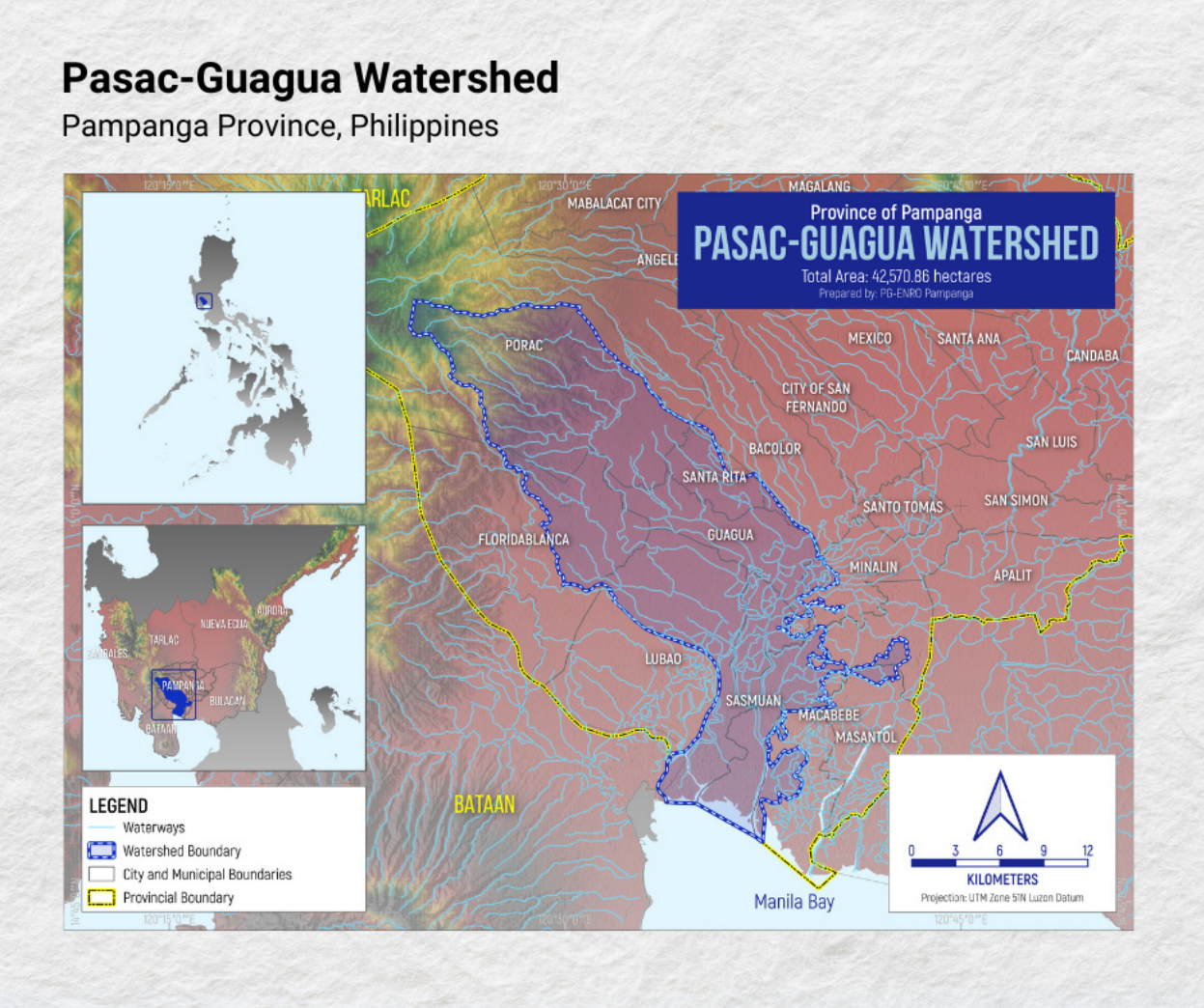
The GEF/UNDP/ASEAN Project on Reducing Pollution and Preserving Environmental Flows in the East Asian Seas through the Implementation of Integrated River Basin Management (IRBM) in the ASEAN Countries

Pasac-Guagua Watershed

A Sanctuary for Wildlife and People

Located in the central region of northern Philippines, the Pasac -Guagua Watershed is a critical source of water and livelihood that supports, at least, 10 municipalities (Bacolor, Floridablanca, Guagua, Lubao, Macabebe, Masantol, Minalin, Porac, Santa Rita and Sasmuan) with approximately 888,560[1] population, over 566,576 live along 152 villages within the watershed. It is one of the major river systems that drain to Manila Bay, considered as the main harbor of the country that is connected to a larger marine ecosystem, that is the South China Sea.



Map generated and developed by the Province of Pampanga.

The Pasac-Guagua Watershed stretches 80.61 kilometers[2] down to its main basin outlet in Manila Bay. Aside from providing livelihood and water supply, the river is also a channel of transportation for the locals.

[1] Philippine Statistics Authority 2020 Census
[2] Estimated from the delineated boundaries of Pasac-Guagua Watershed for the preparation of State of River Basin report

In fact, in the municipality of Guagua, it is still considered as one of the faster and cheaper ways to reach isolated villages through wooden or motorized bancas. During the school year, students from far-flung communities who attend school in the town proper are paying only PhP 5-10[3] per trip.

Local fishers rely on the aquatic resources of Pasac-Guagua Watershed and Manila Bay for their livelihood.

In Guagua, wooden banca is a cheaper option for students to go to school and to return home.

A wildlife refuge and haven

The Pasac-Guagua Watershed has a total of 78.75 hectares of mangrove forest cover located in the municipalities of Lubao, Sasmuan and Macabebe. And nestled in the downstream of Pasac-Guagua Watershed is the Sasmuan Bangkung Malapad Critical Habitat and Ecotourism Area (SBMCHEA), part of the larger Sasmuan Pampanga Coastal Wetlands (SPCW), a recognized Ramsar Site or Wetland of International Importance.

[3] USD 1=PhP 56.36 using September 10, 2024 exchange rate

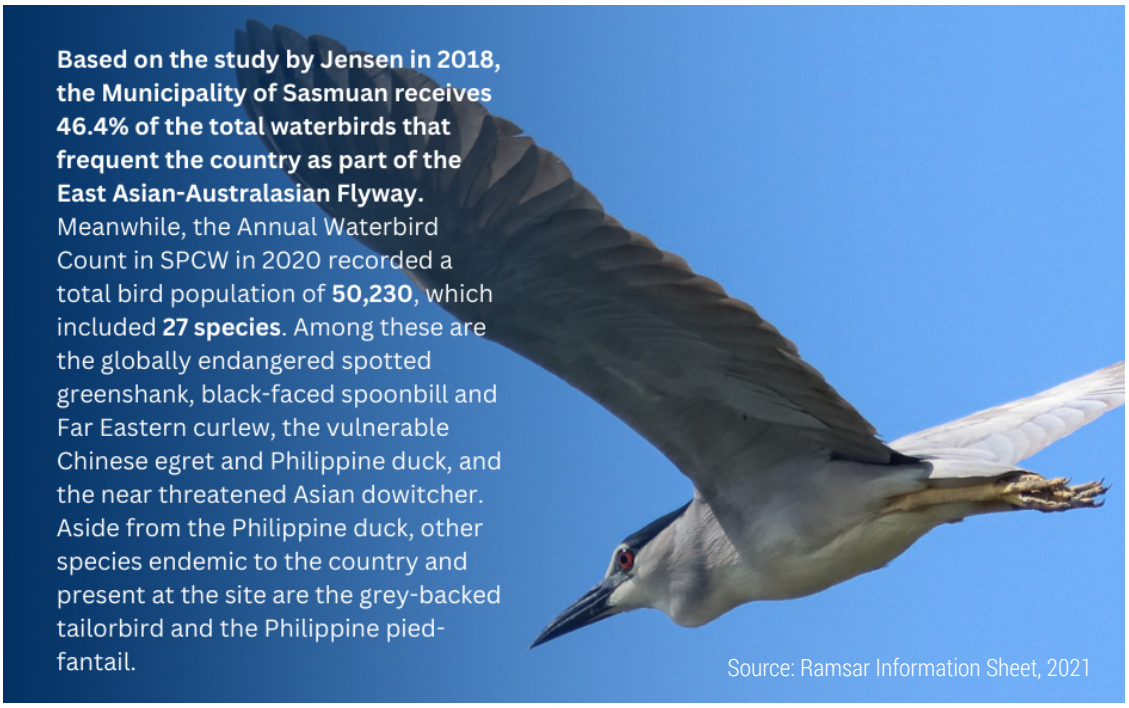
The Sasmuan Bangkung Malapad Critical Habitat and Ecotourism Area has become a haven for tourists and migratory birds and other marine animals.

This wetland area, the 8th Ramsar Site in the country includes mudflats, mangroves and riverine habitats that serve as an important stopover points for migratory waterbirds on the East Asian Australasian Flyway[4].

Waterbirds are residents in the vicinity of Pasac-Guagua Watershed, being part of an important wetland area recognized internationally. (Photos by Irene Marie Villar/Pampanga PGENRO)

[4] https://rsis.ramsar.org/ris/2445

According to Ms. Irene Marie Villar, Assistant Department Head of Provincial Government Environment and Natural Resources Office (PGENRO) of Pampanga, the formation of SBMCHEA was first observed after the eruption of Mt. Pinatubo. The lahar sediments settled in the area while there were mangrove propagules from nearby mangrove forests that started growing from the year 2010. The SBMCHEA is approximately 14 hectares of patches of mangrove forest, with at least nine (9) recorded species of mangroves, according to the 2017 Mangrove Assessment of the Department of Environment and Natural Resources (DENR) Office – Pampanga.



Five coastal villages in the Municipality of Sasmuan rely on SBMCHEA for coastal protection against flood and storm surge. According to the locals, fish catch has increased since the mangroves have grown and protected the area.

The mangrove boardwalk leading to the outpost in Sasmuan Bangkung Malapad Critical Habitat and Ecotourism Area.

In the Municipality of Lubao, the local government established the Bamboo Hub and Eco-Park along the riverbanks that serves not only as a local tourist destination but a mitigating measure against soil erosion. The mature bamboo also offers alternative lumber and a source of income for the locals to be sold commercially in the market.

Aside from providing protection against soil erosion, the Lubao Bamboo Hub and Eco-Park also employs locals and contributes to local tourism in Pampanga Province.

Bamboo along the riverbanks are harvested as an alternative source of lumber for construction and furniture.

Addressing threats in the watershed

Among the identified issues in the watershed were conflicting and competing water uses for available freshwater and impairment of environment flows that can lead to biodiversity degradation and loss, as well as increased susceptibility to climate related impacts. To address these, the Province aims to advance sustainable forestry, fisheries, and aquaculture.

There are dredging stations along the 80.61-kilometer stretch of the Pasac-Guagua Watershed to regularly manage the sediments/lahar from the upstream.

Lahar is one of the identified threats in the SPCW, located downstream of Pasac-Guagua Watershed, according to its management plan. The municipalities of Lubao, Guagua, and Sasmuan are located downstream and are thus affected by lahar sediments from the Pinatubo eruption.

"The lahar deposits from nearby upstream towns, following the Mt. Pinatubo eruption has contributed to the siltation of rivers. The degradation of coastal ecosystems due to siltation could result in reduced fish populations, thereby affecting fisherfolks' fish catch and income. Additionally, the altered river flow due to siltation can lead to an increased vulnerability to flooding, which damages fishing equipment, homes, and coastal infrastructure, further threatening their livelihood," said Ms. Villar of Pampanga PGENRO.

Pampanga Province also heavily relies on groundwater for domestic and industrial use. Coastal municipalities in the province, including Macabebe, have been reportedly affected by seawater intrusion from Manila Bay based on the initial survey conducted by DENR-Mines and Geosciences Bureau, which was supported by a study to determine the possible origin/sources of salinity in the groundwater samples taken from the province.

At a Glance

Pasac-Guagua Watershed

Ten municipalities in the province of Pampanga are located partially within this watershed, namely, Bacolor, Floridablanca, Guagua, Lubao, Macabebe, Masantol, Minalin, Porac, Santa Rita and Sasmuan, which covers **42,570.86 hectares**

The watershed supports over **566,576 people** (as of 2020).

29% of the watershed is designated for aquaculture. Its total aquaculture production reached **221,740.44 MT** in 2023.

42% or over **18,000 hectares** of the watershed is allocated for agricultural use and land cultivation

Most common source of water in the area is **groundwater** which is supplied by artesian wells and deep wells

87% of households have access to the solid waste collection service.

One of the major river systems that drain to **Manila Bay**, considered as the main harbor of the country that is connected to a larger marine ecosystem, that is the South China Sea.

The Sasmuan Bangkung Malapad Critical Habitat and Ecotourism Area (SBMCHEA), part of the larger Sasmuan Pampanga Coastal Wetlands, is a recognized Ramsar Site or Wetland of International Importance which serve as an important stopover points for migratory waterbirds.

The watershed covers an estimated **78.75 hectares** of mangrove area in the municipalities of Lubao, Sasmuan and Macabebe act as buffer zone against typhoon and tidal waves, prevent soil erosion and serve as land builders through soil accretion.

12,940.29 MT of freshwater fish produced in 2023

2,888.05 MT of crustaceans produced in 2023

27 species of birds recorded in 2020

Houses including stilts are common sights along the coastal villages in Sasmuan.

Wastes from domestic sources including untreated sewage discharge from heavily populated areas also contribute to the decline of water quality of Pasac-Guagua Watershed. There is no existing sewage treatment plant in the watershed while most of the local governments within the watershed dispose their solid wastes in the Metro Clark Sanitary Landfill located in Tarlac City.

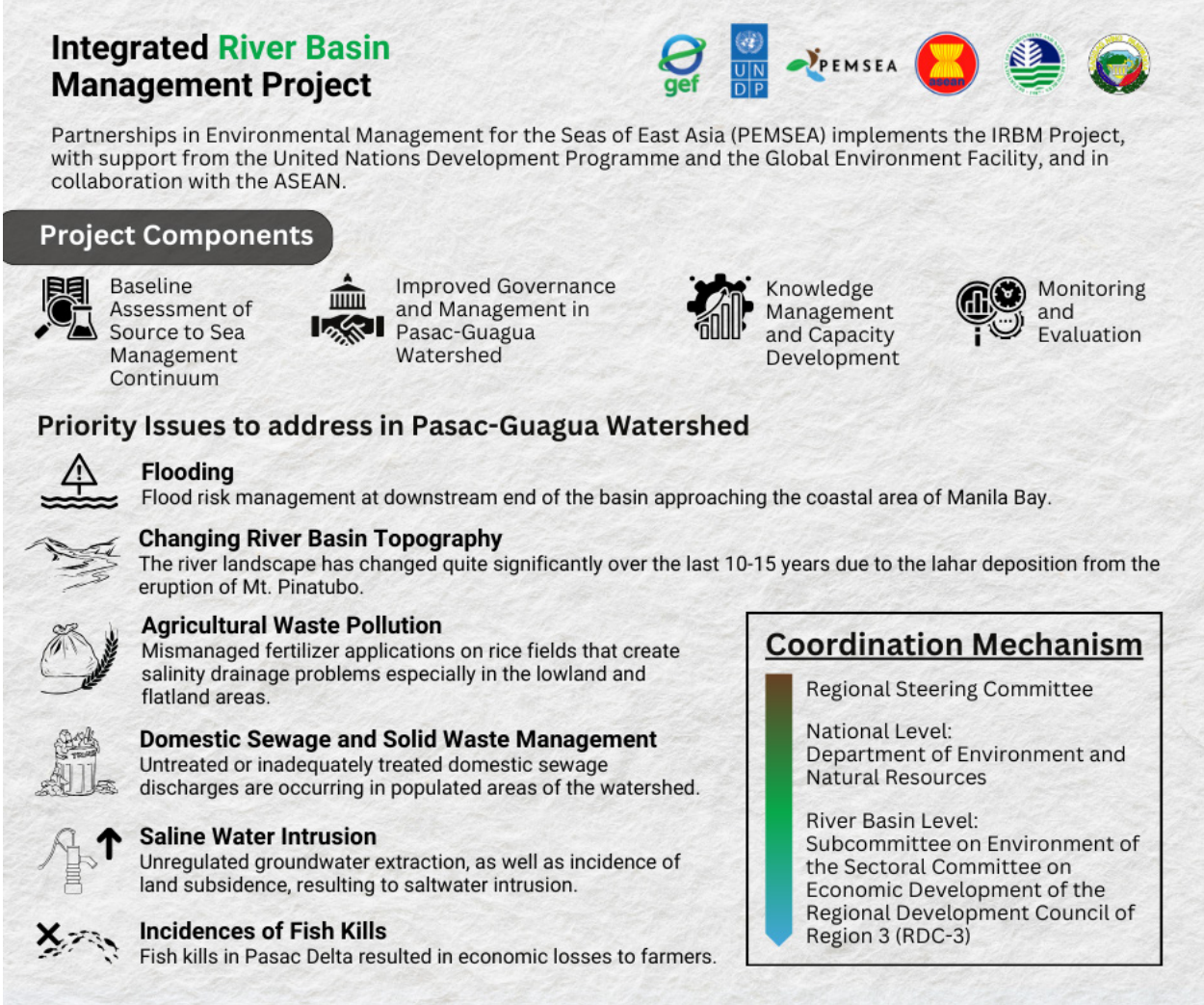
The water quality of Pasac-Guagua Watershed is also heavily impacted by aquaculture.

In heavily populated areas, wastes from domestic and industrial sources contribute to the decreasing water quality of the river.

In 2010, 3,200 hectares of fishponds were constructed along the riverbanks, where tilapia, shrimps, and milkfish are cultivated. There have been incidences of fishkills in the area, which negatively affected the livelihood of local communities.

The pollutants and other issues affecting the water quality of the Pasac-Guagua Watershed have adverse impacts to Manila Bay, which connects to the South China Sea – an important marine ecoregion and a major fishing ground and global shipping route. This connectivity emphasizes the importance of addressing the management concerns of the watershed within the source-to-sea framework, as espoused by the IRBM Project.

The Integrated River Basin Management (IRBM) Project aims to strengthen the existing governance mechanism of the Pasac-Guagua Watershed under the auspices of the Subcommittee on Environment of the Sectoral Committee on Economic Development of the Regional Development Council of Region 3 (RDC-3).The subcommittee serves as venue for discussion and resolution of issues, review and validation of outputs of the plans and projects related to Region 3's environment in general, and the Pampanga River Basin in particular, which include Pasac-Guagua Watershed.



Through the IRBM Project, the awareness and understanding of the land-to-sea ecosystem linkages will be enhanced, putting emphasis on the impacts of watershed-based activities to the coastal waters of Manila Bay. The Project will also promote partnerships between government, businesses, and communities through a participatory process, and facilitate knowledge sharing to ensure the successful transfer of best practices, technologies, and skills among the ASEAN Member States.

Beneath the green waters of the Pasac-Guagua Watershed is a thriving aquatic ecosystem that provides food and livelihood for the people in Pampanga and its nearby provinces. On the sideline, the tall bamboos and lush mangroves provide shade and protection for communities, as well as home for different wildlife. With a more robust governance mechanism in place, a healthy source-to-sea connection will weave through the river, coastal waters, and their communities.

VOICES ON THE GROUND

A Fisherman's Dream

The mid-day sun was shining over a small banca passing through the Pasac-Guagua Watershed. In the surroundings, one could hear the engine slowly fading as it stopped in the riverbanks. An old man secured his banca and his catch of the day in a small fishing box before disembarking at a station. The signage says "DELTAnim." His name is Edgardo Tungcab, 62, one of the local fishers who work at the DELTAnim, a mangrove nursery along the Pasac-Guagua Watershed in the Municipality of Sasmuan in Pampanga Province, Philippines.

The Pasac-Guagua Watershed is a biodiversity haven for migratory birds and mangrove forest, and a critical source of water and livelihood that supports at least 10 municipalities in the Pampanga Province including Sasmuan. It is one of the major river systems that drain to Manila Bay, which is connected to a larger marine ecosystem, that is the South China Sea.

"DELTAnim is a mangrove nursery project that the Provincial Government Environment and Natural Resources Office (PGENRO) of Pampanga started during the pandemic. It intends to help local fishers who have been displaced from their livelihood during community lockdowns,"

Ms. Irene Marie Villar
Assistant Department Head of PGENRO

Starting in 2021, the Provincial Government entered into an agreement with a local federation of fisherfolks to establish and maintain a mangrove nursery, and used its local development and the disaster risk reduction and management funds to jumpstart the initiative. Starting with 5,000 propagules, a total of 30,000 mangrove propagules of various species are now being raised in the nursery. This initiative has paved the way for regular mangrove planting efforts of the province along the riverbanks of Pasac-Guagua Watershed down to the Manila Bay outlet. They engage other national government agencies, law enforcements, and even the private sector in their mangrove reforestation projects. While the mangrove nursery is housed in Sasmuan, they also distribute propagules to other local governments in Pampanga.

The cash for work program of the Department of Social Welfare and Development complements the existing agreement between the Provincial Government and the fisherfolks' association by allowing 70 fishers from from seven coastal villages to work on rotational basis so that they can earn an extra PhP 430 per day[5] when they perform duties at the nursery.

[5] USD 7.63 using September 10, 2024 exchange rate (USD 1=PhP 56.36)

That day, it was Edgardo's duty along with three others. It is important for him to earn extra money to support his daughter's college education. On a normal day with a good harvest, he can earn 400 to 500 pesos. His wife will sell the fish to the market and the earnings will be divided to buy food, school expenses, and a half gallon of fuel to go fishing the following day. By nighttime, it will leave him and his wife with empty pockets again.

***"Kapag may bagyo, walang huli. Sa paglipas ng panahon, mas nababawasan na rin ang nahuhuli naming isda. Kapag walang huli, wala ring pambiling pagkain para sa pamilya. Walang pambili ng krudo kaya nangungutang na lang.* (Whenever there is typhoon, we can't fish. As the years passed by, our harvest decreased. If we don't have any harvest, we can't buy food for our family. We can't buy fuel, and so, we just borrow money.)"**

Mr. Edgardo Tungcab
Fisherfolk, Sasmuan Municipality, Pampanga

According to Edgardo, the river was deeper and wider a few decades ago, before the Mt. Pinatubo eruption. Today, it is shallower and narrower, which potentially affects not only the volume of their harvest but also the kind of fish that they can catch from the river. He said that high commercial valued fish such as groupers, rabbitfish (*samaral*), and silver perch (*ayungin*) are abundant in the area, particularly in the downstream near Manila Bay. Today, the common harvests are only milkfish and *bidbid* (lady fish).

There are days when Edgardo will catch not fish but trash floating on the watershed or trapped along the riverbanks and mangroves. He will recover the trash and carefully inspect if it is something he can sell to the junkshop. He will save what little amount of money he would earn from it, and by the month end, he will use it to pay for their utilities.

Asked about his dream as a local fisher who has been living with his boat and fishing nets for more than half of his life, Edgardo had only one answer: to see his daughter get a college diploma. And he will fish every day no matter the weather, and work at the nursery every call of duty, to fulfill his dream for his family.

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For more information on the project, please visit
www.pemsea.org

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