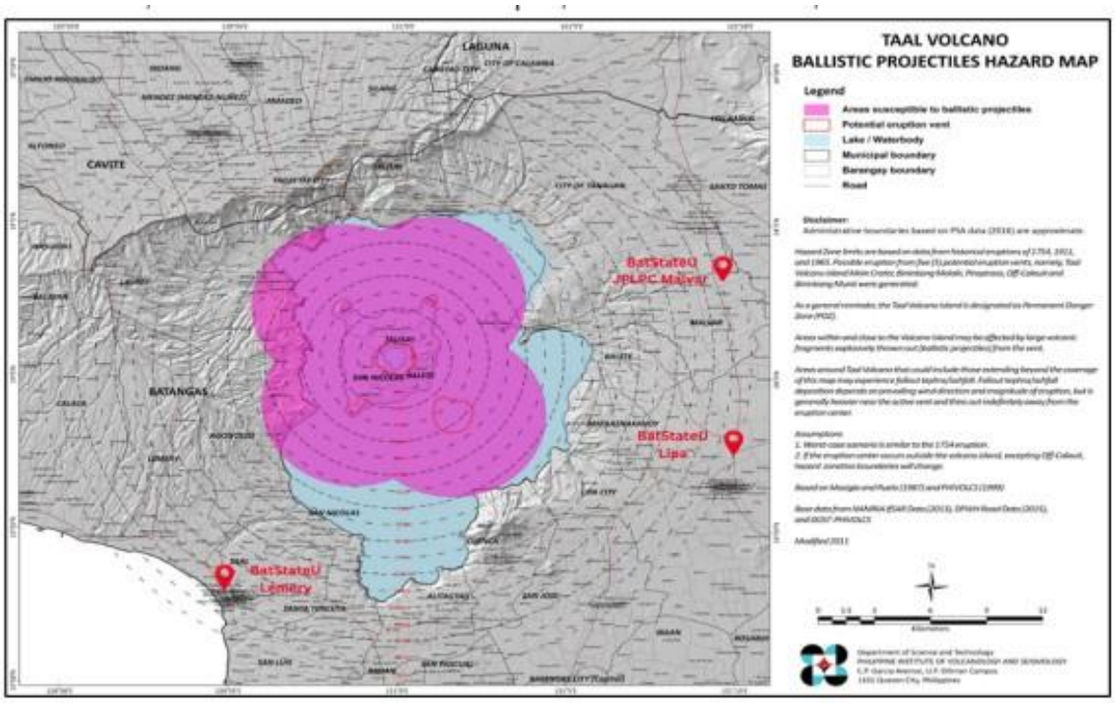


Figure 4.Taal Volcano Ballistic Projectiles Hazard Map

3.2.4. Brief Profile of the City where the BatStateU - Lipa Campus is located.

Batangas State University Lipa campus is a constituent campus located in the City of Lipa. Lipa City is a 1st class component city in the province of Batangas, Philippines. According to the 2020 census, it has a population of 372,931 people. It is the first city charter in the province and one of four cities in Batangas alongside Batangas City, Santo Tomas, and Tanauan. It is located 78 kilometers (48 mi) south of Manila and is the most populous city of Batangas. Lipa covers an area of 20,940 hectares (209.4 km 2) at an elevation of 1,025 feet (312 m) above sea level. Lipa's fishing area is located at barangay Halang, in the west of the city; it is actually a portion of Taal Lake, which is connected to other municipalities (Cuenca, Mataas Na Kahoy and Balete).

a. Description of the land cover and topography of the area where the Lipa is located.

Visually dominated by Mt. Malarayat, Lipa is situated at an elevation of 1,025 feet above sea level with a predominantly agricultural economy based upon coffee, hog and poultry farming. The city's location, in a valley between the Malepunyo Mountain Range and Mount Maculot, makes it a low-risk area for natural disasters. These two mountains serve as a windbreak during typhoons. Mount Maculot, in the west, also served as a shield during eruptions of the Taal Volcano.

Moreover, Lipa is bounded by the city of Santo Tomas in the northeast, San Pablo of Laguna and San Antonio, Quezon in the east, the municipalities of Padre Garcia and Rosario in the southeast, the municipalities of Ibaan and San Jose in the southwest, the municipalities of Cuenca and Mataas Na Kahoy and Taal Lake in the west and the municipalities of Balete and Malvar in the northwest.

Lipa has a tropical monsoon climate with a dry season between January and April, and rain for the rest of the year. The average yearly temperature is 25.6 °C (78.1 °F). The

highest recorded temperature is 35.7 °C (96.3 °F), and the lowest recorded temperature is 16.4 °C (61.5 °F).

b. Vulnerabilities and Risks

As of the current record, at least approximately 90% of Lipa's land area has low susceptibility to landslides except for mountainous and near Taal lake areas. Lipa City is considered under Seismic Zone 4 with Seismic Source Type A as influenced by Central Mindoro Fault and Lubang Fault on the southern area (Mindoro) and tail-ends of Valley Fault and Infanta Fault System on the northwest and northeast proximity.

3.2.5. Brief Profile of the Municipality where BatStateU- Lemery Campus is located.

Batangas State University Lemery campus is an extension of Pablo Borbon campus, located in the Municipality of Lemery. Lemery is a first-class municipality in the Province of Batangas and has a total land area of 10,155 hectares which is equivalent to 3.21% of the total land area of the Province of Batangas. It is located in the Northwestern part of the province and is bounded on the North by the Municipality of Calaca; on the East by the Municipality of Agoncillo; on the South by the Municipality of Taal and on the West by Balayan Bay. It belongs to the First Congressional District and is composed of 46 barangays: 16 of which are classified as urban and 30 as rural. Lemery has a distance of 113 kilometers from Manila and 26 kilometers from Batangas City, the provincial capitol. There are three (3) alternate routes going to Lemery from Manila; via the City of Lipa in the South and via Tagaytay City in the North using the R. Diokno Highway and via Agoncillo in the east using Agoncillo-Laurel Road.

a. Description of the land cover and topography of the area where the Lemery is located

Lemery generally has a rolling terrain with slopes ranging from 0 to above 18%. The topography of the town shows that of its total land area, 26.8% belongs to slope 0-3%, 23.63% belong to 3-8%, 17.5% have slope 8-15%, while the rest which is above 15% constitute 32.07%. The overall terrain is suitable for pasture, tree crops and other agricultural crop development. Brief profile of watershed/subwatershed coverage and locations, if any, under which the SUC is part of significant national or regional/sub-national characteristics or value (e.g. Biodiversity, cultural- historical, traditional or functional).

b. Vulnerabilities and Risks (landslides, earthquakes, floods, volcanic eruptions, underground caves and karst, erosion, and the like.

Lemery is identified as a catch basin such as that flooding during heavy rains and storms poses danger to lives and properties. Its proximity to the Pansipit River makes it prone to flooding and the relatively flat and low location of the town proper cause it to be the catch basin of water coming from the upland areas as well as the nearby municipalities. Its proximity to Taal Volcano makes it susceptible to eruption, earthquakes, and seismic activities. Storm surges and sea-level rise have been observed to affect certain areas of the coastal barangays. The denudation of upland areas also makes them susceptible to landslides during heavy downpours especially during the months of August, September, October and the earlier part of November.

3.2.6. Brief Profile of the Municipality where the BatStateU- Rosario Campus is located.

Batangas State University Rosario campus is an extension of Pablo Borbon campus, located in the Municipality of Rosario. Rosario is a landlocked municipality in the coastal

province of Batangas. The municipality has a land area of 226.88 square kilometers or 87.60 square miles which constitutes 7.27% of Batangas's total area. Its population as determined by the 2015 Census was 116,764.

This represented 4.33% of the total population of Batangas province, or 0.81% of the overall population of the CALABARZON region. Based on these figures, the population density is computed at 515 inhabitants per square kilometer or 1,333 inhabitants per square mile. The municipal center of Rosario is situated at approximately 13° 51' North, 121° 12' East, in the island of Luzon. Elevation at these coordinates is estimated at 143.6 meters or 471.0 feet above mean sea level.

a. Description of the land cover, topography of the area where the Rosario is located

The BatStateU Rosario Campus is located in the Municipality of Rosario, Batangas. Rosario has a land area of 22688 hectares and is known as "The Rice Granary of Batangas". It is one of the interior municipalities of the Batangas Bay area.

A variety of classifications make up the land cover in Rosario. The region is primarily used for agricultural purposes, with large stretches of rice fields covering the plains. These fields are evidence of the prosperous agriculture in the area. Pockets of lush tropical forests may be found scattered throughout the landscape, which not only adds to the region's ecological richness but also helps with carbon sequestration and wildlife preservation efforts.

Rosario's topography is notable for its diversity of elevations. As one moves inland from the coastal areas, the terrain gradually ascends, giving way to rolling hills that punctuate the landscape. These hills add an undulating dimension to the terrain. Further into the interior, the lower reaches of the surrounding mountainous terrain become evident. There are at least four major subwatersheds in the municipality: Malaquing Ilog River, Lawaye River, Rosario River, and Calumpang River.

b. Vulnerabilities and Risks (landslides, earthquakes, floods, volcanic eruptions, underground caves and karst, erosion, and the like.

Rosario Campus is susceptible to flooding, landslides and volcanic eruptions.

3.2.7. Brief Profile of the Municipality where the BatStateU- San Juan Campus is located.

Batangas State University San Juan campus is an extension campus of Pablo Borbon campus, located in the Municipality of San Juan. San Juan, officially the Municipality of San Jua**n** (Tagalog: *Bayan ng San Juan*), is a 1st class municipality in the province of Batangas, Philippines. According to the 2020 census, it has a population of 114,068 people.

San Juan is located in the easternmost part of Batangas province. On its north is the neighboring town of Candelaria, with Malaking Ilog River defining its geographical boundary. Tayabas Bay lies east and the hills on the eastern portion separate it from the towns of Lobo and Rosario**.**

The town is known for its baroque church and the Pinagbayanan excavation, the most important archaeological site in the municipality.

a. Description of the land cover and topography of the area where the San Juan is located

Climate: San Juan has a tropical climate. There is significant rainfall in most months of the year. The short dry season has little effect on the overall climate. The temperature here averages 27.2 °C. The average annual rainfall is 1820 mm. The driest month is March, with 37 mm of rainfall. With an average of 266 mm, the most precipitation falls in November.

Topography: Batangas State University - San Juan is located at Talahiban 2.0, San Juan Batangas. It is the neighboring barangay of Poblacion, San Juan which is the center of the province. It is located at 13 50'N̊ ⁰ 121 24E⁰', at the Easternmost part of Batangas province. North of San Juan is the neighboring town of Candelaria, with Malaking Ilog River defining its geographical boundary. Tayabas Bay lies east and the hills on the eastern portion separate it from the towns of Lobo and Rosario.

According to the Philippine Statistics Authority (2021), the municipality has a land area of 273.40 square kilometers (105.56 sq mi) constituting 8.76% of the 3,119.75-square-kilometer (1,204.54 sq mi) total area of Batangas.

Major Rivers: The two major rivers of San Juan are the Malaking Ilog and the Lawaye river, both near the school and the southwest quadrant of Banahaw Volcano. Because of its extensive watershed, the lower reaches of Malaking Ilog are prone to flooding and flash floods which early settlers might have experienced perennially. The residents further describe the other river as the smaller river "whose watershed is about one hundred (100) squares

Mountains: The two major mountains located at San Juan are the Mt. Daguldul and Mt. Hugom. Its trail becomes a challenge when the ground is wet from the rain, making the terrain slippery. With a height of 672 meters, the climb takes three to four hours.

b. Vulnerabilities and risks (landslides, earthquakes, floods, volcanic eruptions, underground caves and karst, erosion, and the like)

The municipality of San Juan is susceptible to landslides from low to high. Eleven barangays are identified as susceptible to flooding. Fourteen barangays are vulnerable to storm surge.

3.2.8. Brief Profile of the Municipality where the BatStateU- Mabini is located.

Batangas State University Mabini campus is an extension of Alangilan campus, located in the Municipality of Mabini. The municipality is a peninsula nearly surrounded by water bodies and is known as Calumpang Peninsula. It is bounded on the north by the Municipality of Bauan, on the east by Batangas Bay, on the west by Balayan Bay and on the south by Verde Island Passage. It is on the southern tip of Batangas Province.

At present, the Municipality of Mabini consists of 34 barangays of Anilao East, Anilao Proper, Bagalangit, Bulacan, Calamias, Estrella, Gasang, Laurel, Ligaya, Mainaga, Mainit, Majuben, Malimatoc I, Malimatoc II, Nag-iba, Pilahan, Poblacion, Pulang Lupa, Pulong Anahao, Pulong Balibaguhan, Pulong Niogan, Saguing, Sampaguita, San Francisco, San Jose, San Juan, San Teodoro, Santa Ana, Santa Mesa, Santo Nino, Santo Tomas, Solo, Talaga East and Talaga Proper.

Batangas State University Mabini Campus is the youngest and newest of the eleven (11) campuses of the Batangas State University System. It is located in Pulong Niogan specifically located at Sitio Mailayin. The campus is a neighboring government service

institution of the Mabini Community Hospital located behind the buildings of BatStateU Mabini.

Bordering the Campus westward is the Mabini Evacuation Center while residential areas border the campus southward and eastward.

a. Description of the land cover and topography of the area where the Mabini is located

BatStateU Mabini Campus is somewhat vulnerable to rain-induced landslides which is particularly located at Sitio Mailayin, Barangay Pulong Niogan. The sitio formerly has a quarrying area, which operation had ceased for several years now. Having been subjected to this environmental hazard due to continuous excavation, the land area near the Campus resulted in uneven land contours and steep slopes.

There are no inland water bodies. The blue sea waters of Batangas and Balayan Bays nearly surrounded the Municipality on its eastern, western and southern sides. However, no watersheds or sub watersheds can be identified with the location of the Campus since it is located near the heart of the town or the municipality's "poblacion" area.

b. Vulnerabilities and risks (landslides, earthquakes, floods, volcanic eruptions, underground caves and karst, erosion, and the like)

The campus where BatStateU Mabini is within moderate susceptibility to rain-induced landslides. The place formerly had a quarrying area, which operation had ceased for several years now. Having been subjected to this environmental hazard due to continuous excavation, the land area near the Campus resulted in uneven land contours and steep slopes.

3.2.9. Brief Profile of the Municipality where the BatStateU- Balayan Campus is located.

Batangas State University Balayan campus is an extension of Alangilan campus, located in the Municipality of Balayan. The municipality of Balayan encompasses 10,873 hectares and is divided into 12 urban barangays, 36 rural barangays, and 2 disputed barangays. The Población or urban barangays cover 162.23 hectares or 1.49% of the total land area, rural barangays have a total area of 9,908.46 hectares or 91.13% of the total landmass, and the disputed barangays contain an area of 802.32 hectares or 7.38% of the total land area. Barangay Patugo is considered to have the largest land area with 1,484.16 hectares whereas Barangay District No. 12 has the smallest land area with 3.37 hectares.

a. Description of the land cover and topography of the area where the Balayan is located

Balayan municipality owns agricultural and forest lands (upland and mangrove forest along the coastal area). The agricultural land area is approximately 7,264.59 hectares while the forest land is around 1,796.97 hectares. The rest of the land will be used for residential and community purposes. The Municipality's topography is predominantly plain or flat lands. Around 57% of the land area is flat particularly in the town's central and eastern portions. The western section is composed of gently sloping & undulating to moderately undulating & rolling terrain. These relief types are also found in the northeastern portion towards the peak of Mount Batulao. Areas with this topography account for around 36% of the total land area. Barangays Calan, Dalig & Sucol have steeply undulating and rolling terrain. These constitute around 7% of the overall land area

Within the municipality, inland water bodies such as rivers cover 69.93 hectares or 0.64 % of the total land area. These areas are intended for conservation and environmental

considerations. The Binambang River, which passes west of the town proper, serves as the primary drainage system in Balayan. Numerous drainage systems and their tributaries originate in the highest areas and drain southward to Balayan Bay. These occasionally result in flooding in certain areas, particularly those at the mouths of rivers draining towards the sea. Barangay Caloocan where Batangas State University Balayan is located is topographically plain or flat. The barangay which has a total land area of 250.5139 has primarily agricultural land and is known for sugarcane, rice, and coconut products.

b. Vulnerabilities and risks (landslides, earthquakes, floods, volcanic eruptions, underground caves and karst, erosion, and the like)

Balayan is vulnerable to different hydro-meteorological and geologic hazards because of its geographical location and characteristics. Typhoons and flooding are the most common risks in the town. The location of BatStateU Balayan is susceptible to six natural hazards such as typhoon, flood, rain-induced landslide, storm surge, tsunami and liquefaction. The campus is most susceptible to floods due to its proximity to the Binangbang river which is more or less 500 meters away from the institution and earthquakes due to the municipality's proximity to the Lubang Fault, an offshore fault line that crosses between Mindoro and Batangas.

3.2.10. Brief Profile of the Municipality where the BatStateU Lobo Campus is located.

Batangas State University Lobo campus is an extension of Alangilan campus, located in the Municipality of Lobo. The Municipality of Lobo is 158 km from Metro Manila and 36 km from Batangas City, the provincial capital and is considered one of the central business districts in the province. It is situated in the southern part of Batangas and shares common boundaries with Taysan in the north, Verde Island Passage in the south, San Juan in the east, and Batangas City in the west. Lobo which was previously a logging settlement was founded in September 27, 1871 with seven component barrios (now barangays) namely Masaguitsit, Tayuman, Bignay, Malapad na Parang, Mabilog na Bundok, Malabrigo and Sabana. The term Lobo was believed to have originated from a Filipino version of a wild forest, "Lobo" which was often seen by loggers in the forest during the year 1800 (CLUP 2012- 2020).

While Batangas State University located in Barangay Masaguitsit is the only tertiary school in the municipality of Lobo. The school is offering a Bachelor of Science in Agriculture and Bachelor of Science in Forestry, a four year program. The Experimental Farm is located in Barangay Lagadlarin one of the Laboratory Experimental farms for Agriculture to educate students in the

a. Description of the land cover and topography of the area where the Lobo is located.

Lobo is a hilly mountainous municipality of Batangas, 148 km south of Manila and 36 km southeast of Batangas City. It is bounded in the west by Batangas City, on the north by the Municipality of Taysan and Rosarion. As shown in figure _, the property in Brgy. Masaguitsit is at 13° 38 '29.32' ' latitude and 121° 11' 32.41 " longitude while in Brgy. Lagadlarin lies at 13° 37 '46.87' ' latitude and 121° 12' 35.63 " longitude.

b. Vulnerabilities and risks (landslides, earthquakes, floods, volcanic eruptions, underground caves and karst, erosion, and the like)

BatStateU Lobo properties located in Brgy. Masaguitsit and Brgy. Lagadlarin are susceptible to flooding. Based on the result of the Hazard Landslide Susceptibility,

Barangay Masaguitsit and Lagadlarin where the BatStateU Lobo is located are highly prone to flooding, landslides, and storm surge. Other barangays in Lobo are prone to landslides, storm surge, flooding and rock fall.

3.3. Demographic Profile

Batangas State University offers over 110 undergraduate and graduate degree programs. It has programs in engineering, architecture, fine arts, interior design, law, computer science, information technology, industrial technology, teacher education, nursing, dietetics, accountancy, management accounting, business administration, entrepreneurship, public administration, customs administration, tourism management, hospitality management, development communication, criminology, biology, chemistry, mathematics, agriculture, forestry, and fisheries and aquatic sciences. Recently, the university started offering programs in disaster risk management, the first in the CALABARZON region.

It also has an Integrated School in its Pablo Borbon Campus and a Laboratory School in its ARASOF Nasugbu campus, both offering basic education, junior high school, and senior high school (STEM strand) under a science and technology-based curriculum.

The overall population of BatStateU is 48, 652 enrolment and 2608 employees. In terms of enrolment projection, based on a 10-year projection of student population at BatStateU, it is expected to continuously increase over the next 10 years at a 7.06% increase in AY 2023-2024.

BatStateU campuses are seated strategically in the municipalities and cities in Batangas region Province in the CALABARZON occupying the central section of Luzon.

The province has a land area of 3,119.75 square kilometers or 1,204.54 square miles. Its population as determined by the 2020 Census was 2,908,494. The latest census figures in 2020 denote a positive growth rate of 7.94%, or an increase of 214,159 people, from the previous population of 2,694,335 in 2015. The province ranked 9th in the 2020 Cities and Municipalities Competitive Index. In 2009, the Philippine Statistics Office ranked Batangas as one of the provinces with a High Development Index (HDI). HDI is a composite index measuring achievements in three basic dimensions of human development, which are: to lead a long and healthy life; to acquire knowledge; and to have access to the resources needed for a decent standard of living.

3.3.1. BatStateU - Pablo Borbon including Extension Campuses

As of November 2022, BatStateU PB including its extension campuses has a total of 935 employees of which 543 are male and 392 are female. See the breakdown below for the disaggregated data of employee's population at Pablo Borbon including extension campuses (Rosario, Lemery and San Juan).

Table 1. Population of Employees at Batangas State University Pablo Borbon for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	119	58	177
Temporary	6	4	10
Contractual	43	15	58
Casual Employees	0	2	2
Job Order	122	129	251
Contract of Service	253	184	437
Total	**543**	**392**	**935**

The breakdown of the disaggregated data for the workforce at BatStateU Pablo Borbon including its extension campuses is shown in table 1. The population included 177 regular employees, 10 temporary employees, 58 contractual employees, 2 casual employees, 251 job order employees, and 437 service contract employees.

3.3.1.1. BatStateU-Pablo Borbon

A. Employees

As of November 2022, BatStateU Pablo Borbon employed a total of 792 people, 327 of them are male and 465 are female. The population of employees at BatStateU Pablo Borbon, is broken down into different categories in the table below.

Table 2.Population of Employees at Batangas State University Pablo Borbon for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	40	92	132
Temporary	2	3	5
Contractual	15	43	58
Contract of service	200	227	387
Casual	2	0	2
Job Order	108	100	208
Total	**327**	**465**	**792**

Table 2 exhibits the breakdown of the employees' disaggregated statistics at BatStateU Pablo Borbon constituent campus. There are 132 regular employees, 5 in temporary status, 58 in contractual positions, 387 in contract of service, 2 casual employees, and 208 job order personnel among the population.

Students

Academic Year 2022-2023 welcomed a total of 19,172 students of the Campus. Four thousand eight hundred fifteen (4,815) or 25% were males while 14,357 or 75% were females.

Table 3. Population of Students at Batangas State University Pablo Borbon for Calendar Year 2022

Program	Major	Total		Total
		Male	Female	
Bachelor of Arts in English Language Studies		108	367	475
Bachelor of Early Childhood Education		11	89	100
Bachelor of Elementary Education		17	245	262
Bachelor of Laws		39	45	84
Bachelor of Physical Education		46	110	156
Bachelor of Public Administration		344	505	849
Bachelor of Secondary Education	Biological Science	0	1	1

Bachelor of Secondary Education	English	58	255	313
Bachelor of Secondary Education	Filipino	51	307	358
Bachelor of Secondary Education	Mathematics	34	154	188
Bachelor of Secondary Education	Sciences	37	114	151
Bachelor of Secondary Education	Social Studies	74	245	319
Bachelor of Secondary Education	Technology Livelihood Education	1	0	1
Bachelor of Technology and Livelihood Education	Home Economics	24	97	121
BS Accountancy		182	1,235	1417
BS Biology		120	240	360
BS Business Administration	Business Economics	45	125	170
BS Business Administration	Financial Management	170	694	864
BS Business Administration	Human Resource Management	144	585	729
BS Business Administration	Marketing Management	211	664	875
BS Business Administration	Operations Management	96	196	292
BS Chemistry		38	75	113
BS Criminology		289	549	838
BS Customs Administration		135	609	744
BS Development Communication		194	382	576
BS Entrepreneurship		86	195	281
BS Hospitality Management		292	698	990
BS Hotel and Restaurant Management		1	0	1
BS Management Accounting		203	880	1083
BS Mathematics		29	37	66
BS Nursing		228	943	1171
BS Nutrition and Dietetics		39	248	287
BS Psychology		174	939	1113
BS Public Health	Disaster Response	23	59	82
BS Tourism Management		129	674	803
Doctor of Business Administration		8	27	35
Doctor of Education in Educational Management		18	42	60
Doctor of Medicine		10	46	56
Doctor of Philosophy in English	Language and Literature	7	20	27
Doctor of Philosophy major in Educational Management		23	39	62

Doctor of Philosophy Major in English		3	0	3
Doctor of Philosophy major in Mathematics		23	22	45
Doctor of Public Administration		8	7	15
Juris Doctor	Non-thesis	8	30	38
Master in Business Administration	Thesis	50	109	159
Master in Business Administration	Non-thesis	3	3	6
Master in Disaster Risk Management		34	19	53
Master in Port Management		1	1	2
Master in Public Administration	Thesis	19	32	51
Master in Supply Chain Management		1	4	5
Master of Arts in Development Studies		5	2	7
Master of Arts in Education	Technology and Livelihood Education Teaching	0	1	1
Master of Arts in Education major in Educational Management	Non-thesis	1	1	2
Master of Arts in Education major in Educational Management	Thesis	37	140	177
Master of Arts in Education major in English Language Teaching		16	84	100
Master of Arts in Education major in Filipino		0	2	2
Master of Arts in Education major in Mathematics Teaching		28	57	85
Master of Arts in Education major in Pagtuturo ng Filipino		14	58	72
Master of Arts in Education major in Physical Education		5	11	16
MA in Education in Science Teaching		1	4	5
Master of Arts in Education major in Psychology		0	8	8
Master of Arts in Education major in Science Teaching		15	59	74
Master of Arts in Education major in Social Studies Teaching		13	37	50

Master of Arts in Education major in Technology and Livelihood Education Teaching		16	37	53
Master of Arts in English		0	2	2
Master of Arts in English	Language and Literature	2	3	5
Master of Development Communication		5	3	8
MS in Mathematics		1	3	4
Pre-Elementary		18	19	37
Professional Subjects		14	25	39
Elementary		203	221	424
Junior High School		335	425	760
Senior High School		198	193	391
Total		**4,815**	**14,357**	**19,172**

3.2.1.2. BatStateU-Lemery

A. Employees

As of November 2022, BatStateU Lemery employed a total of 55 people, 26 of them are male and 29 are female. The population of employees at BatStateU Lemery, is broken down into different categories in the table below.

Table 4.Population of Employees at Batangas State University Lemery Campus for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	7	7	14
Temporary	0	1	1
Contract of Service	9	13	22
Job Order	10	8	18
Total	**26**	**29**	**55**

Table 4 exhibits the breakdown of the employees' disaggregated statistics at BatStateU Lemery campus. There are 14 regular employees, 1 in temporary status, 22 contract of service, and 18 job order personnel among the population.

Students

Academic Year 2022-2023 welcomed a total of 1385 students of the Campus. Three hundred sixty-two (362) or 35% were males and 1023 or 65% were female.

Table 5.Population of Students at Batangas State University Lemery Campus for Calendar Year 2022

PROGRAM	Major	TOTAL	
		Male	Female
Bachelor of Industrial Technology	Electronics Technology	56	32
Bachelor of Secondary Education	Social Studies	15	100

Bachelor of Technical-Vocational Teacher Education	Garments, Fashion and Design	15	101
BS Business Administration	Financial Management	105	372
BS Business Administration	Human Resource Management	18	63
BS Business Administration	Marketing Management	100	208
BS Computer Science		16	9
BS Management Accounting		37	138
Total		**362**	**1023**

3.2.1.3. BatStateU- Rosario

A. Employees

As of November 2022, BatStateU Rosario employed a total of 58 people, 25 of them are male and 33 are female. The population of employees at BatStateU Rosario, is broken down into different categories in the table below.

Table 6.Population of Employees at Batangas State University Rosario Campus for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	9	17	26
Temporary	1	1	2
Job order	8	8	16
Contract of Service	7	7	14
Total	**25**	**33**	**58**

Table 6 exhibits the breakdown of the employees' disaggregated statistics at BatStateU Rosario campus. There are 26 regular employees, 2 in temporary status, 16 job order personnel, and 14 contract of service among the population.

B. Students

Academic Year 2022-2023 welcomed a total of 1385 students of the Campus. Three hundred sixty-two (362) or 35% were males and 1023 or 65% were female

Table 7. Population of Students at Batangas State University Rosario Campus for Calendar Year 2022

count	PROGRAM	Major	TOTAL		
			Male	Female	Total
1	Bachelor of Industrial Technology	Electronics Technology	56	32	88
2	Bachelor of Secondary Education	Social Studies	15	100	115
3	Bachelor of Technical-Vocational Teacher Education	Garments, Fashion and Design	15	101	116
4	BS Business Administration	Financial Management	105	372	477
5	BS Business Administration	Human Resource Management	18	63	81

6	BS Business Administration	Marketing Management	100	208	308
7	BS Computer Science		16	9	25
8	BS Management Accounting		37	138	175
	Total		**362**	**1023**	**1,385**

.

3.2.1.3. BatStateU- San Juan

A. Employees

As of November 2022, BatStateU San Juan employed a total of 30 people, 14 of them are male and 16 are female. The population of employees at BatStateU San Juan, is broken down into different categories in the table below.

Table 8.Population of Employees at Batangas State University San Juan Campus for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	2	3	5
Temporary	1	1	2
Contract of Service	8	6	14
Job Order	3	6	9
Total	**14**	**16**	**30**

Table 8 exhibits the breakdown of the employees disaggregated statistics at BatStateU San Juan campus. There are 5 regular employees, 2 in temporary status, 14 contract of service, and 9 job order personnel among the population.

B. Students

Academic Year 2022-2023 welcomed a total of 514 students of the Campus. One hundred twelve (112) or 22% were males and 402 or 78% were females.

Table 9.Population of Students at Batangas State University San Juan Campus for Calendar Year 2022

count	PROGRAM	Major	TOTAL		Total
			Male	Female	
1	Bachelor of Industrial Technology	Computer Technology	33	23	56
2	Bachelor of Secondary Education	English	14	127	141
3	Bachelor of Secondary Education	Filipino	16	120	136
4	Bachelor of Secondary Education	Music, Arts, Physical Education and Health	1	0	1
5	Bachelor of Technology and Livelihood Education	Home Economics	10	12	22
6	BS Business Administration	Marketing Management	38	120	158
	Total		**112**	**402**	**514**

3.3.2. BatStateU – Alangilan including Extension Campuses

As of November 2022, BatStateU Alangilan together with its extension campuses has a total of 892 employees of which 436 are male and 456 are female. See the breakdown below for the disaggregated data of employee's population at Alangilan including its extension campuses (Balayan, Mabini and Lobo).

Table 10.Population of Employees at Batangas State University Alangilan including Extension Campuses for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	92	67	159
Temporary	5	12	17
Contractual	0	0	0
Casual Employees	1	1	2
Job Order	97	90	187
Contract of Service	241	286	527
Total	**436**	**456**	**892**

The breakdown of the disaggregated data for the workforce at BatStateU Alangilan together with its extension campuses is shown in table 10. The population included 159 regular employees, 187 job order employees,5 temporary employees, 2 casual employees, and 527 contract of service employees.

Table 11.Population of Students at Batangas State University Alangilan including Extension Campuses for Calendar Year 2022

Campus	SECOND SEMESTER 2022-2023		
	Male	Female	Total
BATSTATEU-ALANGILAN	10386	8587	18973
BATSTATEU-BALAYAN	513	219	732
BATSTATEU-LOBO	96	101	197
BATSTATEU-MABINI	119	128	247
Total	**11114**	**9035**	**20149**

3.3.2.1. BatStateU Alangilan Constituent Campus

As of November 2022, BatStateU Alangilan constituent campus has a total of 805 employees of which 406 are male and 399 are female. See the breakdown below for the disaggregated data of employee's population at Alangilan constituent campus.

Table 12.Population of Employees at BatStateU Alangilan Constituent Campus

Employment Status	Male	Female	Total
Regular	60	73	133
Temporary	8	5	13
Job Order	70	72	142
Casual Employees	1	1	2
Contract of Service	267	248	515
Total	**406**	**399**	**805**

Table 12 exhibits the breakdown of the workforce's disaggregated statistics at BatStateU Alangilan constituent campus. There were 133 regular employees, 13 temporary employees, 142 job order employees, 2 casual employees, and 515 contract of service employees among the population.

3.3.2.2. BatStateU – Balayan

As of November 2022, BatStateU Balayan campus has a total of 45 employees of which 22 are male and 23 are female. See the breakdown below for the disaggregated data of employee's population at BatStateU Balayan.

Table 13.Population of Employees at BatStateU Balayan Campus

Employment Status	Male	Female	Total
Regular	5	13	18
Temporary	1	1	2
Contract of Service	10	3	13
Job Order	6	6	12
Total	**22**	**23**	**45**

The breakdown of the disaggregated data for the workforce at BatStateU Balayan campus is shown in table 13. The population included 18 regular employees, 2 temporary employees, 13 contract of service employees, and 12 job order employees.

3.2.2.3. BatStateU – Lobo

As of November 2022, BatStateU Lobo campus has a total of 25 employees of which 12 are male and 13 are female. See the breakdown below for the disaggregated data of employee's population at BatStateU Lobo.

Table 14.Population of Employees at BatStateU Lobo Campus

Employment Status	Male	Female	Total
Regular	3	4	7
Temporary	2	0	2
Contract of Service	3	5	8
Job Order	5	3	8
Total	**13**	**12**	**25**

Table 14 exhibits the breakdown of the employee's disaggregated statistics at BatStateU Lobo campus. They were among the population. The population included 7 regular employees, 2 temporary employees, 8 job order employees, and 8 in service contracts.

3.2.2.4. BatStateU- Mabini Campus

As of November 2022, BatStateU Mabini campus has a total of 16 employees of which 5 are male and 11 are female. See the breakdown below for the disaggregated data of employee's population at BatStateU Mabini.

Table 15.Population of Employees at BatStateU Mabini Campus

Employment Status	Male	Female	Total
Regular	1	2	3

Contract of Service	6	2	8
Job Order	4	1	5
Total	**11**	**5**	**16**

3.3.3. BatStateU – Lipa

A. Employees

As of November 2022, BatStateU Lipa campus has a total of 187 employees of which 100 are male and 87 are female. See the breakdown below for the disaggregated data of employee's population at BatStateU Lipa.

Table 16.Population of Employees at Batangas State University-Lipa Campus for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	19	16	35
Temporary	4	2	6
Job Order	29	19	48
Contract of Service	48	50	98
Total	**100**	**87**	**187**

The breakdown of the disaggregated data for the workforce at BatStateU Lipa is shown in table 16. The population included 35 regular employees, 6 temporary employees, 48 job order employees, and 98 contract of service employees.

B. Students

Academic Year 2022-2023 welcomed a total of 4792 students of the Lipa Campus. 1724 or 36% were males and 3068 or 66% are female

Table 17.Population of Students at Batangas State University-Lipa Campus for Calendar Year 2022

count	PROGRAM	Major	TOTAL		Total
			Male	Female	
1	Bachelor of Arts in Communication		325	657	982
2	Bachelor of Industrial Technology	Computer Technology	168	92	260
3	Bachelor of Industrial Technology	Electrical Technology	88	16	104
4	Bachelor of Industrial Technology	Electronics Technology	35	21	56
5	Bachelor of Industrial Technology	Instrumentation and Control Technology	18	6	24
6	Bachelor of Public Administration		187	277	464
7	Bachelor of Secondary Education	English	11	77	88
8	Bachelor of Secondary Education	Mathematics	3	16	19

9	Bachelor of Secondary Education	Sciences	10	39	49
10	BS Business Administration	Human Resource Management	53	295	348
11	BS Business Administration	Marketing Management	144	308	452
12	BS Business Administration	Operations Management	38	72	110
13	BS Computer Science		59	19	78
14	BS Industrial Engineering		131	221	352
15	BS Information Technology		291	132	423
16	BS Management Accounting		98	378	476
17	BS Psychology		65	442	507
	Total		**1724**	**3068**	**4792**

3.3.4. BatStateU – ARASOF-Nasugbu

A. Employees

As of November 2022, BatStateU ARASOF-Nasugbu campus has a total of 320 employees of which 186 are male and 134 are female. See the breakdown below for the disaggregated data of employee's population at BatStateU Arasof- Nasugbu.

Table 18.Population of Employees at Batangas State University-ARASOF Campus for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	62	42	104
Temporary	10	14	24
Job Order	41	29	70
Contract of Service	72	50	122
Total	**186**	**134**	**320**

The breakdown of the disaggregated data for the workforce at BatStateU ARASOF-Nasugbu is shown in table 18. The population included 104 regular employees, 24 temporary employees,70 job order employees, and 122 contract of service employees.

B. Students

Academic Year 2022-2023 welcomed a total of 7317 students of the Campus. 2466 or 36% were males and 4851 or 66% were female.

Table 19.Population of Students at Batangas State University-ARASOF Campus for Calendar Year 2022

count	PROGRAM	Major	TOTAL		Total
			Male	Female	
1	Bachelor of Arts in Communication		276	272	548
2	Bachelor of Elementary Education		27	237	264

3	Bachelor of Industrial Technology	Electrical Technology	55	14	69
4	Bachelor of Physical Education		43	77	120
5	Bachelor of Secondary Education	English	38	306	344
6	Bachelor of Secondary Education	Filipino	19	64	83
7	Bachelor of Secondary Education	Mathematics	34	101	135
8	Bachelor of Secondary Education	Sciences	25	109	134
9	BS Accountancy		50	186	236
10	BS Business Administration	Financial Management	38	150	188
11	BS Business Administration	Human Resource Management	112	399	511
12	BS Business Administration	Marketing Management	180	479	659
13	BS Computer Engineering		26	15	41
14	BS Computer Science		10	7	17
15	BS Criminology		287	404	691
16	BS Fisheries and Aquatic Sciences		157	96	253
17	BS Food Technology		15	19	34
18	BS Hospitality Management		251	433	684
19	BS Hotel and Restaurant Management		0	1	1
20	BS Information Technology		213	94	307
21	BS Information Technology	Business Analytics	59	39	98
22	BS Information Technology	Network Technology	66	64	130
23	BS Management Accounting		22	65	87
24	BS Nursing		39	165	204
25	BS Nutrition and Dietetics		8	26	34
26	BS Psychology		73	368	441
27	BS Tourism Management		68	286	354
28	Elementary		98	109	207
29	Junior High School		111	166	277
30	Pre-Elementary		18	23	41
31	Professional Subjects		8	17	25
32	Senior High School		40	60	100
	Total		**2466**	**4851**	**7317**

3.3.5. BatStateU – Malvar Campus

As of November 2022, BatStateU Malvar campus has a total of 274 employees of which 131 are male and 87 are female. See the breakdown below for the disaggregated data of employee's population at BatStateU Malvar

Table 20. Population of Employees at Batangas State University - Malvar Campus for Calendar Year 2022

Employment Status	Male	Female	Total
Regular	33	28	61
Temporary	3	0	3
Job Orders	27	40	67
Casual	0	1	1
Contract of Service	68	74	142
Total	**131**	**143**	**274**

The breakdown of the disaggregated data for the workforce at BatStateU Malvar is shown in table 20. The population included 61 regular employees, 3 temporary employees,67 job order employees, 1 casual employee and 142 contract of service employees.

B. Students

Academic Year 2022-2023 welcomed a total of 6515 students of the Campus. 2445 or 40% were males and 4070 or 60% are female

Table 21. Population of Students at Batangas State University - Malvar Campus for Calendar Year 2022

count	PROGRAM	Major	TOTAL		Total
			Male	Female	
1	Bachelor of Elementary Education		13	106	119
2	Bachelor of Industrial Technology		1	0	1
3	Bachelor of Industrial Technology	Automotive Technology	111	3	114
4	Bachelor of Industrial Technology	Civil Technology	81	62	143
5	Bachelor of Industrial Technology	Computer Technology	116	86	202
6	Bachelor of Industrial Technology	Drafting Technology	49	47	96
7	Bachelor of Industrial Technology	Electrical Technology	90	20	110
8	Bachelor of Industrial Technology	Electronics Technology	38	15	53
9	Bachelor of Industrial Technology	Food Technology	37	69	106
10	Bachelor of Industrial Technology	Mechanical Technology	89	18	107
11	Bachelor of Industrial Technology	Mechatronics Technology	64	8	72

12	Bachelor of Physical Education		30	72	102
13	Bachelor of Secondary Education	English	20	110	130
14	Bachelor of Secondary Education	Filipino	34	91	125
15	Bachelor of Secondary Education	Mathematics	22	92	114
16	Bachelor of Secondary Education	Sciences	15	50	65
17	Bachelor of Secondary Education	Social Studies	31	116	147
18	BS Business Administration	Financial Management	113	405	518
19	BS Business Administration	Human Resource Management	59	206	265
20	BS Business Administration	Marketing Management	157	381	538
21	BS Computer Science		39	23	62
22	BS Criminology		145	273	418
23	BS Hospitality Management		161	408	569
24	BS Industrial Engineering		114	183	297
25	BS Information Technology		302	152	454
26	BS Information Technology	Business Analytics	154	111	265
27	BS Information Technology	Network Technology	45	27	72
28	BS Information Technology	Service Management	96	67	163
29	BS Management Accounting		62	287	349
30	BS Mechatronics Engineering		48	40	88
31	BS Psychology		72	343	415
32	BS Tourism Management		37	199	236
	Total		**2445**	**4070**	**6515**

3.4. Projected Population

Table 22.Projected Enrollment in the next 10-years

Enrollment PROJECTION	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	2030-2031	2031-2032	2032-2033
Pablo Borbon	20,892	21,863	21,234	21,535	22,003	22,336	22,823	23,424	23,905	24,301
Alangilan	19,061	18,358	18,457	18,546	18,611	18,498	18,533	18,635	18,902	19,234
Nasugbu	7,598	8,290	8,374	8,793	9,026	9,272	9,512	9,598	9,622	9,702
Malvar	8,300	8,905	9,510	10,115	10,720	11,324	11,929	12,534	12,865	13,165
Lipa	7,360	8,640	9,520	10,480	11,120	11,760	12,600	13,160	13,421	13,748
Lemery	1,395	1,462	1,543	1,604	1,604	1,604	1,604	1,604	1,604	1,604
Rosario	1,009	1,004	1,046	1,043	1,026	1,026	1,029	1,034	1,048	1,058
San Juan	664	787	927	1,046	1,029	1,030	1,038	1,051	1,090	1,142
Balayan	1,206	1,202	1,191	1,200	1,197	1,196	1,198	1,198	1,125	1,125
Lobo	377	380	384	379	375	382	385	387	389	341
Mabini	170	116	119	119	119	120	125	135	145	160
Total	**68,032**	**71,007**	**72,305**	**74,860**	**76,830**	**78,548**	**80,776**	**82,760**	**84,116**	**85,580**

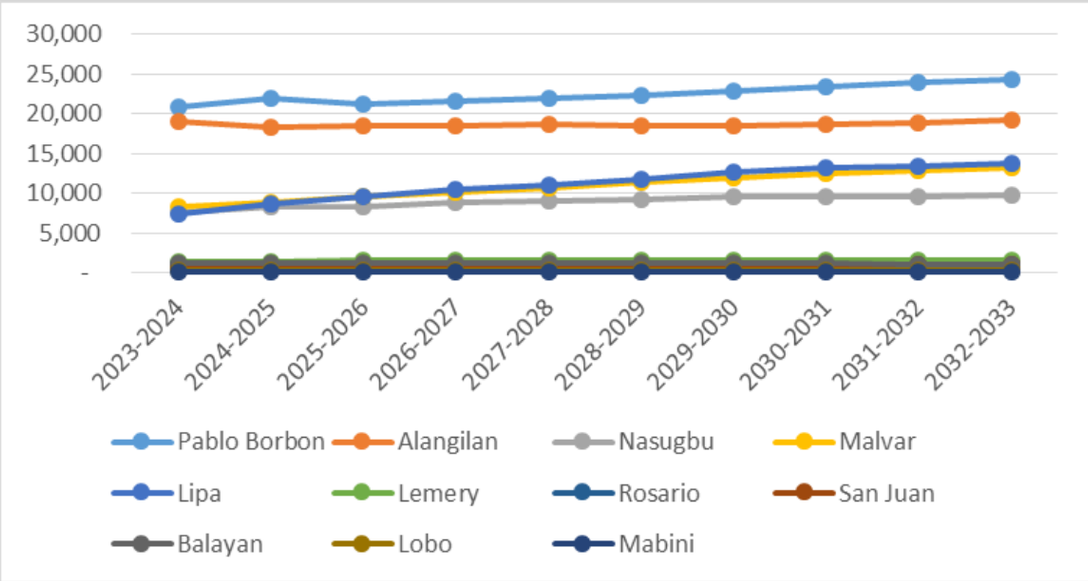


Figure 5. Projected Enrollment of Batangas State University

The enrollment projection is made based on many variables. The school considered the enrollment trend in the past ten-year, where a modest steady increase was noted in most programs. Likewise, the increasing population of the nearby communities resulting in rising enrollment in basic education and engineering. It should also be noted each campus is strategically located in the province of Batangas. This gives the school the opportunity as the institution to be primarily considered by prospective college students for their tertiary education. In addition, the business and commercial activities humming in the areas of Batangas province is a prospect for population increase due to migration The student population of BatStateU Pablo Borbon is expected to continuously increase over the next 10 years though the Tertiary and Integrated School levels are to experience a gradual decrease during the Academic Year 2025-2026.

Likewise, the increase in the population of students in BatStateU Malvar Campus in the academic years is caused by the two (2) undergraduate programs which are proposed to be offered by AY 2023-2024. These include 1) Bachelor of Science in Data Science and 2) Bachelor of Science in Cyber Security. In the same academic year, Master of Science in Business Administration will also be open. In academic year 2024-2025, 1) Bachelor of Elementary Education, Bachelor of Industrial Technology major in Automotive Technology and Bachelor of Science in Food Technology will be added to the list of the

programs in the campus. However, in the same academic year, there will be no students in Bachelor of Science in Computer Science and Bachelor of Science in Industrial Engineering as these programs will no longer be offered. Additional programs are proposed to open in the next academic year. These include Bachelor of Science in Accountancy, Bachelor of Science in Statistics, Bachelor of Science in Social Work, and Bachelor of Arts in English Language Studies by AY 2026-2027; Bachelor of Science in Management Engineering by AY 2028-2029; Bachelor of Arts in History and Bachelor of Arts in Literature and Cultural Studies by AY 2029-2030; and Bachelor of Science in Information Technology Entrepreneurship by AY 2030-2031.

For, BatStateU Lobo, it is projected that the next ten (10) years BS Agriculture and BS Forestry program enrollees in the campus were increased, if not at least maintained by the 380 student enrollees. Meanwhile, continuous development in infrastructure and experimental farms provide students with various learning sites to perform learning by doing experiences.

The next two years and the succeeding academic years after will be crucial for BatStateU Mabini. Because of the niching of courses offered, only the BS Information technology program will accept student enrollees in the succeeding years. The rest of the program which are niched to the Pablo Borbon Campus did not accept enrollees anymore and that those who want to enroll will be accommodated already by the College of Arts and Sciences and the College of Accountancy, Business, Economics and International Hospitality Management of the Pablo Borbon Campus

Table 23. Projected Population of Teaching Personnel in the next 10-years regardless of Status

TEACHING PERSONNEL PROJECTION (REGARDLESS OF STATUS)	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	2030-2031	2031-2032	2032-2033
Pablo Borbon	684	721	716	729	750	768	796	833	860	902
Alangilan	750	859	966	1,071	1,179	1,285	1,391	1,498	1,532	1,565
Nasugbu	226	248	260	273	286	294	302	317	325	332
Malvar	240	262	285	309	338	350	374	399	405	420
Lipa	272	320	352	388	411	435	466	487	532	568
Lemery	40	42	43	44	44	44	44	44	45	45
Rosario	42	42	43	43	43	43	43	43	44	44
San Juan	28	30	33	35	35	38	38	39	39	39
Balayan	37	40	42	46	48	52	55	58	59	59
Lobo	21	21	22	24	24	26	27	29	29	29
Mabini	13	13	13	11	11	11	11	11	11	11
Total	**2,353**	**2,598**	**2,775**	**2,973**	**3,169**	**3,346**	**3,547**	**3,758**	**3,881**	**4,014**

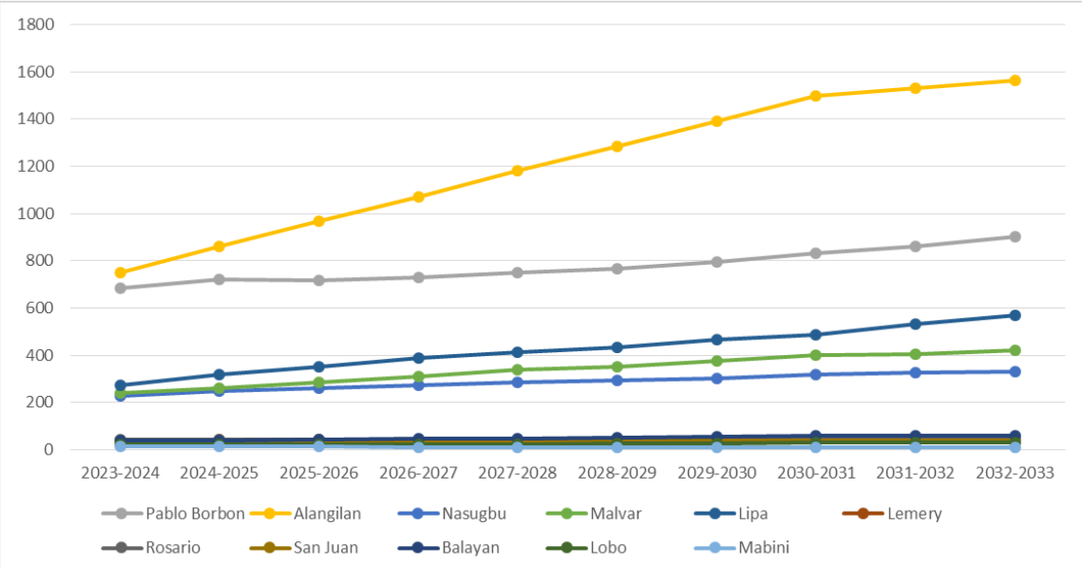


Figure 6.Projected Population of Teaching Personnel in the next 10-years regardless of status employment

The table and figure above demonstrate the 10-year projection of teaching personnel at Batangas State University. The projected increase in the population of students from AY 2023-2024 to AY 2032-2033 denotes the increase in the number of faculty members and learning resources needed. With this projection, strategic planning on students' class scheduling and acquisition of learning facilities should be secured. Observance of three-shifts in a day and establishment of buildings for additional classrooms may be considered.

3.5. Various Environmental Mitigation-Related Initiatives of Batangas State University

The following initiatives of Batangas State University related to environmental concerns are consistent and supportive to its Sustainable Development Goals (SDGs).

3.5.1. Green Space Management

3.5.1.1. Open spaces and unbuilt areas are preserved in their natural states (permeable area and natural vegetation) as much as possible. Ecological landscaping methods and green space preservation shall be prioritized.

3.5.1.2. All existing trees, whether native or non-native, shall be preserved as much as possible. If removal is needed, extraction for relocation or replacement of similar species must be implemented. All concerned must have to observe laws requiring the planting of trees in certain places and penalizing unauthorized cutting or destruction thereof (i.e., PD No. 953).

3.5.1.3. Forest patches and other critical natural habitat within the university shall be protected and maintained whenever possible from conversion.

3.5.1.4. Lawns shall not be cemented to encourage infiltration and groundwater recharge as much as possible.

3.5.1.5. The use of native trees and plants throughout the University shall be highly encouraged to promote biodiversity.

3.5.1.6. The University shall encourage establishment and protection of botanical gardens and arboretums whenever feasible.

3.5.1.7. Indiscriminate introduction of plants and animals as in the case of, but not limited to, random dispersal of seeds and release of animals within the campus shall not be permitted.

3.5.1.8. Fertilizer use and water consumption, preserving groundwater.

3.5.1.9. Endemic and indigenous species of flora shall be the priority in all landscaping programs in the entire university. Whenever feasible, flowering and fruiting trees shall be planted in landscaping projects of the university to encourage local biodiversity.

3.5.1.10. The University shall encourage establishment and protection of botanical gardens and arboretums whenever feasible.

3.5.1.11. Indiscriminate introduction of plants and animals as in the case of, but not limited to, random dispersal of seeds and release of animals within the campus shall not be permitted.

3.5.2. Green Buildings (GB)

The University GB Policy shall be subject to the following performance standards:

3.5.2.1. Energy Efficiency. Energy efficiency requires the adoption of efficient practices, designs, methods and technologies that reduce energy consumption resulting in cost savings.

3.5.2.1.1. Building Envelope

3.5.2.1.1.1. Air Tightness and Moisture Protection. As the humidity levels are very high in the Philippines, the unwanted infiltration and humidity ingress into the spaces can cause additional load on the air conditioning system and a detrimental impact on air quality. Buildings shall be planned and designed with specific details to ensure that air tightness is maximized. Details shall precisely include joints, service entry points, windows and doors. The implementation of these measures requires only increased attention to the construction details and it can be implemented at practically no cost.

3.5.2.1.1.2. Buildings shall be planned and designed with:

3.5.2.1.1.2.1. Complete gaskets, weather-stripping, door bottom sweeps and seals within and around window and door assemblies.

3.5.2.1.1.2.2. Moisture protection on the surface of the external façade to reduce vapor or moisture migration from external spaces.

3.5.2.1.1.3. Glass Properties. Compared to wall assemblies, glazing transfers more heat and hence, it is ideal to reduce the amount of glazing with respect to the wall in order to reduce internal heat gains. The requirement of Windows to Wall Ratio (WWR) needs to be balanced with the amount of daylight coming through the glass area. Solar Heat Gain Coefficient (SHGC) is used to determine the amount of solar heat admitted through the glass divided by the total solar radiation incident on the glass. Visible light Transmittance (VLT) is used to determine the amount of light transmitted through the glass WWR shall be balanced with SHGC to maintain flexibility in design. To further describe, the higher the designed building WWR, the lower the required SHGC in glass windows shall be and vice-versa.

3.5.2.2. Natural Ventilation This measure will give building occupants the flexibility and opportunity to use natural ventilation for free cooling and fresh air in regularly occupied spaces. This measure will limit the tendency to create glass sealed box type buildings. Size of each room and space shall be consistent with the occupancy load of the NBC.

Windows shall be planned and designed with:

A. Operable windows or balcony doors shall be provided in regularly occupied spaces. The size of the opening shall be equal to at least ten percent (10%) of the floor area of regularly occupied spaces.

B. All operable windows shall be provided with safety features for protection against strong winds, water penetration and protection for building occupants including child safety and security.

3.5.2.2.1. Building Envelope Color

Light-colors building envelopes, especially the roof areas which are the most vulnerable, can reduce heat transfer from the outside to the inside of the building by having surfaces with high Solar Reflectance Index (SRI), hence must be prioritized.

3.5.2.2.2. Roof Insulation

Insulation can help reduce heat gain in a building thus improving thermal comfort, acoustic quality and reducing the load on the air conditioning system. Buildings shall be provided with roof insulation so that the average thermal resistance value (R-Value) of the roof is at least R-8

3.5.2.2.3. Mechanical System

a. Air Conditioning System Air conditioning typically accounts for more than fifty percent (50%) of total electricity costs in a centrally air-conditioned building. Hence, the efficiency of an air conditioning system is of prime importance. The heart of the air conditioning system is the cooling system, typically chillers in large buildings and is important to procure an efficient cooling system. The cooling equipment shall meet or exceed the minimum efficiency requirements.

b. Water Heating System - The use of energy-efficient water heating systems in buildings, by observing minimum power performance requirements, will help reduce energy consumption due to heating of water. Applicable buildings shall comply with the minimum performance requirements for water heating in the 2010 PSVARE Standards.

c. Variable Speed Drives and High Efficiency Motors - Variable Speed Drive (VSD) describes the equipment used to control the speed of machinery by changing the frequency of the motor that is being operated. Where process conditions demand adjustment of flow from a pump or fan, varying the speed of the drive may save energy compared with other techniques for flow control.

Motors requirements shall comply with the ff:

C.1 All motors for mechanical equipment over five (5) kW shall be provided with variable speed drive and high efficiency motors.

C.2All motors of cooling towers shall be provided with variable speed drive and high efficiency motors.

C.3All motors for domestic pumps shall have high efficiency motors.

d. Enthalpy Recovery of Exhaust Air - When buildings have outside air or fresh air supply and extract system through mechanical means, using heat exchangers can use the air.

3.5.3 Solid Waste Management

Efficient waste management requires the adoption of efficient waste management practices and use of eco-friendly materials.

3.5.3.1. Material Recovery Facility (MRF)

a. MRF shall be provided for the collection and segregation of solid waste materials. Applicable requirements for MRF are the following:

A1. Buildings shall be provided with a minimum area for MRF.

A.2MRF shall be fully enclosed and easily accessible from within the building and from the outside for easy collection of waste.

A.3Solid waste containers shall be provided for at least four (4) types of wastes: - compostable (biodegradable) - non-recyclable (to be disposed of in the landfill) - recyclable (paper, cardboard, plastic, metal, wood, etc.) - special waste

A.4For hospitals, isolated bins for hazardous wastes shall be provided to avoid contamination

3.5.4. Energy Conservation

3.5.4.1. All buildings and facilities of the University shall be operated in the most energy efficient manner. The following standards shall guide proper offices tasked to implement the same:

3.5.4.1.1. Use of Air-Conditioning Units

3.5.4.1.1.1. The University shall promote the use of energy efficient air conditioning units/systems that utilize ozone-friendly refrigerants.

3.5.4.1.1.2. Load calculations and audit of all air-conditioned spaces to determine the sufficiency of the air condition units/systems shall be conducted. Regular monitoring and maintenance of the units/system must be conducted by PFMO.

3.5.4.2. Lighting

A. Turning off lights in offices, classrooms, laboratories, conference rooms, and restrooms when not in use shall be practiced especially at the end of a class, and at the end of the day.

b. The University shall ensure that classrooms, offices and other University facilities (e.g. laboratories) employ and maintain energy efficient lighting that meet basic lighting illumination standards for the intended room use or activity.

C. Defective lighting fixtures shall be replaced with a more energy efficient fixture whenever applicable.

3.5.4.3. The University shall set and publish energy performance targets and shall have a monthly monitoring and evaluation of performance levels which will be performed by a designated Energy Conservation and Efficiency Committee.

3.5.4.4. The University shall promote the use of renewable energy resources especially to new constructions and to integrate them in existing building renovations. This shall include the utilization of solar PV.

3.5.4.5. The University shall implement measures on reduction of greenhouse gases emissions. The goal is to reduce the greenhouse gas emissions of the campuses to 25% below 2022 levels by 2029 based on the BatStateU Sustainability Plan.

a. The following shall be practiced as regards the use of University vehicles

A1 Proper trip planning, car-pooling and vehicle maintenance

A.2All vehicles shall be properly maintained and have valid registration with t the LTO and are compliant to the Clean Air Act emission standards

A3 Drivers shall practice eco-friendly driving habits to ensure efficient and low-carbon footprint use of all University vehicles.

b. As regards private vehicles, the following must be observed:

b.1"No-idling policy" shall be implemented

a.1 With valid registration with the LTO and compliant to the Clean Air Act emission standards. Vehicle pass stickers are issued upon submission of a photocopy of the vehicle's Official Receipt and the Certificate of Registration (OR/CR).

b. Generator sets

b.1 Generator set will only be used when there is no power supply and/or during an emergency situation.

3.4.3.1. Students and personnel of the University shall make every effort in achieving the goals of BatStateU to lower energy consumption, decrease greenhouse gas emissions, reduce energy expenditures, transition to clean and alternative energy sources, and educate the BatStateU community on the importance of energy conservation, management and efficiency.

3.5.5. Green Procurement

The following are the environmental considerations that shall be adopted in screening possible suppliers in relation to the procurement activities of the University. The performance criteria to which the supplier will be screened are based on the product attributes, waste management, labelling or certification, packaging or reverse logistics, compliance to government regulations, environmental programs at the facilities of the supplier.

3.5.5.1. Improvement of the energy consumption efficiency for supplied goods themselves.

3.5.5.2. Active utilization of recyclable energy.

3.5.5.3. Resource Recycling

3.5.5.4. Resource Saving

a. Reduction of natural resource consumption.

b. Reduction of packing materials.

c. Reduction of resources input and industrial emissions at the manufacturing stage and reduction of waste materials.

3.5.5.5. Recyclability/Reusability

3.5.5.5.1.1. Have a clear 3R policy to reduce, reuse and recycle materials and products in its entire life-cycle.

3.5.5.5.2. Consideration for easiness of treatment/disposal (simplification of disassembly and crushing disposal, and others).

3.5.5.5.3. Water saving activity to minimize the amount of water intake and utilization of water recycling technology.

3.5.5.5.4. Understanding of the water risk by location and taking action according to the risk.

3.5.5.6. Biodiversity

3.5.5.6.1. Understanding of the impact of our business activities on biodiversity and making efforts to minimize it.

3.5.5.6.2. Promotion of activities to preserve and nurture nature with consideration for the global environment.

3.5.5.6.3. Establishment of an Environmental Management System

3.5.5.6.4. Establishment of an Environmental Management System through ISO14001 certification and registration

3.5.5.7. Control of Environmentally Hazardous Substances

3.5.5.7.1. Do not use substances prohibited or banned by law in laboratory activities.

3.5.5.7.2. Where necessary, respond to an information request or survey of chemical substances contained in a purchased material, part, or product.

3.5.5.7.3. Implement energy conservation efforts to reduce energy use, run manufacturing processes efficiently, and save energy, such efforts should include increased use of renewable energy sources such as solar, wind, hydro, or bioenergy.

3.5.5.7.4. Carry out life-cycle environmental impact assessments of material extraction, manufacturing processes sale, use, and disposal of products (including air, water, ground, and noise pollution).

3.5.5.8. Supplier's Responsibility

3.5.5.8.1. Ensure that companies and their suppliers are legally compliant with a country's environmental laws and regulations.

3.5.5.8.2. Institute proper procedures for information disclosure, particularly to consumers and suppliers.

3.5.5.8.3. BatStateU and its suppliers shall carry out environmental audits, assessments, or surveys to understand their extended impacts on the environment throughout the lifecycle of the products they produce.

3.5.5.9. Technical Specifications of Goods, Infrastructure, and Services. The technical specification of goods, infrastructure and services shall be provided by both the end user and the supplier to assure matching of the quality and performance of goods, infrastructure and services that will be utilized in the activities of the university. The qualification of the goods, infrastructure and services categorized as CSE and non-CSE shall be evaluated based on the specification set in the Green Public Procurement technical specifications for priority product groups. The evidence indicated in the Green Public Procurement are required to be provided and the means of verification as recommended in the Green Public Procurement may be considered to provide necessary evidence.

3.5.5.10. Green Procurement Awareness. The University shall provide an awareness seminar annually for the purpose of providing awareness to end users and suppliers and orientation and before the start of the procurement process. This shall be available to the university website and is disseminated to all concerned.

3.5.6. Minimization of the Use of Plastic and Disposable Items. In all activities of the University, including those under 1.6 herein, and insofar as practicable, the following policy guidelines are hereby adopted in relation to the subject matter:

3.5.6.1. The use, sale, and entry of “unnecessary single-use plastics” specified in NSWMC Res. No, 1363s.2020 are prohibited in all activities in all campuses of the University. This includes plastic cups (lower than 0.2 mm in thickness), plastic drinking straws, plastic coffee stirrers, plastic spoons, plastic forks, plastic knives, plastic labo, and thin-filmed sando bags (lower than 15 microns).

3.5.6.2. The use, sale, and entry of single-use plastic water bottles is also prohibited. Water dispensers and drinking fountains shall be provided for faculty, employees, and students. Individuals shall bring tumblers/mugs for water refilling.

3.5.6.3. The use of reusable microwavable plastic containers is allowed, provided that the recommended number of use is maximized and will not be disposed inside the campus premises.

3.5.6.4. The use of laminated paper products as food containers, paper cups, and paper plates is strictly discouraged. Stores and canteen concessionaires shall implement a bring your own container policy. Products shall be brought inside the University unpacked and sold only to buyers who have their own containers.

3.5.6.5. The use, sale and entry of any products in sachet packaging are discouraged when alternative packaging such as bottles are available for the same product.

3.5.6.6. The use of non-refillable whiteboard and permanent markers is strongly discouraged.

3.5.7. Solid Waste Management.

This policy and guidelines shall cover the generation, collection, handling, storage, transport, treatment and disposal of solid and hazardous wastes, tracking and other general wastes and the management of the wastewater generated in the university.

3.5.7.1. Solid Waste

3.5.7.2. Generation

a) Items to be purchased by the University shall be environmentally-acceptable, durable and cost effective as to minimize waste generation.

b) Procurement of items for the University's Operation shall be in bulk order to avoid excessive packaging materials to be disposed of.

c) Packaging products to be used, foods to be sold shall be of recyclable and/or reusable type.

d). the waste shall be segregated from the source of generation

e) Waste generated shall be recorded and updated as basis in compliance with Ecological Solid Waste Management Act of 2000

f) Food waste shall not be accessible to stray animals and pests. Moreover, it is prohibited to feed the stray animals with any type of food or waste.

g) Students, faculty members, staff and university personnel must be familiar with the importance of segregation and waste reduction through various information and education activities to include online infographics, webinars/seminars, workshops and other Information Education Campaign approaches.

3.5.7.3. Collection

3.5.7.3.1. A four bin – system shall be located strategically on university grounds and buildings. Green for Biodegradable Wastes, Blue for Recyclable Wastes, Black for Residual Wastes and Yellow for Infectious Wastes. Each trash bin shall be provided with a trash bag and shall be properly labeled to indicate specific wastes to be contained for a more efficient waste segregation.

3.5.7.3.2. The strategic location of bins on university grounds will serve as the waste collection point. For the buildings and other facilities, a waste collection point shall be established for a more organized collection method.

3.5.7.3.3. For the collection of food wastes, specified trash bin shall be provided for university canteens and for every office.

3.5.7.3.4. GSO personnel shall be in PPEs (gloves, face masks) to avoid exposure to possible-disease causing microorganisms.

3.5.7.3.5. Wastes shall be collected by the janitors from the bins and collection points and be brought to the Materials Recovery Facility or any equivalent facility.

3.5.7.3.6.

Wastes generated from trimming, landscaping and the like shall not be part of the containers positioned in collection points. A plastic or other approved container shall be used to avoid overloading the capacity of the positioned bins. This

container shall not contain non-biodegradable wastes and must be brought to the composting area.

3.5.7.3.7. Trash Bins shall be ensured to be properly covered at all times

3.5.7.3.8. Periodic trash bin inspection shall be conducted by the EMU to monitor proper segregation of wastes.

3.5.7.3.9. Periodic waste collection must be observed by the GSO personnel, or at maximum capacity of the bins.

3.5.7.3.2. Transport (From Collection Bins to the MRF)

3.5.7.3.2.1. The GSO personnel shall be in PPE during the transport of collected wastes from trash bins and collection points to the MRF or any equivalent facility

3.5.7.3.2.2. Proper equipment for the transport of waste from collection point to MRF shall be provided and be used for a more efficient waste transport.

3.5.7.4. Handling, Processing and Storage

a) A Materials Recovery Facility (MRF) that is strategically located, properly designed and equipped shall be provided for each campus (Extension and Constituent Campuses)

b) All waste generated (excluding hazardous waste) shall be brought and be processed to the MRF. It shall be weighed and be recorded.

b.1 Residual Waste

b.1.1 Collected residual wastes shall be inspected for possible waste recovery.

b.1.2 The MRF Operator shall ensure that residual wastes are properly packed in a trash bag before its storage in the allotted compartment at the MRF.

b.1.3 The compartment for the residual wastes shall be kept close and has no access for stray animals and pests.

b.1.4 Storage period shall be determined based on the capacity of the MRF

b.1.5 Collected recyclable waste shall be sorted based on its waste category (Paper, PET Bottles, Plastics, Cans and Metals).

b.1.6 MRF Operator shall ensure that the recyclable wastes are stored properly on its designated compartment

b.1.7 Storage period shall be determined based on the capacity of the MRF

b.1.8 Provision of recycling equipment/facility for the university may also be considered

b.2 Compostable Wastes/Biodegradable Wastes

b.2.1 A composting facility shall be provided for each campus for the processing of the compostable wastes;

b.2.2 The MRF operator shall ensure that the collected compostable wastes are free of other types of waste such as residual and recyclable waste;

b.2.3 The facility shall be kept clean to avoid pests and vermin

b.2.4 The compostable waste shall undergo a composting process for the production of soil enhancer/conditioner that might be utilized by the university and for different extension activities.

3.5.7.5. Transport and Disposal

a) Periodic hauling of residual wastes shall be conducted by a third-party garbage hauler

b) The hauled residual wastes shall be disposed to a DENR accredited sanitary landfill

c) The stored recyclable materials shall be sold to a junkshop to add income for the operation and maintenance of the MRF

d) Wastes shall not be burned

e) No compostable wastes and recyclable wastes shall be hauled and be disposed by the garbage hauler

3.5.7.6 Hazardous Waste

3.5.7.6.1. Generation

a) all waste generated shall be registered to the regulatory agency for their inventory.

b) A Generator's ID number shall be secured from the authority as a transaction ID number for the issuance of permit to transport waste.

c) Any material containing toxic, hazardous elements for procurement shall be considered by the management to minimize significant environmental and health effects when incidentally spilled, released and its cost of cleaning, collection, treatment and disposal.

d) Chemicals for procurement shall be based on the required quantity so as not to minimize waste generation.

e) Use of alternative and non-toxic materials, if possible, as packaging material for equipment, instruments to reduce special handling and operation and maintenance cost.

f) Train or inform the personnel and staff on the hazards posed by the improper handling, storage, transport, and use of hazardous waste and the containers.

3.5.7.6.2. Collection

a) Every hazardous waste generated (e.g. busted fluorescent light bulb, paint container) shall be turned over to a designated officer (e.g. MRF Operator). The designated officer shall log (in a logbook or form) all received hazardous wastes for proper accounting. Hazardous wastes shall not be disposed of in an ordinary plastic bin.

b) All waste shall be collected with proper protective gear to avoid contact and exposure to chemicals either for a short or long period of time.

c) Waste shall be collected using an approved container, leak and punctured-proof, durable and cost-effective.

d) Waste shall not be drained in piping systems to avoid a mixture of incompatible materials so as to prevent explosions, damage to lives and properties.

3.5.7.6.3. Transfer

3.5.7.6.3.1. An approved method of handling shall be used in transferring waste from the point of generation to the temporary storage area.

3.5.7.6.3.2. An approved vehicle shall be used in transporting waste so as to avoid spilling and/or released to the environment.

3.5.7.6.4. Storage

3.5.7.6.4.1. Waste shall be safely stored prior to its collection of the authorized hauler.

3.5.7.6.4.2. The storage area shall be equipped with proper ventilation and security for safety purposes.

3.5.7.6.4.3. The storage area shall not be accessible to people except for the person-in- charge to ensure public health protection.

3.5.7.6.4.4. All containers must be regularly checked for leaks.

3.5.7.6.5. Labelling

3.5.7.6.5.1. The size of the label is minimum 20cm by 30cm

3.5.7.6.5.2. The color of the label is yellow background and black for letters conspicuously marked in paint or other permanent form of marking.

3.5.7.6.5.3. The material of the label must be scratch proof and resistant to tampering and weathering.

3.5.7.6.5.4. The label is accompanied with the symbol corresponding to the characteristics of hazardous waste.

3.5.7.6.6. Packing

3.5.7.6.6.1. In packing the hazardous waste, the containers must be in good condition without leaks and damages.

3.5.7.6.6.2. The containers must be equipped with a strong lid or cap to prevent spillage during the transport.

3.5.7.6.6.3. The containers to be used must be made from materials suitable for the characteristic

3.5.7.6.7. Transport and Treatment

3.5.7.6.7.1. Only authorized haulers with proper permit shall transport the generated waste.

3.5.7.6.7.2. The management shall ensure that all waste generated shall be transported and treated prior to its disposal.

3.5.7.6.8. Disposal

a) All waste shall be disposed of in a sanitary landfill or other approved method of disposal.

b) All waste that is being disposed shall be recorded for documentation purposes

3.5.8. Climate Change Action

As articulated, The University shall implement measures on reduction of greenhouse gases emissions. The goal is to reduce the greenhouse gas emissions of the campuses to 25% below 2022 levels by 2029 based on the BatStateU Sustainability Plan. To achieve this, the BatStateU shall implement measures and concrete plans consistent with RA No. 9729 (Climate Change Act of 2009), the Paris Climate Accords including the Philippines' commitment to a projected greenhouse gas (GHG) emissions reduction and avoidance of 75%, Greenhouse Gas Protocols, and the National Climate Change Action Plan (NCCAP), among others.

3.6. UCCAP Planning Process

Creating a comprehensive climate change action plan for a university involves a systematic and collaborative planning process. Here are the key steps to develop an effective plan:

Step 1: Formation of a Task Force or Committee

Establish a dedicated team of experts and stakeholders focused on climate action.

Step 2: Conducting a Greenhouse Gas (GHG) Emissions Inventory

Measure and analyze the organization's or community's greenhouse gas emissions to understand the current impact.

Step 3: Stakeholder Engagement

Engage with stakeholders, employees, and the public to gather input and build support for climate action.

Step 4: Setting Ambitious and Achievable Goals

Define clear and ambitious climate-related goals that align with the organization's or community's priorities.

Step 5: Action Identification and Prioritization

Identify and prioritize specific initiatives and actions to achieve the established goals.

Step 6: Resource Assessment

Evaluate the financial and human resources needed to implement climate initiatives effectively.

Step 7: Implementation Strategy

Develop a comprehensive climate action plan that outlines how to execute initiatives, including timelines and responsibilities.

Step 8: Public Communication and Reporting

Communicate climate action efforts to the public, employees, and stakeholders through effective communication strategies. Provide regular reports on progress.

Step 9: Continuous Improvement

Continuously assess and improve climate action efforts, incorporating the latest developments, technologies, and best practices.

Step 10: Partnerships and Collaborations

Establish partnerships and collaborations with other organizations, governments, or communities to enhance the collective impact of climate action.

Step 11: Celebrate Successes

Acknowledge and celebrate achievements and milestones in climate action to maintain motivation and enthusiasm among team members and stakeholders.

This framework provides a structured approach to addressing climate change, ensuring that efforts are well-organized, measurable, and adaptable to evolving challenges

The process should be inclusive, transparent, and supportive of ongoing efforts to create a sustainable and resilient institution.

3.6.1. Adaptation Planning Approaches

Adaptation planning approaches refer to the strategies and methodologies used to address and respond to the challenges posed by climate change and other environmental, social, and economic changes. These approaches aim to enhance the resilience and capacity of communities, ecosystems, and systems to cope with and adapt to the impacts of these changes. Several adaptation planning approaches have been developed over the years.

Here are some key ones:

1. Vulnerability assessments are fundamental to adaptation planning. These involve analyzing the sensitivity of a system or community to climate change impacts and the potential consequences of exposure to these changes. By identifying vulnerable areas, groups, or sectors, planners can prioritize adaptation measures and target resources effectively.
2. Similar to vulnerability assessments, risk assessments focus on identifying and evaluating the potential impacts of climate change and other stressors. The approach involves considering the likelihood and magnitude of hazards and the associated vulnerabilities to determine the overall risk. This information helps inform the development of adaptation strategies and actions.
3. Participatory approaches involve engaging local communities, stakeholders, and experts in the adaptation planning process. Including diverse perspectives can improve the relevance and effectiveness of adaptation measures, as those directly affected can share valuable knowledge about their unique circumstances and needs.
4. Scenario planning involves developing and exploring different future scenarios based on various climate change projections and socio-economic trends. By considering a range of potential outcomes, planners can better understand the uncertainties and develop flexible adaptation strategies that can be adjusted as the situation evolves.
5. Mainstreaming adaptation refers to integrating climate change adaptation considerations into existing policies, programs, and decision-making processes. This approach ensures that adaptation becomes an integral part of broader development efforts, making it more sustainable and less costly.

6. Infrastructure resilience involves designing and retrofitting infrastructure to withstand the impacts of climate change. For example, constructing buildings to be more resistant to extreme weather events or implementing nature-based solutions like green roofs and permeable pavements to manage stormwater.
7. Adaptive management involves a flexible and iterative approach to planning and implementing adaptation measures. Planners continuously learn from the outcomes of actions, monitoring and evaluating the effectiveness of measures, and adjusting strategies accordingly.
8. Access to timely and accurate climate information is crucial for effective adaptation planning. Climate information services provide climate data, forecasts, and early warnings, helping decision-makers make informed choices and take timely action.

Combining these approaches and tailoring them to specific contexts is essential for successful adaptation planning. As the understanding of climate change and its impacts evolves, adaptation planning continues to be refined and improved to build more resilient and sustainable communities and ecosystems

3.6.2. Mitigation Section Planning Approach

Mitigation planning approaches refer to strategies and methods employed to reduce or eliminate the impacts of potential hazards, disasters, or adverse events. These approaches are essential for risk reduction and building resilience in various contexts, including natural disasters, environmental challenges, cybersecurity threats, and public health crises.

Here are some common mitigation section planning approaches:

1. Conducting thorough risk assessments and analyses to identify potential hazards and their potential consequences is the foundation of any effective mitigation plan. Understanding the risks allows planners to prioritize and target the most critical areas for mitigation.
2. Developing comprehensive hazard mitigation plans specific to the identified risks. These plans outline specific actions, timelines, and resources required to reduce the risk and impact of each hazard.
3. Implementing physical measures and infrastructure changes to reduce the vulnerability of buildings, infrastructure, and communities to potential hazards. This might include building retrofits, construction of flood defences, seismic strengthening, and wildfire-resistant landscaping.
4. Employing measures that do not involve physical changes to infrastructure but still contribute to risk reduction. Non-structural mitigation can involve land-use planning, zoning regulations, early warning systems, public education campaigns, and community engagement.
5. Emphasizing the protection and restoration of natural ecosystems to enhance their resilience and ability to mitigate hazards. For example, wetlands can act as natural buffers against flooding, and forests can reduce the impacts of landslides.
6. Addressing the long-term impacts of climate change through adaptation Strategies, such as promoting water conservation, implementing energy-efficient practices, and developing heat- resilient urban planning.
7. Utilizing advanced technologies and innovations to improve early warning systems, monitoring capabilities, and response mechanisms. This includes the use of artificial intelligence, sensors, drones, and remote sensing technologies.
8. Encouraging the adoption of insurance and other financial instruments to reduce the economic burden of disasters on individuals, businesses, and governments.

9. Collaborating with other nations and international organizations to address trans boundary risks and share best practices in mitigation and disaster response.
10. Developing continuity plans for critical services and businesses to ensure their continued operation during and after disasters, reducing overall societal impact.
11. Facilitating the sharing of relevant data and information between different agencies, organizations, and stakeholders to improve decision-making and coordination during emergencies.
12. Investing in research and development to enhance understanding of hazards and their impacts, as well as to identify innovative mitigation strategies.

Combining these various approaches in a cohesive and well-coordinated manner can significantly improve the effectiveness of mitigation planning, reducing the impact of disasters and increasing community resilience.

3.6.3. Establishing a Climate Core Team

Establishing a Climate Core Team is of paramount importance in addressing the urgent challenges of climate change.

A Climate Core Team consists of a specialized group of experts and stakeholders solely dedicated to addressing climate change. This team ensures that climate mitigation efforts are well-coordinated and integrated across different parts of an organization or community. Its members possess expertise in climate science, sustainability, policy, and related fields, enabling informed decision-making and the creation of effective strategies to reduce the impacts of climate change.

Furthermore, the Climate Core Team takes responsibility for crafting a comprehensive climate action plan tailored to the specific needs and priorities of the organization or community. This strategic planning process involves identifying essential climate-related goals, targets, and initiatives. The team sets clear and measurable climate objectives, directing efforts toward specific outcomes while maintaining accountability among its members, thereby increasing the chances of achieving meaningful results.

Recognizing the significant risks that climate change poses to businesses, governments, and communities, the Climate Core Team conducts vulnerability assessments, identifies potential risks, and devises strategies to enhance resilience, thereby minimizing the impact of climate-related hazards. In light of the rapidly evolving nature of the climate challenge, the team remains up-to-date with the latest developments, technologies, and best practices to incorporate them into the organization's climate action plan.

Additionally, the Climate Core Team actively engages with stakeholders, employees, and the public to raise awareness, foster commitment, and encourage participation in climate initiatives. Effective communication plays a vital role in garnering support and enthusiasm for climate action.

As climate action often necessitates financial and human resources, the team advocates for and allocates these resources to implement climate initiatives effectively. It ensures that the organization or community aligns its climate action with global targets, such as those outlined in international agreements like the Paris Agreement.

Recognizing that climate change is a long-term challenge requiring sustained and coordinated action, the Climate Core Team provides continuity and ensures that climate action remains a priority, even amid short-term fluctuations. Organizations and communities that demonstrate a commitment to climate action and sustainability typically enhance their reputation and appeal to customers, investors, and potential employees.

Overall, the establishment of a Climate Core Team is a proactive and essential step toward addressing climate change, promoting sustainability, and safeguarding the future well-being of both the organization and the broader community.

MEMBERS OF THE BATANGAS STATE UNIVERSITY CLIMATE CORE TEAM

	RESPONSIBILITY
Chairman	Heads the work of the core team
University President	
Vice Chairman	Provides management support
Vice President for Research, Development and Extension Services	
Director- Center for Sustainability	
Manager	Assist the chairman and vice chairman in the management and climate change action plan implementation. monitors the progress of the strategies laid out in the plan; heads the GHG Management Team
MEMBERS	
Vice President for Development and External Affairs	Provide technical assistance to the committee; integration and coordination of the action plan content to the university's strategic and development plan
Director, Health Services	Responses in public health issues relative to climate change effects
Assistant Director, Agriculture, Aquatic and Natural Resources	Provide city agricultural data and presents strategies and actions to address effects of climate change on agricultural production and food security
Director, Financial Services	Responsible for the climate tagging expenditure and budgetary allotment
Director, Presidential Management Office	Responsible for all infrastructures, public works, and other engineering matters relative to climate change adaptation and

	mitigation measures
Director, ACTION Center	Implementation of DRRM plan and ensure that climate change adaptation and mitigation actions are integrated
Assistant Director, General Services Office	Implementation of identified transport strategies laid out in the plan
Director, Public Relations Office	Responsible for the information dissemination and public awareness relative to climate change and its impacts to the BatStateU Community
Director, Research	Responsible for research and information gathering; spearhead GHG accounting and inventory among campuses of Batangas State University
Assistant Director, Procurement	Responsible for the green procurement processing in the University
Head, GIS Applications Development Center	Provides for the data and climate change related response operations
Local Government Unit of Batangas City	
Local Government Unit of Rosario, Batangas	
Local Government Unit of San Juan, Batangas	
Local Government Unit of Lobo, Batangas	
Local Government Unit of Lemery	Provides support to the group in implementing the strategies identified; Responsible for the initiation of climate change initiatives or support thereto.
Local Government of Malvar, Batangas	
Local Government Unit of Balayan	
Local Government Unit of Mabini	
Local Government of Lipa City	
Meralco	
Petron, Gasoline Station, Balagtas Batangas City	

II. GREENHOUSE GAS MITIGATION APPROACHES

Section 1. Introduction

Republic Act 9729, commonly referred to as the Climate Change Act of 2009, holds significant importance in the national policy landscape as it integrates climate change considerations into government policy formulations. The Act establishes a robust framework strategy and program to effectively address the challenges posed by climate change. In accordance with the principles of climate justice, common but differentiated responsibilities, and the Precautionary Principle, the State commits itself to protect the climate system for the benefit of humankind.

Recognizing the vulnerability of the Philippine archipelago and its local communities, particularly marginalized groups such as the poor, women, and children, to the potential dangerous consequences of climate change, including rising seas, changing landscapes, and the increasing frequency and severity of droughts, fires, floods, and storms, as well as climate-related illnesses and diseases, ecosystem damage, and biodiversity loss, the State affirms its commitment to cooperate with the global community in addressing climate change issues and disaster risk reduction.

To achieve this, the State emphasizes the importance of active participation from national and local governments, businesses, non-governmental organizations, local communities, and the public at large to prevent and reduce the adverse impacts of climate change. Concurrently, the State aims to maximize the benefits that can arise from climate change, while ensuring the integration of gender-sensitive, pro-children, and pro-poor perspectives in all climate change and renewable energy efforts, plans, and programs.

Moreover, the State acknowledges the necessity of incorporating climate change considerations into various phases of policy formulation, development plans, poverty reduction strategies, and other development tools and techniques. By systematically integrating the concept of climate change, the State endeavors to ensure that national and sub-national government policies, plans, programs, and projects are grounded in sound environmental considerations and the principle of sustainable development.

In alignment with the objectives of Republic Act 9729, BatStateU recognizes the need to take proactive measures to reduce its carbon footprint and actively contribute to the broader efforts in addressing climate change. As an initial step, the university aims to identify greenhouse gas (GHG) emissions at BatStateU, encompassing a comprehensive assessment of gross emissions per sector or unit, along with projections for future emissions. This crucial activity will provide valuable insights and data to inform the development of mitigation approaches that the university can implement effectively, aligning its operations with sustainable practices and contributing to the overall fight against climate change.

Section 2. Greenhouse Gas Emissions at Batangas State University

2.1 Gross Emissions per Sector/Unit

BatStateU recognizes the imperative of addressing climate change and reducing its environmental impact. As part of its commitment to sustainability, the university will undertake a comprehensive assessment of greenhouse gas (GHG) emissions, specifically focusing on the gross emissions per sector/unit. This essential endeavor aims to provide a detailed understanding of the sources and magnitude of emissions within the university's operations and infrastructure. By gaining insights into these emissions, BatStateU can develop targeted strategies and implement effective mitigation measures to minimize its

carbon footprint and contribute to the collective efforts in combating climate change. Through this proactive approach, BatStateU aims to establish itself as a leading institution in sustainable practices, promoting environmental stewardship, and inspiring the broader community to adopt climate-friendly action.

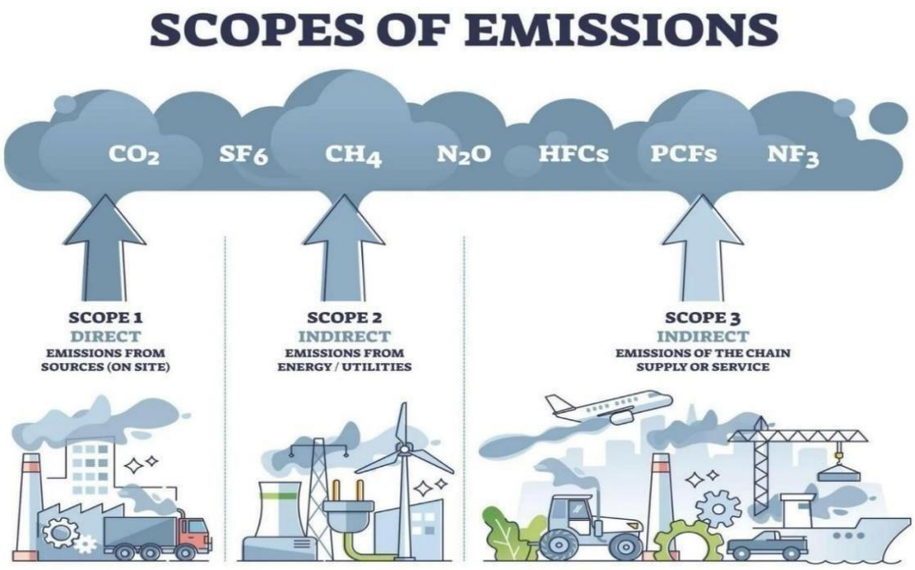
BatStateU, with its 11 campuses, aims to estimate its greenhouse gas (GHG) emissions within the university's geographic boundary, including additional emissions caused by consumption within the university community but emitted elsewhere. The GHG Inventory Report for Batangas State University will illustrate the methodological decisions, assumptions, and details underlying the inventory, such as inventory boundaries, quantification methods, data collection approaches, and information sources considered.

The GHG emissions of the University originate from three (3) main sources: Scope 1 Emissions. Direct GHG emissions from sources owned or controlled by the university; Scope 2 Emissions. Indirect GHG emissions associated with the consumption of purchased electricity, heat, or steam; and Scope 3 Emissions. Indirect GHG emissions that occur as a result of the university's activities but are not directly owned or controlled by the institution.

As BatStateU gears towards expansion due to an increasing enrollment rate every academic year, it is projected to increase GHG emissions every year. The University's growing population and continuous economic progress have led to an increasing demand for electricity, contributing to the emissions from the electricity consumption sector.

In addition, as BatStateU-The NEU looks at its GHG emissions, this initial assessment highlights the areas and sectors where targeted mitigation efforts can be focused to reduce emissions and contribute to the university's sustainability goals.

The initial evaluation with focus on three scopes. First is the direct GHG emissions from sources owned or controlled by the university. These may include combustion of fossil fuels for heating, cooling, and electricity; emissions from university-owned vehicles and maintenance equipment; and emissions from on-campus industrial processes such as laboratory equipment or specialized research facilities. Second, are the indirect GHG emissions associated with the consumption of purchased electricity, heat or steam. These may include emissions resulting from the generation of electricity supplied to the university by the local grid or renewable energy sources and emissions associated with heat or steam purchased from external providers for heating and cooling purposes. Lastly, indirect emissions that occur as a result of the university’s activities but are not directly owned or controlled by the institution. These include commuting by students, staff, and faculty using personal vehicles or public transportation to and from the university; business travel, including air travel, train travel, and other forms of transportation for conferences, meetings, and collaborations; procurement of goods and services, including the production, transportation, and disposal of products used by the university; waste management, including emissions from landfilling, incineration, or recycling processes associated with campus waste; upstream emissions from the production and transportation of food consumed in campus dining facilities; and emissions from off-campus housing and other facilities managed or influenced by the university.



Source:Corporate Finance Institute, 2022

Figure 7. Scope of greenhouse gas emissions (GHG) assessment of BatStateU- The NEU

2.2 Greenhouse Gas Projection (Representative Concentration Pathway (RCP) Modelling)

To foster a sustainable future by proactively addressing climate change and reducing its environmental impact, BatStateU will undertake an important initiative to project greenhouse gas (GHG) emissions using Representative Concentration Pathway (RCP) modelling. By employing this robust modelling approach, BatStateU aims to forecast the potential trajectory of GHG emissions within its operations and infrastructure over a specified time frame. This forward-looking analysis enables the university to anticipate and evaluate the potential impact of its activities on climate change. Armed with this knowledge, BatStateU can develop targeted strategies and implement effective mitigation measures that align with its sustainability goals. Through this proactive approach, BatStateU strives to lead by example, inspiring the wider community and fostering a culture of environmental responsibility and resilience

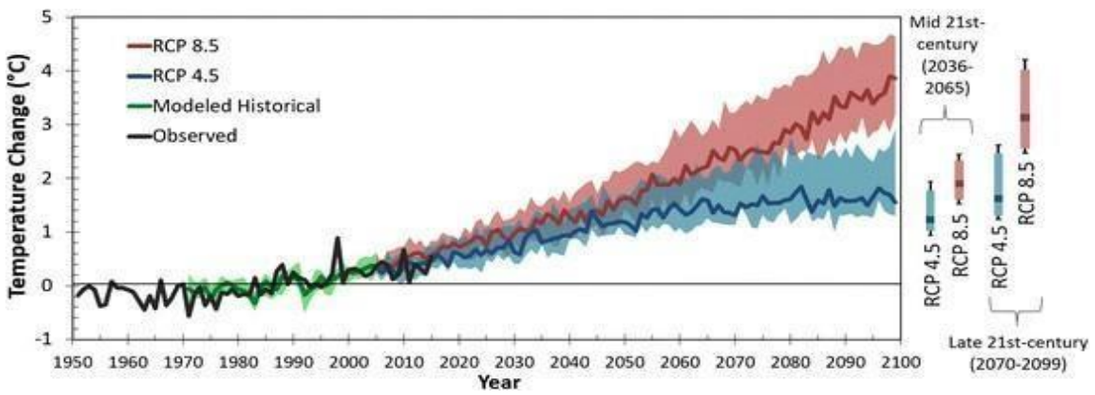


Figure 8.RCP 4.5 and RCP 8.5 climate projection to be used in projecting GHG emissions as influenced by climate change

To project the changes in GHG emissions by different activities and units of the university, two climate change scenarios will be used. First is the RCP 8.5 which is the highest baseline emissions scenario in which emissions continue to rise throughout the

twenty-first century. On the other hand, RCP 4.5 is described by the Intergovernmental Panel on Climate Change (IPCC) as a moderate scenario in which emissions peak around 2040 and then decline. Therefore, climate change projected under RCP 8.5 will typically be more severe than under RCP 4.5.

Section 3. Plan and Objectives

BatStateU aims to develop a comprehensive GHG Management Plan that aligns with its vision of becoming a premier national institution for developing leaders in the global knowledge economy. Guided by its mission to provide a 21st-century learning environment through educational innovations, multidisciplinary research, and strong community and industry partnerships, BatStateU is committed to nurturing the spirit of nationhood, driving the national economy, and actively contributing to sustainable development, including addressing climate change.

Central to BatStateU climate action objectives is the ambitious vision of achieving carbon neutrality by reducing GHG emissions by 5% annually from 2023 to 2050. This proactive approach reflects the university's dedication to mitigating its environmental impact and actively engaging in sustainable practices. By setting these targets, BatStateU aims to lead by example and inspire its students, staff, and the wider community to embrace sustainable behaviors and contribute to the collective efforts in combating climate change. Through the successful implementation of its GHG Management Plan, BatStateU seeks to become a model for other academic institutions and make significant contributions towards a more sustainable and resilient future.

Shown below is the planned activities and timeframe for the development of the GHG Inventory and Management Plan which will serve as a blueprint for climate action, laying out the framework, targets and goals to reduce emissions, and concrete approaches and options that the university can adopt and implement to pursue to achieve its reduction targets and details a management plan to implement such strategies. It articulates the strategies, policy options, programs, and activities – both existing and future actions – to institutionalize as common and best practices on climate change mitigation.

Table 24.Programs and projects to enable the establishment of GHG accounting, projection, and monitoring in BatStateU the NEU for the next Three Years (3)

Suggested Activities	Steps to be taken	Y1				Y2	Y3
		Q1	Q2	Q3	Q4		
Create Climate Change Action Committee	Issuance of a memorandum from the Office of the University President creating the University Climate Change Committee						
Undergo GHG Entity Inventory Training	Conduct GHG Inventory Training						
Conduct GHG Inventory	*Data Assessment *Data collection or generation						

	*GHG emission calculation, *Report preparation						
Prepare the GHG Management Plan	Identify relevant partners (e.g. private sector, academe, other government agencies, NGOs)						
	Identify mitigation potential (PPAs)						
	Prioritization of identified PPAs						
Initialization of GHG Monitoring							
Evaluation of GG Mitigation Action							

Section 4. Mitigation Action

In line with its unwavering commitment to addressing climate change and promoting sustainable practices, the University Climate Change Action Plan outlines a robust Mitigation Action strategy at BatStateU. As a responsible and forward-thinking institution, BatStateU recognizes the urgent need to reduce its carbon footprint and limit the impact of its operations on the environment. Through this Mitigation Action plan, the university aims to implement a series of targeted initiatives, policies, and projects that will effectively curb greenhouse gas (GHG) emissions and enhance its overall sustainability efforts. By proactively taking these measures, BatStateU endeavors to serve as a catalyst for change, inspiring its academic community and stakeholders to embrace greener practices and contribute meaningfully to the global fight against climate change.

The quantification of GHG emissions and reductions of the PPAs of BatStateU will be undertaken and will be reflected in the succeeding versions of the plan.

Table 25.Summary of Existing GHG Reduction Measures of BatStateU

SECTOR	INITIATIVES
Energy	● Energy conservation measures in all offices ● Use of clean energy technologies e.g. solar street lights, LEDs, switching to CFLs from incandescent bulbs, etc. ● Automation and streamlining of services at all offices ● Purchase and use of new vehicles and discarding unserviceable and road unworthy vehicles by each of the campuses of the University

	• Conduct of energy audit • Transition of low carbon • Retrofit less efficient buildings • Adopt new construction and energy standards • Install metering, monitoring and control systems • Expand on-campus solar generation • Adoption of low carbon cement and concrete products in new campus construction projects would help to reduce carbon footprint.
Waste	• Solid waste management • Minimization of the use of plastic and disposable items. • Banning Styrofoam and regulation on the use of plastic as food containers
Environment	• Tree/Mangrove planting and regulation on the cutting of trees/mangroves • Coastal and /or city-wide Clean-Up • Conduct of IECs and annual environmental celebrations for heightening environmental awareness • Formation of Eco-Rangers (green speakers/advocates composed of volunteer college students) • Integrate parasitic architecture in the design of the existing building . It can be done through integrating the following in the existing structures of the university: ☐ green roof ☐ vertical garden ☐ raised beds ☐ aquaponics ☐ Hydroponics • Green Procurement
Travel and Mobility	• Promotion of carpooling through allotment of special parking space for those who carpooled • Bike parking areas • Promote Flexible Work Arrangement • Create safe bicycle and pedestrian infrastructure in all campuses of Batangas State University and provide incentive for bicycle transportation • Provide incentive for the use of Electronic Vehicle in the campus • Business travel emissions tracking • Incentives for reducing business travel emission
Water Consumption	• Reduction in Water Utilization • Reusing of Treated wastewater

Food Supply Chain	• Targeting a 15-25%% reduction in emissions from menu changes, including a shift to more “Plant Forward” meals • Adopting a climate-friendly food labelling system to educate eaters of lower carbon food options • Increasing use of reusable water bottles and hydration stations • Offer training, and develop new programs to support local food and agriculture resiliency efforts • Build partnerships with local farms, indoor cultivation facilities, farm-to-school initiatives, food waste reduction initiatives, food-to-energy initiatives, donations food banks, food service and throughout the food supply chain.
Rest of the Supply Chain	• Implement a comprehensive University source reduction & reuse policy and program • Purchase products with reduced toxic or hazardous chemicals • Contract with suppliers that offer end-of-life reuse, recycling, and/or take back agreement programs • Integrate climate-related criteria into procurement processes

Section 5. Monitoring and Evaluation

The effective implementation of any comprehensive Climate Change Action Plan necessitates a robust Monitoring and Evaluation framework, and BatStateU recognizes the critical importance of this process. In alignment with its commitment to addressing climate change, BatStateU has established a diligent

And systematic approach to monitor and evaluate the progress and outcomes of its climate mitigation and adaptation efforts. Through this monitoring and evaluation component of the University Climate Change Action Plan, the university will assess the effectiveness of its initiatives, track key performance indicators, and identify areas for improvement. By employing a data-driven and evidence-based approach, BatStateU seeks to ensure accountability, transparency, and continuous improvement in its climate action endeavors. This rigorous monitoring and evaluation process will serve as a cornerstone of BatStateU commitment to sustainability and enable the university to adapt and refine its strategies, ultimately driving meaningful impact in the journey towards a more resilient and climate-conscious future. Below is the monitoring and evaluation framework of the University for GHG mitigation initiatives:

PPAs identified as urgent in the GHG mitigation actions were assigned detailed performance indicators for proper evaluation and tracking. The following are the parameters to be measured and monitor as well as the responsible unit for the data collection:

1. Strategy - this specifies the name of the activities, programs and projects toward GHG mitigation.
2. Budget source/ tagging code - this identifies the sources and amount of funding to devote for the identified action.

3. Performance indicator - parameter or indicator to be measured and monitored determine the performance of each mitigation activity.
4. Target - magnitude or percentage change targeted for each indicator toward GHG mitigation.
5. Manner of collection - process or strategies of obtaining the data for each indicator from the source unit.
6. Data source - place or location of the data to be collected per parameter.
7. Responsible person for data collection - person or unit responsible for collecting the data for each parameter.
8. Frequency of data collection - time interval between data collection for each parameter.

Section 6. Monitoring and Evaluation

Comprehensive monitoring and evaluation (M&E) framework for a climate change action plan involves defining clear objectives, setting up indicators, collecting data, and analyzing progress. As BatStateU embarks on an aspiring journey towards a sustainable and climate-resilient future, climate change becomes increasingly evident. The M&E framework is a strategic approach that will ensure the successful execution of adaptation initiatives to forge a path towards a greener and more sustainable campus community.

III. ADAPTATION

Section 1. Introduction

Climate change poses a significant threat to Batangas State University (BatStateU) and its surrounding communities in the Province of Batangas, Philippines. The observed and projected climate trends in the country indicate a gradual increase in temperatures, changing rainfall patterns, and rising sea levels, which have far-reaching impacts on agriculture, water resources, coastal areas, and public health. To safeguard the well-being of our campus community and support the sustainable development of the region, BatStateU is committed to proactively addressing the challenges of climate change through a comprehensive and strategic Climate Change Adaptation Plan.

As an institution of higher learning and a key player in nurturing future global knowledge economy leaders, BatStateU acknowledges the urgency and importance of integrating climate change adaptation strategies into our policies, programs, and infrastructure planning. In line with the National Climate Change Action Plan and the Climate Change Act of 2009, this adaptation plan aligns seamlessly with BatStateU vision and mission, propelling the institution towards becoming a leading national institution for sustainable development and climate resilience.

Section 2 of this adaptation plan focuses on Climate Change Projections, providing crucial insights into the observed and projected climate trends in the Philippines and Batangas Province. According to the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), recent observations indicate a rising temperature trend in the Philippines, with predictions of continued warming in the coming years. Projections under different emission scenarios (RCP4.5 and RCP8.5) anticipate temperature increases ranging from 0.9 ℃ to 4.5 ℃ by the end of the 21st century.

Additionally, changing rainfall patterns and sea-level rise are key concerns for Batangas Province. Projections indicate altered precipitation distributions, leading to more prolonged dry periods and increased risk of heavy rainfall events, flash floods, and

landslides. Coastal areas face vulnerability to rising sea levels, intensifying storm surges, and saltwater intrusion, posing threats to communities and ecosystems.

Based on these projections, BatStateU recognizes the urgent need to develop and implement adaptation actions that address the unique vulnerabilities of the campus and surrounding communities. Section 3 of this plan encompasses a comprehensive Vulnerability Assessment, which analyzes the impacts of climate change-related hazards on various sectors, such as agriculture, water resources, coastal areas, and public health. By understanding the risks and vulnerabilities, adaptation strategies can be tailored to enhance resilience and reduce the potential impacts of climate change on our campus and the region.

In Section 4, the Plan and Objectives, BatStateU establishes clear and actionable objectives to guide its climate change adaptation efforts. The primary objectives include fostering climate-resilient development, optimizing water management, promoting climate-smart agriculture, implementing coastal protection measures, upholding environmental sustainability, and enhancing public awareness and capacity-building initiatives.

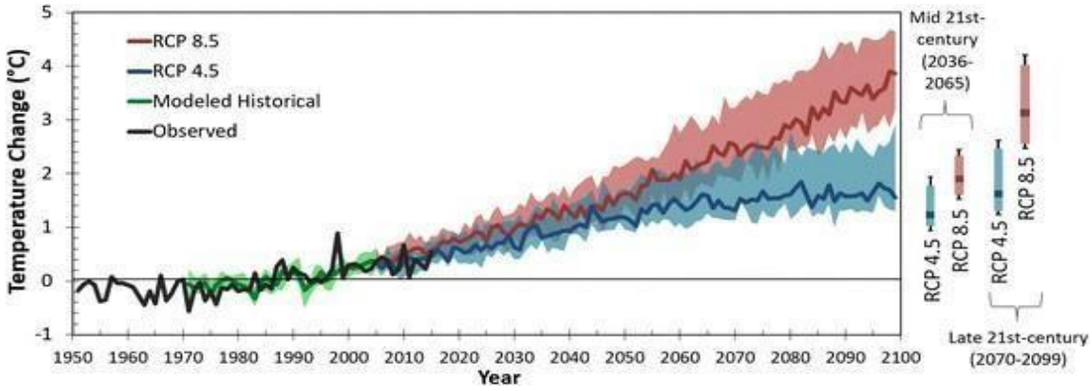
Section 5, Adaptation Actions, outlines the key strategies and measures that BatStateU undertakes to achieve its objectives. These actions encompass a wide range of activities, from incorporating climate resilience into campus planning and construction to promoting water conservation, implementing sustainable agriculture practices, and enhancing coastal protection measures. The plan also emphasizes public awareness campaigns and community engagement to build climate resilience at the grassroots level.

Lastly, Section 6 outlines the Monitoring and Evaluation framework, which serves as a critical tool to track the implementation and effectiveness of various climate change adaptation actions. It utilizes a series of indicators that span different aspects of climate-resilient development, water management, agricultural adaptation, and coastal protection. These indicators will provide valuable data to assess the success of our objectives and guide evidence-based decision-making.

Throughout this adaptation plan, BatStateU will diligently monitor and evaluate the progress of its objectives and adaptation actions. By regularly tracking indicators related to carbon footprint reduction, climate change awareness, and climate resilience enhancement, informed decisions can be made and BatStateU climate change adaptation strategies can be continuously improved.

Section 2. Climate Change Projections

The observed and projected climate trends in the Philippines present a critical concern for Batangas State University (BatStateU) and its 11 campuses strategically located across the Province of Batangas. Based on recent data from the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), the country has been experiencing a gradual increase in temperatures, with predictions of continued warming in the coming years. Under different emission scenarios (RCP4.5 and RCP8.5)



The anticipated temperature increases in the Philippines range from 0.9 ℃ to 4.5 ℃ by the end of the 21st century. Furthermore, changing rainfall patterns, intensified typhoons, and sea-level rise pose additional threats to Batangas Province, making it vital for BatStateU to address the challenges of climate change through effective adaptation strategies. This section delves into the observed and projected climate trends in the Philippines, providing essential insights into the impacts that BatStateU must consider when formulating its Climate Change Adaptation Plan.

2.1 Observed and Projected Climate Trends in the Philippines

According to the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), recent observations indicate that temperatures in the Philippines have been increasing at an average rate of 0.1 ℃ per decade. Climate experts predict that this warming trend will persist in the coming years. Under the moderate emission scenario (RCP4.5), it is anticipated that the country's average temperature could rise by 0.9 ℃ to 1.9 ℃ between 2036 and 2065. In the high emission scenario (RCP8.5), the projected increase is higher, ranging from 1.2 ℃ to 2.3 ℃ during the same period. Looking further ahead to the end of the 21st century (2070-2099), temperatures are expected to continue rising. Depending on the emission scenario, the mean temperature could increase by 1.3 ℃ to 2.5 ℃ (RCP4.5) or 2.5 ℃ to 4.5 ℃ (RCP8.5) compared to the baseline climate.

In various regions across the country, there have been noticeable trends of increasing annual and seasonal rainfall. These trends have been linked to occurrences of intense rainfall events. According to projections from multiple models, there is a wide range of potential changes in seasonal-mean rainfall, with some areas showing an increase of over 40% compared to historical values, while others may experience a decrease. It's worth noting that the central estimate of projected changes in rainfall from the various models falls within the range of natural rainfall variations. However, one exception is the projected reduction in rainfall over central sections of Mindanao, which goes beyond what has been observed in the past.

Over the course of 65 years, spanning from 1951 to 2015, the Philippine Area of Responsibility (PAR) experienced a slight reduction in the overall number of tropical cyclones, while there was a slight uptick in the frequency of very strong tropical cyclones, defined as those surpassing 170 kph in intensity. Experts anticipate that these patterns will persist in the years ahead. However, it is essential to highlight that despite these observed trends, the future climate conditions in the Philippines will continue to exhibit significant year-to-year fluctuations in both the occurrence and intensity of tropical cyclones. These fluctuations are expected to play a dominant role in shaping the cyclonic activity in the region.

Between 1993 and 2015, certain areas of the Philippines experienced a sea level rise nearly twice as fast as the global average rate. Looking ahead, projections indicate that

the sea level in the country could rise by approximately 20 cm by the end of the 21st century, assuming the RCP8.5 scenario. This anticipated increase in sea level could have concerning implications, particularly for coastal communities, as it might exacerbate storm surge hazards. These communities may face higher risks and greater vulnerability to the impact of storm surges, underscoring the importance of preparedness and adaptation measures to mitigate potential damages.

2.2 BatStateU Campuses Location and Climate Vulnerability

The 11 campuses of Batangas State University (BatStateU), The National Engineering University, are strategically located in different cities and municipalities of the Province of Batangas, Philippines. The location map of Batangas Province and the BatStateU campuses is shown on Figure 48.

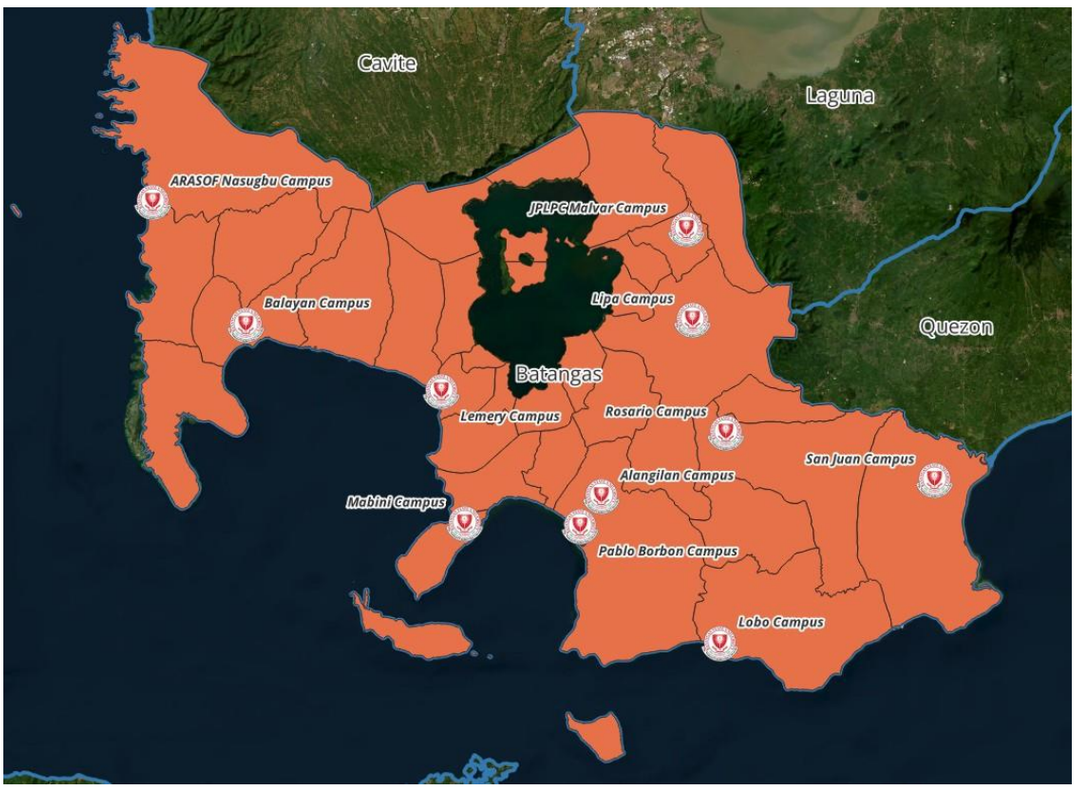


Figure 9. Location of Batangas Province and the 11 Campuses of Batangas State University, The National Engineering University

As shown in the figure, Batangas Province is situated in the southern part of the island of Luzon in the CALABARZON Region. It is bordered by the provinces of Cavite and Laguna to the north and Quezon to the east. The province boasts a diverse landscape that includes a long coastline, fertile plains, rolling hills, and volcanic mountains. With its proximity to the sea, Batangas is vulnerable to various climate-related hazards such as typhoons, storm surges, heavy rainfall,

landslides, and rising sea levels. Moreover, the province's economy is largely dependent on agriculture, fisheries, and tourism, making it imperative to understand and plan for potential climate impacts.

2.3 Climate Data Analysis for Batangas Province

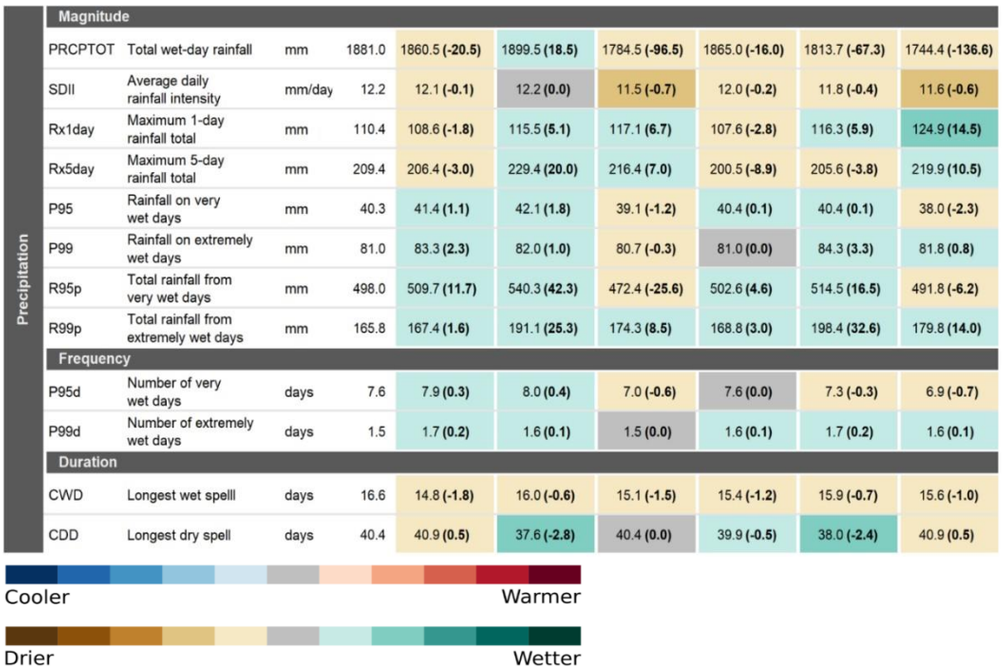
PAGASA, in collaboration with international climate organizations and research institutions, has employed climate models to project potential future climate changes for

Batangas Province. These projections are based on various emission scenarios, including moderate-emission (RCP4.5) and high-emission (RCP8.5) pathways.

In order to support localized planning within specific institutions, such as the BatStateU, the Philippine Climate Extremes Report 2020 provided the observed and projected annual climate extremes data for Batangas at the provincial scale. These data were derived by averaging values from various grid points situated within the boundaries of the province. Each grid point covers an area of approximately 25 kilometers by 25 kilometers. This approach allows for a more detailed and tailored understanding of the climate conditions in Batangas, which can be highly valuable for local-scale planning endeavors. The provincial-scale observed and projected annual climate extremes for Batangas Province is presented in the following figures.

Extremes Index				Baseline Value	Moderate Emission (RCP4.5)			High Emission (RCP8.5)		
Type	Code	Description	Unit		Early (2020-2039)	Mid (2046-2065)	Late (2080-2099)	Early (2020-2039)	Mid (2046-2065)	Late (2080-2099)
Temperature	**Magnitude**									
	TNn	Coldest night time temperature	°C	18.2	19.0 (**0.8**)	19.4 (**1.2**)	19.8 (**1.6**)	19.1 (**0.9**)	20.0 (**1.8**)	21.8 (**3.6**)
	TNm	Average night time temperature	°C	22.7	23.3 (**0.6**)	23.8 (**1.1**)	24.1 (**1.4**)	23.4 (**0.7**)	24.3 (**1.6**)	25.8 (**3.1**)
	TNx	Warmest night time temperature	°C	25.6	26.2 (**0.6**)	26.8 (**1.2**)	27.1 (**1.5**)	26.3 (**0.7**)	27.2 (**1.6**)	28.6 (**3.0**)
	TXn	Coldest day time temperature	°C	25.2	25.9 (**0.7**)	26.4 (**1.2**)	26.6 (**1.4**)	25.9 (**0.7**)	26.8 (**1.6**)	28.2 (**3.0**)
	TXm	Average day time temperature	°C	31.0	31.5 (**0.5**)	32.1 (**1.1**)	32.4 (**1.4**)	31.8 (**0.8**)	32.6 (**1.6**)	34.2 (**3.2**)
	TXx	Warmest day time temperature	°C	35.0	35.6 (**0.6**)	36.3 (**1.3**)	36.6 (**1.6**)	35.8 (**0.8**)	36.8 (**1.8**)	38.6 (**3.6**)
	DTR	Daily temperature range	°C	8.3	8.3 (**0.0**)	8.3 (**0.0**)	8.4 (**0.1**)	8.4 (**0.1**)	8.3 (**0.0**)	8.3 (**0.0**)
	Frequency									
	TN10p	Fraction of cold nights	%	11.3	3.6 (**-7.7**)	1.5 (**-9.8**)	1.2 (**-10.1**)	2.8 (**-8.5**)	0.9 (**-10.4**)	0.3 (**-11.0**)
	TN90p	Fraction of warm nights	%	11.1	31.7 (**20.6**)	51.1 (**40.0**)	63.5 (**52.4**)	36.9 (**25.8**)	71.0 (**59.9**)	96.2 (**85.1**)
	TX10p	Fraction of cool days	%	11.4	5.2 (**-6.2**)	2.2 (**-9.2**)	1.4 (**-10.0**)	3.8 (**-7.6**)	1.4 (**-10.0**)	0.7 (**-10.7**)
	TX90p	Fraction of hot days	%	11.4	26.0 (**14.6**)	53.8 (**42.4**)	65.4 (**54.0**)	34.5 (**23.1**)	66.5 (**55.1**)	91.9 (**80.5**)
	Duration									
	WSDI	Warm Spell Duration Index	days	3.9	66.9 (**63.0**)	153.5 (**149.6**)	231.8 (**227.9**)	101.1 (**97.2**)	280.0 (**276.1**)	365.0 (**361.1**)

Figure 10.Batangas provincial data table for temperature include climate extremes index, baseline value, and projections for RCP4.5 and RCP8.5 scenarios.



Precipitation	**Magnitude**									
	PRCPTOT	Total wet-day rainfall	mm	1881.0	1860.5 (-20.5)	1899.5 (18.5)	1784.5 (-96.5)	1865.0 (-16.0)	1813.7 (-67.3)	1744.4 (-136.6)
	SDII	Average daily rainfall intensity	mm/day	12.2	12.1 (-0.1)	12.2 (0.0)	11.5 (-0.7)	12.0 (-0.2)	11.8 (-0.4)	11.6 (-0.6)
	Rx1day	Maximum 1-day rainfall total	mm	110.4	108.6 (-1.8)	115.5 (5.1)	117.1 (6.7)	107.6 (-2.8)	116.3 (5.9)	124.9 (14.5)
	Rx5day	Maximum 5-day rainfall total	mm	209.4	206.4 (-3.0)	229.4 (20.0)	216.4 (7.0)	200.5 (-8.9)	205.6 (-3.8)	219.9 (10.5)
	P95	Rainfall on very wet days	mm	40.3	41.4 (1.1)	42.1 (1.8)	39.1 (-1.2)	40.4 (0.1)	40.4 (0.1)	38.0 (-2.3)
	P99	Rainfall on extremely wet days	mm	81.0	83.3 (2.3)	82.0 (1.0)	80.7 (-0.3)	81.0 (0.0)	84.3 (3.3)	81.8 (0.8)
	R95p	Total rainfall from very wet days	mm	498.0	509.7 (11.7)	540.3 (42.3)	472.4 (-25.6)	502.6 (4.6)	514.5 (16.5)	491.8 (-6.2)
	R99p	Total rainfall from extremely wet days	mm	165.8	167.4 (1.6)	191.1 (25.3)	174.3 (8.5)	168.8 (3.0)	198.4 (32.6)	179.8 (14.0)
	Frequency									
	P95d	Number of very wet days	days	7.6	7.9 (0.3)	8.0 (0.4)	7.0 (-0.6)	7.6 (0.0)	7.3 (-0.3)	6.9 (-0.7)
	P99d	Number of extremely wet days	days	1.5	1.7 (0.2)	1.6 (0.1)	1.5 (0.0)	1.6 (0.1)	1.7 (0.2)	1.6 (0.1)
	Duration									
	CWD	Longest wet spelll	days	16.6	14.8 (-1.8)	16.0 (-0.6)	15.1 (-1.5)	15.4 (-1.2)	15.9 (-0.7)	15.6 (-1.0)
	CDD	Longest dry spell	days	40.4	40.9 (0.5)	37.6 (-2.8)	40.4 (0.0)	39.9 (-0.5)	38.0 (-2.4)	40.9 (0.5)

Source: Philippine Climate Extreme Report 2020, Annex A

Figure 11. Batangas provincial data table for precipitation include climate extremes index, baseline value, and projections for RCP4.5 and RCP8.5 scenarios

The climate extremes index for precipitation and temperature is categorized based on magnitude, duration, and frequency, with corresponding codes, descriptions, and units of measure. The baseline values stem from the SA-OBS observation data spanning 1986 to 2005. Projections for both moderate (RCP4.5) and high (RCP8.5) emission scenarios are shown in three columns, representing early (2020-2039), mid-future (2046-2065), and late-future (2080-2099) periods. Each column includes two values presented: the projected value (outside parenthesis) and the amount of change (enclosed by parenthesis). The projected value is obtained by adding the baseline value to the amount of change.

To aid in the comprehension of the presented data, color-coding schemes are utilized. In the temperature table, cooler temperatures are represented by shades of blue, while warmer temperatures are depicted by shades of red. In the precipitation section, wetter trends are shown in various shades of green, while drier trends are illustrated with shades of brown. If the changes fall within the range of +0.1 to -0.1, the table value is designated as 0.0, and the cell background color is set to grey. This system enhances the visual understanding of the data and simplifies the interpretation process.

2.4 Climate Projections Summary for Batangas Province

The summary of the climate projections for Batangas Province is presented in terms of temperature, precipitation, typhoons and extreme events, and sea level rise:

a. Temperature

Mean daily temperatures in Batangas province are projected to continue rising throughout the 21st century. Under the high-emission scenario, average day time temperature may increase by 3.2 ℃, and warmest could increase by 3.6 ℃ reaching 39.1℃ by 2100. Extreme heat events may become more frequent, projecting 96.6% of warm nights and

91.4% hot days by 2100, leading to potential heat stress on both human populations and agriculture. Furthermore, warm spell duration is expected to last the whole year by 2100.

b. Precipitation

Projections indicate that while the daily precipitation in Batangas province may not change significantly, there will be alterations in the distribution and intensity of rainfall. Batangas may experience more prolonged dry periods, leading to increased risk of drought, while the frequency and intensity of heavy rainfall events may elevate the threat of flash floods and landslides.

c. Typhoons and Extreme Events

Projections for typhoons remain uncertain, but there is evidence to suggest that the region may experience more intense tropical cyclones. These events can bring devastating winds, heavy rainfall, and storm surges, posing risks to infrastructure, agriculture, and human safety.

d. Sea Level Rise

Sea levels are expected to continue rising throughout the 21st century. According to the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report, under the RCP8.5 scenario (which represents a high greenhouse gas emissions pathway), global mean sea level rise by 2100 is projected to be between 52 and 98 centimeters compared to the average sea level during 1986-2005. Coastal areas in the Philippines like in Batangas will face increased vulnerability to erosion, inundation, and saltwater intrusion, necessitating the implementation of adaptive measures.

The climate projection for Batangas Province reveals rising temperatures, changing rainfall patterns, and increasing sea levels, with significant implications for agriculture, water resources, coastal areas, and public health. To address these challenges, implementing appropriate adaptation and mitigation strategies is crucial for enhancing resilience and safeguarding the well-being of communities and ecosystems. Collaboration among government agencies, local communities, private sectors, and non-governmental organizations will play a pivotal role in fostering a sustainable and climate-resilient future for Batangas Province. Continuous monitoring and regular updates to climate projections will provide valuable insights for informed decision-making and climate planning. This is especially relevant for Batangas State University, which operates 11 campuses across the province and can take proactive measures to enhance its resilience and adapt to the impacts of climate change.

Section 3. Vulnerability Assessment

As Batangas Province faces the challenges of a changing climate, it becomes crucial for Batangas State University (BatStateU) to conduct a comprehensive Vulnerability Assessment. This assessment aims to identify the potential risks and impacts of climate change on various sectors within the province, including agriculture, water resources, coastal areas, and public health. By understanding the vulnerabilities that the changing climate poses to these sectors, BatStateU can tailor its Climate Change Adaptation Plan to effectively mitigate risks and enhance resilience. This section delves into the potential hazards and impacts associated with climate change in Batangas Province and provides a systematic analysis of the university's susceptibility to these changes. Through this Vulnerability Assessment, BatStateU can proactively address climate-related risks and pave the way for a sustainable and climate-resilient future for the institution and the surrounding communities.

3.1 Risk Assessment

The Risk Assessment Table presented below outlines the potential hazards, vulnerabilities, and associated risk levels that Batangas State University (BatStateU) may encounter in the face of climate change. As an institution committed to addressing the challenges of a changing climate, BatStateU recognizes the importance of understanding and mitigating the risks posed to various sectors within its campuses and surrounding communities. The table highlights the key areas of concern, such as agriculture, water resources, coastal areas, and public health, shedding light on the potential impacts that climate change may have on these sectors.

Risk Assessment Table

Sector	Hazards and Impacts	Vulnerabilities	Risk Level
Agriculture	- Disruption of traditional practices	- Dependence on specific crop varieties	High
	- Decreased crop yields	- Reliance on seasonal rainfall	High
	- Shifts in crop suitability	- Exposure to extreme weather events	Moderate
	- Increased vulnerability to extreme weather events (droughts, heavy rainfall)		
Water	- Water scarcity during dry periods	- Dependence on rainfall for water supply	High
	- Increased risk of flooding	- Unsustainable water use practices	Moderate
	- Impact on agriculture and domestic water	- Insufficient water storage capacity	Moderate
Coastal Areas	- Rising sea levels and storm surges	- Proximity to the coast	High
	- Coastal erosion and inundation	- Vulnerability of infrastructure	High
	- Saltwater intrusion into freshwater resources	- Impact on coastal communities	High
Public Health	- Increase in heat-related illnesses - Changes in distribution of vector-borne diseases (dengue, malaria)	- Lack of public awareness - Insufficient vector control programs	Moderate

Section 4. Plan and Objectives

BatStateU is dedicated to crafting a robust Climate Change Adaptation Plan that aligns seamlessly with its vision of establishing itself as a leading national institution for nurturing global knowledge economy leaders. Guided by its mission to cultivate a progressive 21st-century learning environment through educational innovations, interdisciplinary research, and forging strong partnerships with both the community and industry, BatStateU holds steadfast in its commitment to fostering a sense of nationhood, propelling the national economy, and actively contributing to sustainable development, with special attention to addressing the pressing issue of climate change.

The BatStateU Climate Change Adaptation Plan supports the national approaches to climate change and aims to attain the following objectives:

1. Climate-resilient development:

To foster a comprehensive climate-resilient development approach that integrates climate adaptation measures into all facets of planning, policy-making, and implementation. Build resilient communities and infrastructure that can effectively withstand and respond to the impacts of climate change, reducing vulnerability to climate-related risks and enhancing the overall adaptive capacity of the university and its surrounding communities.

2. Water Management:

To implement efficient and sustainable water management strategies that optimize water use, storage, and distribution, enabling communities to cope with water scarcity, flooding, and other water-related challenges exacerbated by climate change seeking to safeguard water resources, enhance resilience to changing hydrological conditions, and promote equitable access to clean water for all.

3. Agricultural Adaptation:

To enhance agricultural practices and techniques that are resilient to climate variability, ensuring food security, and the livelihoods of farmers while minimizing the environmental impact and resource consumption through instruction, research and extension as part of the university's social responsibility.

4. Coastal Protection:

To develop and implement comprehensive coastal protection measures that safeguard vulnerable areas from the escalating risks of sea-level rise, extreme weather events, and erosion caused by climate change.

5. Environmental Sustainability:

To promote and uphold environmental sustainability principles within the university system and its surrounding communities, ensuring responsible resource management, reduced environmental impact, and the preservation of biodiversity to achieve a balanced and resilient ecosystem.

6. Public Awareness and Capacity Building:

To raise awareness among the public and key stakeholders about the impacts of climate change and the importance of adaptation measures, while building their capacity to actively participate in and support climate resilience initiatives.

Section 5. Adaptation Actions

This Climate Change Adaptation Plan serves as the gateway to realizing the university's ambitious goal of sustainability. By implementing a comprehensive set of Adaptation Actions, we aim to address the following key areas of concern, proactively adapting to the challenges posed by climate change, and advancing our commitment to a resilient and sustainable future:

5.1 Climate-Resilient Development

a. Incorporate Climate Resilience in Campus Planning

Integrate climate resilience principles into the university's campus master plan, ensuring infrastructure and buildings are designed to withstand climate-related hazards and extreme weather events.

b. Climate-Resilient Design and Construction

Encourage sustainable and climate-resilient design and construction practices for new buildings and renovations, using eco-friendly materials and energy-efficient technologies.

c. Promote Green Infrastructure

Implement green infrastructure initiatives such as rainwater harvesting, green roofs, and permeable pavements to manage stormwater and enhance the campus's resilience to flooding.

d. Climate-Resilient Education and Research

Introduce climate change adaptation and resilience topics into various academic programs and research projects to foster a culture of sustainability and innovation.

5.2. Water Management

a. Water Conservation and Efficiency

Implement water-saving measures across campus, such as low-flow fixtures, smart irrigation systems, and water recycling, to reduce water consumption and mitigate water scarcity risks.

b. Water Campus Audits

Conduct regular water audits to identify opportunities for water use reduction and optimize water management practices.

c. Education on Water Conservation

Raise awareness among students, faculty, and staff about the importance of water conservation through educational campaigns and workshops.

5.3. Agricultural Adaptation

a. Climate-Smart Agriculture

Integrate climate-smart agricultural practices in university-owned farms and agricultural research projects to adapt to changing climate conditions.

b. Research and Innovation

Conduct research on climate-resistant crop varieties, soil conservation techniques, and sustainable agricultural practices suitable for the region's changing climate.

c. Demonstrate Farms

Establish demonstration farms showcasing climate-resilient agricultural practices to educate students, farmers, and the local community.

5.4. Coastal Protection

a. Coastal Erosion Monitoring

Monitor and assess coastal erosion risks to understand vulnerabilities and develop appropriate protection strategies.

b. Shoreline Protection

Implement shoreline protection initiatives, such as mangrove restoration.

c. Public Education on Coastal Resilience

Raise awareness about coastal protection and the importance of preserving coastal ecosystems through educational outreach and public awareness campaigns.

5.5. Environmental Sustainability

a. Sustainable Campus Orientation

Promote sustainable practices in waste management, energy consumption, and transportation to reduce the university's carbon footprint.

b. Biodiversity Conservation

Preserve and restore natural habitats on campus to support local biodiversity and ecosystem services.

c. Sustainable Procurement

Adopt sustainable procurement policies, giving preference to eco-friendly and locally sourced products.

6. Public Awareness and Capacity Building

a. Climate Change Workshops and Seminars

Organize workshops and seminars to educate students, staff, and the local community about climate change impacts and adaptation strategies.

b. Student-Led Sustainability Initiatives

Encourage student-led sustainability clubs and initiatives that promote awareness and engage in climate change adaptation projects.

c. Community Outreach Programs

Collaborate with local communities to build their capacity in climate change adaptation, supporting resilience-building efforts beyond the university campus.

Section 6. Monitoring and Evaluation

The indicators presented in the Monitoring and Evaluation (M&E) Plan Table 22 align with the principles of addressing the immediate causes of climate change challenges while delivering tangible deliverables resulting from BatStateU project activities. Additionally,

the M&E Plan looks beyond mere outputs to assess the expected changes in behaviors, systems, and policies resulting from the implementation of climate change adaptation initiatives. These aspirational indicators emphasize the institution's focus on sustainability, livelihood improvement, well-being, and overall resilience.

Table 26. Action Output, Outcome, and Impact Indicators

Action	Output	Output Indicator	Outcome	Outcome Indicator	Impact	Impact Indicator
*Address the immediate causes of the core problem	*Deliverables resulting from project activities		*Expected change(s) in behaviors, systems, policies resulting from project outputs and activities		*Aspirational, focusing on sustainability, livelihood, well-being, etc.	

Monitoring and Evaluation (M&E) Plan

Strategy	Indicator	Description of Indication	Target	Manner of Collection	Data Source	Responsible Office	Frequency of Collection	Resourcing needed	Estimated Cost
Climate-Resilient Development									
Incorporate Climate Resilient in Campus Planning	Number of Climate Resilient Initiatives Implemented in Campus Planning.	Measures the number of climate-resilient initiatives and strategies incorporated into the university's campus planning and development projects.	Implement at least 10 climate-resilient initiatives in campus planning by the end of the academic year.	Regular assessments and reviews of ongoing campus planning and development projects. Any new initiatives or modifications made to existing plans in response to climate change will be documented.	Climate adaptation team for data related to resilience enhancement.	SDO, EMU	Annual Reports	Financial, Human Resource	

Climate-resilient Design and Construction	Percentage of climate-resilient infrastructure projects completed.	Measures the extent to which the university's infrastructure is designed and constructed to be energy-efficient and climate-resilient, reducing the institution's carbon footprint and enhancing its resilience to climate change impacts.	Achieve at least 30% reduction in energy consumption from new and retrofitted infrastructure projects compared to a baseline year.	Data collection through project reports and progress updates	Energy meters, sensors, and building management systems installed in the university's infrastructure will provide real-time energy consumption data.	PFMO, EMU	Quarterly Reports, Annual Report	Funding	
Promote Green Infrastructure	Green Infrastructure Implementation Rate	Measures the total area of green spaces (such as parks, gardens, and natural areas) on the university campus.	Increase green space area by 10% compared to the previous year	Quantitative Data Collection through Surveys and Site Visits	The university's Facilities Management office, environmental monitoring teams, and satellite imagery providers. On-site inspections will be conducted by trained personnel, and remote sensing data will be obtained	SDO, PFMO	Quarterly Reports, Annual Report	Personnel, Technology, Financial Resources	

					from reliable satellite imagery sources.				
Climate-Resilient Education and Research	Climate-Resilient Curriculum Development and Research Initiatives	Measures the extent to which the state university has integrated climate-resilient education into its curriculum and academic programs.	100% of academic programs to include climate-resilient content and principles by the end of the academic year.	Periodic assessment of course syllabi and program outlines to identify the inclusion of climate-resilient topics.	Course syllabi, program outlines, and academic documentation.	AA	Quarterly Reports, Annual Report	Personnel, Funding	
Water Management									
Water Conservation and Efficiency	Water Consumption per Capita	Measures the average amount of water consumed per individual within the state university premises over a specific period.	Reduce water consumption per capita by 10% compared to the previous year.	Metering individual water usage within the university campus and recording the data regularly.	Water meters installed throughout the campus.	PFMO	Quarterly Reports, Annual Report	Tools, Equipment, Personnel	
Water Campus Audits	Water Quality Compliance	Assesses the state of water quality in and around the university campus, ensuring that water sources meet or exceed established health and safety standards.	Maintain water quality compliance with all relevant local, regional, and national regulations	Conduct periodic water quality testing at various points on campus, including drinking water sources, ponds, and other water bodies.	Environmental Health and Safety Office or a certified external laboratory.	EMU	Quarterly Reports, Annual Report	Equipment, Personnel	

Education on Water Conservation	Water Consumption per Student	Measures the average water consumption per student within the state university's premises.	Reduce water consumption per student by 10% compared to the previous year.	Meter readings from water supply sources across the campus will be collected regularly.	Relevant authorities responsible for water supply monitoring.	PFMO	Quarterly Reports, Annual Report	Material, Devices	
Agricultural Adaptation									
Climate-Smart Agriculture	Adoption of Climate-Smart Agriculture Practices	Measures the extent to which climate-smart agricultural practices are being adopted by farmers and stakeholders within the state university's agricultural programs	Increase the adoption of climate-smart agriculture practices by 20% within the next academic year.	Collection through surveys and on-field assessments.	Responses gathered from the surveys and interviews conducted with farmers, students, and stakeholders. Additionally, on-field assessments will provide valuable information on the ground-level implementation of climate-smart agriculture practices.	RDES	Quarterly Reports, Annual Report	Human Resources, Technology, Financial Resources	

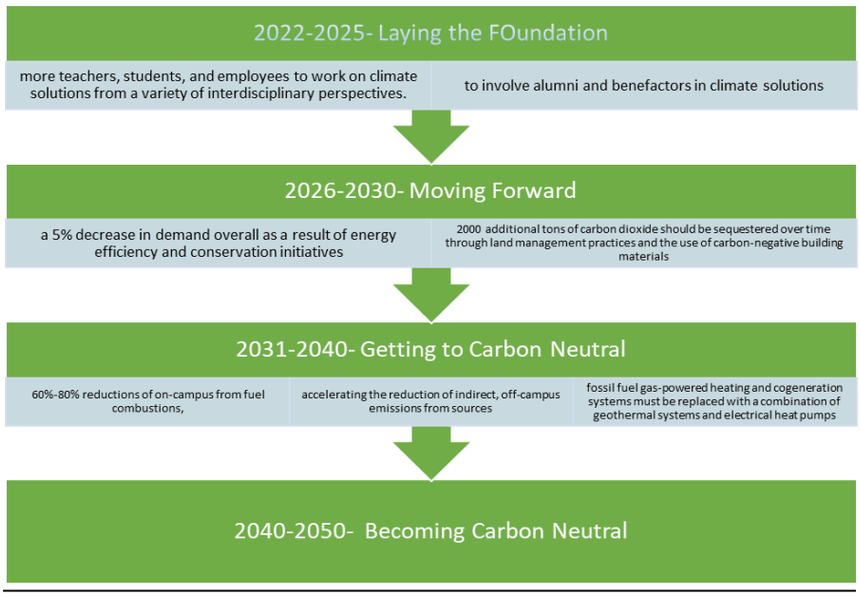
Research and Innovation	Adoption Rate of Climate-Resilient Agricultural Practices	Measures the percentage of farmers or agricultural producers in the state university's region who have adopted climate-resilient agricultural practices.	Achieve a 15% increase in the adoption rate of climate-resilient agricultural practices among farmers in the region within the next two years.	Conduct surveys and field visits to assess and record the implementation of climate-resilient agricultural practices among farmers in the region.	Survey responses from farmers, field assessment reports, and agricultural extension workers' feedback.	RDES	Quarterly Reports, Annual Report	Personnel, Materials	
Demonstrate Farms	Crop Yield Resilience	Ability of agricultural crops to maintain or recover productivity in the face of changing environmental conditions, such as extreme weather events, pests, or climate variations.	Increase crop yield resilience by 10% compared to the previous year's average.	Annual assessment of crop yield data for selected crops across the university's agricultural areas.	University's Agriculture and Crop Research Stations.	EMU	Quarterly Reports, Annual Report	Materials, Equipment, Tools	
Coastal Protection									
Coastal Erosion Monitoring	Coastal Erosion Rate	Measures the gradual loss of land and shoreline due to natural processes or human activities, resulting in the retreat of the coastline.	Reduce rate of coastal erosion to inform coastal management and protection strategies.	Regular field surveys and remote sensing techniques will be used to monitor changes in the coastline over time.	Field surveys conducted by trained personnel and satellite imagery for remote sensing data.	Environmental Science and Coastal Management Unit	Quarterly Reports, Annual Report	Technology and Equipment, Personnel, Financial Resources	

Shoreline Protection	Shoreline Erosion Rate	Measures the rate of shoreline erosion along the university's coastal areas.	Maintain shoreline erosion at a rate below 1 meter per year.	Conduct regular surveys and monitoring using GPS, drones, or satellite imagery to track changes in shoreline positions over time.	Geospatial data collected through surveys and satellite imagery analysis.	Environmental Science and Coastal Management Unit	Quarterly Reports, Annual Report	Personnel, Materials, Equipment	
Public Education on Coastal Resilience	Students participating in coastal resilience workshops and programs.	Measures the engagement of students in workshops and programs focused on coastal resilience, aiming to increase their awareness and understanding of coastal ecosystem protection and climate change adaptation.	Achieve a 20% increase in the number of students participating in coastal resilience workshops and programs within one academic year.	The number of students participating in coastal resilience workshops and programs will be recorded and monitored through attendance registers, sign-up sheets, and online registration platforms.	Workshop and program organizers, registration records, and online platforms where students can sign up for these activities.	AA	Quarterly Reports, Annual Report	Funding, Materials, Personnel	
Environmental Sustainability									
Sustainable Campus Orientation	Sustainability Awareness Index (SAI)	Measures the level of awareness and understanding of sustainable practices among students, faculty, and staff on campus.	Increase the Sustainability Awareness Index by 10% compared to the previous year.	Surveys and Focus Groups	Survey responses and result of focus group discussions.	SDO, Research	Quarterly Reports, Annual Report	Funding, Human Resources, Equipment	

Biodiversity Conservation	Species Richness	Number of different species present in a specific area within the state university campus. It measures the biodiversity and ecological health of the campus environment.	Increase species richness by 10% over the next five years.	Regular biodiversity surveys will be conducted to identify and record different species present on the campus.	Biodiversity surveys conducted	EMU	Quarterly Reports, Annual Report	Personnel, Equipment, Funding	
Sustainable Procurement	Percentage of Sustainable Procurement Practices Implemented	Measures the extent to which sustainable procurement practices are being implemented in the state university's procurement processes.	Achieve 50% sustainable procurement practices by the end of the academic year.	regular monitoring and tracking of procurement activities. Procurement officers will be required to record information on the sustainability aspects of each purchase made by the university.	Procurement records and documentation.	Procurement Office, SDO	Quarterly Reports, Annual Report	Capacity Building, Tools	
Public Awareness and Capacity Building									
Climate Change Workshops and Seminars	Climate Change Awareness	Measures the level of awareness and knowledge of climate change among students, faculty, and staff in the state university.	To achieve a 20% increase in climate change awareness among the university community within one year.	Pre and post-workshop surveys will be conducted to gauge the participants' knowledge and awareness levels before and after	The data will be collected directly from workshop and seminar participants through surveys distributed before and after	Climate Change Research and Education Center	Quarterly Reports, Annual Report	Funding, Human resources, Materials	

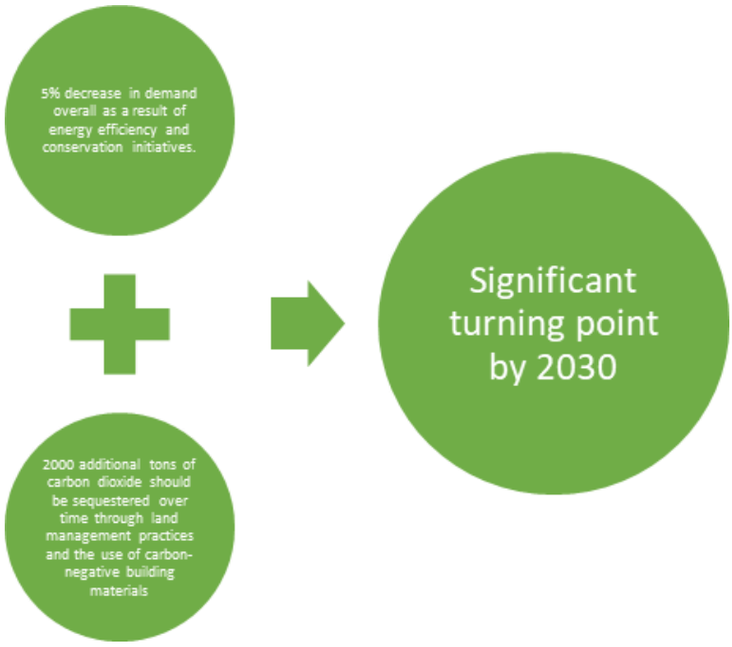
				attending climate change workshops and seminars.	each event.				
Student-Led Sustainability Initiatives	Student-led sustainability projects implemented.	Number of sustainability initiatives or projects that are led and implemented by students within the university.	Increase the number of student-led sustainability projects by 20% compared to the previous academic year.	Regular reporting by student project leaders or sustainability committees. They will submit project details, progress reports, and outcomes.	Reports submitted by student project leaders or sustainability committees.	SDO, Research	Quarterly Reports, Annual Reports	Funding, Materials	
Community Outreach Programs	Number of Outreach programs	Measures the number and effectiveness of community outreach programs conducted by the state university.	Increase the number of community outreach programs by 20% compared to the previous year and achieve a satisfaction rating of at least 80% from the participants.	Data for this indicator will be collected through program reports, surveys, and feedback forms from participants, partner organizations, and community representatives.	Program reports, participant surveys, feedback forms, and records of collaboration with partner organizations will serve as the primary sources of data	RDES	Quarterly Reports, Annual Reports	Personnel, Funding, Technology, Facilities	

III. WAY FORWARD



2022-2025: LAYING THE FOUNDATION

Adopting the objectives outlined in this Climate Action Plan as university-wide priorities will be the first step in establishing Batangas State University as a leading institution promoting Climate Mitigation Plans. A primary priority over the next three years should be on developing the procedures and guidelines that will govern university-wide climate mobilization, most notably by creating a network of Climate Mobilization Task Forces across operational and academic units. The university should put its efforts into expanding and seeding activities that simultaneously address mitigation and adaptation goals while creating chances for teaching, research, and service, as well as on bridging the gap between operational and academic components. Increases in professors, students, and service should be encouraged by the university. The University should encourage more teachers, students, and employees to work on climate solutions from a variety of interdisciplinary perspectives. The University should also endeavor to involve alumni and benefactors in climate solutions. The university's sustainability plan, strategic plan, and budgeting system should all take climate change into account.



2026-2030: MOVING FORWARD

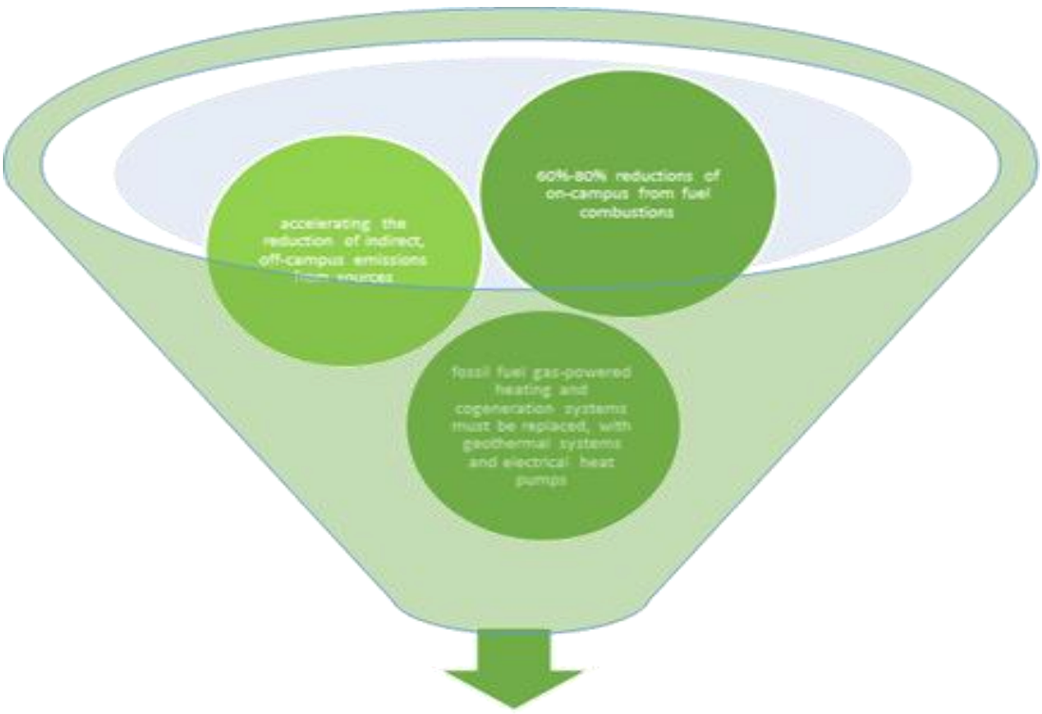
In terms of the proposed climate targets, the year 2030 represents a significant turning point. There should be a 5% decrease in demand overall as a result of energy efficiency and conservation initiatives. A total of 2000 additional tons of carbon dioxide should be sequestered over time through land management practices and the use of carbon-negative building materials. While this amount is small in comparison to the university's overall emissions, it will greatly improve educational and research opportunities and help the university move closer to its long-term goal of net-negative emissions

2031-2040: GETTING TO CARBON NEUTRAL

Batangas State University will need to focus on two major mitigation challenges: 60%-80% reductions of on- campus from fuel combustions, and accelerating the reduction of indirect, off-campus emissions from sources like the supply chain and commuting.

In order to eliminate emissions on campus, fossil fuel gas-powered heating and cogeneration systems must be replaced, probably with a combination of geothermal systems and electrical heat pumps.This is a significant portion of the university's capital expenditures for which the financial advantages do not equal or outweigh the expenses, but we anticipate costs to drop significantly over the next ten years.

Batangas State University should therefore continue to advocate for measures that speed societal emissions reductions and put in place processes that ensure the offsets we employ meet the highest quality standards and maximize their side benefits to residents of Batangas Province.



Getting to Carbon Neutral by 2040

2041-2050: BECOMING CARBON NEUTRAL

It is our hope that by adhering to the course outlined in this climate action plan, Batangas State University would take the lead among universities throughout the world in taking climate action. Not only will Batangas State University make its campuses more resilient and sustainable throughout the decades, but it will also significantly speed up climate action throughout the country and the region. In doing so, Batangas State University will provide a global paradigm for a sizable, public, land-grant university that places addressing the global climate problem at the center of its mission and connects all of our efforts in the service of revolutionary change.

ACKNOWLEDGEMENT

Dear UCCAP Team,

I want to express my heartfelt gratitude for the unwavering commitment and invaluable contributions of the members of the UCCAP Team to the development of our groundbreaking Climate Change Action Plan.

The journey towards creating a sustainable and eco-friendly campus has been nothing short of remarkable, and it wouldn't have been possible without the collective effort and dedication of each and every one of you. Your passion for environmental stewardship and your tireless work have set a shining example for the entire university, and we are immensely proud to have you as part of our team.

Throughout the planning process, we faced numerous challenges and complexities, but your expertise, creativity, and perseverance shone through every step of the way. Your innovative ideas, research, and thoughtful insights have laid the foundation for a comprehensive and impactful Climate Change Action Plan that will not only benefit our university but also inspire other institutions to follow suit.

From the brainstorming sessions to the countless hours of research, from the consultations with various stakeholders to the careful crafting of achievable goals, your contributions have been instrumental in shaping a brighter and more sustainable future for our campus and the wider community.

As we embark on the implementation phase, I have no doubt that everyone's continued support and enthusiasm will play a pivotal role in turning our vision into a tangible reality. Together, we will take significant strides towards reducing our carbon footprint, fostering climate resilience, and creating a positive impact on our environment.

I want to extend my deepest appreciation to each department, faculty member, student representative, administrative staff, and all other stakeholders involved in this endeavor. It is your collective dedication and collaborative spirit that has made this initiative so successful.

Let us all move forward with confidence and determination, knowing that our efforts today will leave a lasting legacy for generations to come. The challenges posed by climate change are daunting, but with a united front, we are bound to achieve remarkable results.

Once again, thank you for your remarkable contributions to our university's Climate Change Action Plan. We are all excited to see the positive transformation that we will accomplish together.

Warmest regards,

Dr. NICKIE BOY A. MANALO

Chairperson, Committee on the Development of UCCAP Batangas State University

UCCAP TASK FORCE

Chairperson :	Dr. Nickie Boy A. Manalo
Members :	Engr. Erwin Rafael D. Cabral Assoc. Prof. Lorenjane E. Balan Dr. Romel U. Briones Engr. Lovely C. Anonuevo Ms. Richelle M. Sulit Dr. Reymark D. Maalihan Dr. Daryl M. Magpantay
Content Contributors :	Dr. Rosenda A. Bronce Mr. Jonas Erik L. Ebora Assoc. Prof. Antonio A. Gamboa Asst. Prof. Jhune Carlo S. Ada Mr. Romeo Ramos Assoc. Prof. Albertson D. Amante Dr. Vaberlie P. Mandane-Garcia
Editor:	Dr. Lorena Mendoza
Support Staff:	Denise Nicole Escarez

BIBLIOGRAPHY

Adam Voiland (2020). An Ash-Damaged Island in the Philippines. Earth Observatory. Retrieved March 23, 2020. Available at: https://earthobservatory.nasa.gov/images/146444/an-ash-damaged-island-in-the-philippines.

Anuar, T. (2010). Photo - Buco, Volcano Island. Sundown. Archived December 14, 2018, at the Wayback Machine, Panoramio.

Batangas.balinkbayan.gov.ph Website (2021). Slope and Topography. https://batangas.balinkbayan.gov.ph/batangas-province/.

Batangas State University Portal (2021). About the Batangas State University Alangilan Campus. Available at: https://batstate-u.edu.ph/campuses/alangilan/.

Batangas State University Portal (2021). About the Batangas State University Balayan Campus. Available at: https://batstate-u.edu.ph/campuses/balayan/.

Batangas State University Portal (2021). About the Batangas State University Lemery Campus. Available at: https://batstate-u.edu.ph/campuses/lemery/.

Batangas State University Portal (2021). About the Batangas State University Lipa Campus. Available at: https://batstate-u.edu.ph/campuses/lipa/.

Batangas State University Portal (2021). About the Batangas State University Lobo Campus. Available at: https://batstate-u.edu.ph/campuses/lobo/.

Batangas State University Portal (2021). About the Batangas State University 550 JPLPC-Malvar Campus. Available at: https://batstate-u.edu.ph/campuses/malvar/.

Batangas State University Portal (2021). About the Batangas State University ARASOF-Nasugbu Campus. Available at: https://batstate-u.edu.ph/campuses/nasugbu/.

Batangas State University Portal (2021). About the Batangas State University Pablo Borbon Campus. Available at: https://batstate-u.edu.ph/campuses/pablo-borbon/.

Batangas State University Portal (2021). About the Batangas State University Rosario Campus. Available at: https://batstate-u.edu.ph/campuses/rosario/.

Batangas State University Portal (2021). About the Batangas State University San Juan Campus. Available at: https://batstate-u.edu.ph/campuses/san-juan/.

Batangas State University Portal (2021). About the Batangas State University Mabini Campus. Available at: https://batstate-u.edu.ph/campuses/mabini/.

Church, J.A., P.U. Clark, A. Cazenave, J.M. Gregory, S. Jevrejeva, A. Levermann, M.A. Merrifield, G.A. Milne, R.S. Nerem, P.D. Nunn, A.J. Payne, W.T. Pfeffer, D. Stammer and A.S. Unnikrishnan, 2013: Sea Level Change. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Intergovernmental Panel on Climate Change (IPCC). (2021). Climate change 2021: The physical science basis. Contribution of working group I to the sixth assessment report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., Zhai, P, Pirani, A., Connors, S. L., Péan, C., Berger, S., Caud, N., Chen, Y., Goldfarb, L., Gomis, M. I., Huang, M., Leitzell, K., Lonnoy, E., Matthews, J. B. R., Maycock, T. K., Waterfield, T., Yelekçi, O., Yu, R.,& Zhou, B. (eds.)]. Cambridge University Press. In Press. https://www.ipcc.ch/report/ar6/wg1/

Phivolcs.dost.gov.ph Website (2021). Primer on the April 2017 Series of Earthquakes in Batangas Province. Available at: https://www.phivolcs.dost.gov.ph/index.php?option=com_content&view=article&id=628%3Amayon-volcano-bulletin-17-february-2011-800-am&Itemid=40.

Phivolcs.dost.gov.ph Website (2020) Taal Volcano Bulletin: 03 December 2020 08:00 A.M. Available at: https://www.phivolcs.dost.gov.ph/index.php/taal-volcano-bulletin-menu/10943-taal-volcano-bulletin-03-december-2020-08-00-a-m.

Provincial Government of Batangas Website (2011). The Province Map. Wayback Machine.

Scientific Expert Group on Climate Change (SEG), 2007: Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable.[Rosina M. Bierbaum, John P. Holdren, Michael C. MacCracken, Richard H. Moss, and Peter H. Raven (eds.)]. Report prepared for the United Nations Commission on Sustainable Development. Sigma Xi, Research Triangle Park, NC, and the United NationsFoundation, Washington, DC, 144 pp. Accessed:https://www.researchgate.net/publication/264083453_Confronting_Climate_Change_Avoiding_the_Unmanageable_and_Managing_