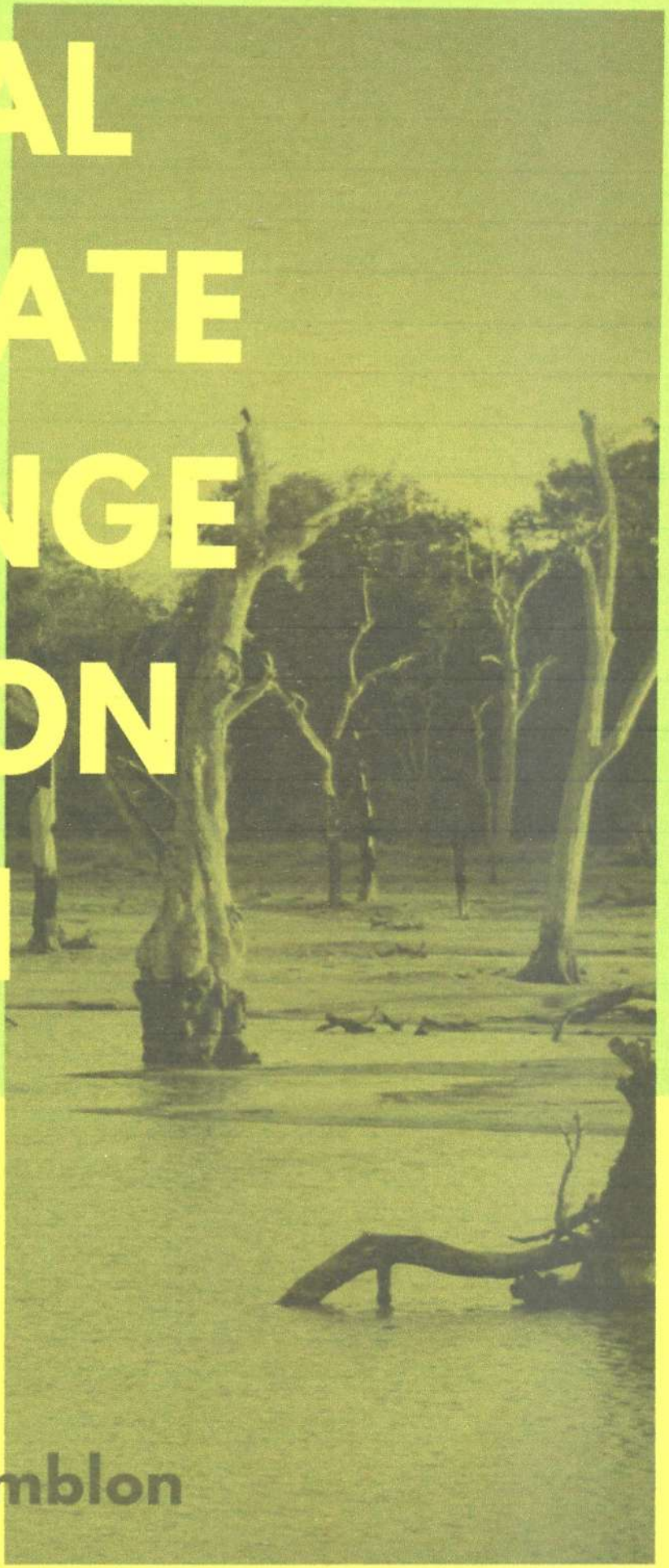
LOCAL CLIMATE CHANGE ACTION PLAN



BUNTAY SANTA FE, LALAWIGAN NG ROMBLON • 1946 •

2019-2024
Santa Fe, Romblon

Republic of the Philippines

OFFICE OF THE MUNICIPAL MAYOR

March 05, 2020

HON. EMMANUEL DE GUZMAN
Secretary/ Commissioner
National Climate Change Commission
6th Floor, First Residence Building
J.P. Laurel Street, Malacañang Complex
San Miguel, Manila

Subject : *Transmittal Re Submission of LCCAP Hard Copy*

Dear Hon. De Guzman;

Greetings of peace and goodwill.

The Local Government Unit of Santa Fe is respectfully submitting the Local Climate Change Action Plan (LCCAP) for review and approval of the commission.

Please acknowledge receipt hereof.

Thank you and more power.

Very truly yours,

ELSIE D. VISCA
Municipal Mayor

CLIMATE CHANGE COMMISSION
RECORDS SECTION
RECEIVED
DATE: 5 MAR 2020 Time: 9:09
RECEIVED BY: JCM

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LIST OF ACRONYMS

CBMS – Community Based Monitoring System
CC – Climate Change
CCA – Climate Change Adaptation
CCC – Climate Change Commission
CCVA-Climate Change Vulnerability Assessment
CDP – Comprehensive Development Plan
CDRA-Climate and Disaster Risk Assessment
CHE-College of Human Ecology
CLUP – Comprehensive Land Use Plan
CRM – Coastal Resource Management
DA – Department of Agriculture
DCERP-Department of Community and Environmental Resource Planning
DENR – Department of Environmental and Natural Resources
DepEd – Department of Education
DILG – Department of Interior and Local Government
DJF- December, January, February
DOST – Department of Science and Technology
DPWH – Department of Public Works and Highways
DRR – Disaster Risk Reduction
DRRM – Disaster Risk Reduction and Management
ENSO – El Nino Southern Oscillation
EWS – Early Warning System
GHG – Greenhouse Gases
HLURB – Housing and Land Use Regulatory Board
HUDCC – Housing and Urban Development Coordinating Council
IEC – Information and Education Campaign
JJA- June, July, August
LCCAP – Local Climate Change Action Plan
LCE – Local Chief Executive
LDC – Local Development Council
MAM- March, April, May
MDRRMO-Municipal Disaster Risk Reduction and Management Office
MENRO – Municipal Environment and Natural Resources Office
MEO-Municipal Engineering Office
MGB – Mines and Geosciences Bureau
MHO-Municipal Health Office
MOA – Memorandum of Agreement
MOU – Memorandum of Understanding
MPDO-Municipal Planning and Development Office
NAMRIA – National Mapping and Resource Information Authority
NEDA-National Economic and Development Authority
NCCAP – National Climate Change Action Plan
NFSCC- National Framework Strategy for Climate Change
PDP – Philippine Development Plan
RHU- Rural Health Unit
RPS – Rationalized Planning System
RV-Relative Vulnerability

SB-Sangguniang Bayan
SEPP- Socio-Economic and Physical Profile
SON- September, October, November
UPLB-University of the Philippines Los Baños
VAA – Vulnerability Adaptation Assessment

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CHAPTER I. BACKGROUND AND RATIONALE

1.1. Rationale of the Plan

The formulation of the Local Climate Change Action Plan (LCCAP) is essential to address and apprehend the impacts of climate change in the Municipality of Santa Fe. Primarily, the municipality is afflicted by hydro-meteorological hazards, specifically, typhoons. In the previous years, it has been apparent that typhoons cause major damage to the development sectors, namely: economic, social, environmental, infrastructure and institutional. Furthermore, these typhoons trigger other hazards like rain-induced landslide and flooding which also pose a great threat and risk to the municipality.

In response to the impacts of climate change and in accordance to RA 9729 or the Climate Change Act of 2009, the Municipality of Santa Fe is formulating its LCCAP for the adaptation and mitigation of the development sectors with regards to climate change and its adverse effects. Generally, this plan is inclined in the guiding principles of National Climate Change Action Plan (NCCAP) and National Framework Strategy for Climate Change (NFSCC). Through the extensive assessment of the climate information, vulnerabilities and threat level of different sectors, the LCCAP will be initiated and anchored. This will also provide information on future occurrence of these hazards. As the main objective of the LCCAP, the occurrence of these hazards will be impeded by mitigating strategies in the form of programs, policies and activities.

The formulation of the LCCAP entails a multi-sectoral assessment which obliges the involvement of different offices of the municipality. This is spearheaded by the Municipal Disaster Risk Reduction Management Office (MDRRMO) in cooperation with the Municipal Planning and Development Office (MPDO) through the assistance of TAP-HSP from the Department of Community and Environmental Resource Planning (DCERP) in the University of the Philippines-Los Baños (UPLB).

1.1.1. Legal Mandates

In response to the urgency for action on climate change, the Philippines passed Republic Act 9729, also known as the Climate Change Act of 2009, anchored on the constitutional provision which states that "it is the policy of the State to afford full protection and the advancement of the right of the people to a balanced and healthful ecology to fulfill human needs while maintaining the quality of the natural environment for current and future generations." Further the said provision also provides among others the following stipulations:

- Establishment of a Climate Change Commission (CCC), an independent and autonomous body that has the same status as that of a national government agency. The CCC is under the Office of the President and is the "sole policy-making body of the government which shall be tasked to coordinate, monitor and evaluate the programs and action plans of the government relating to climate change pursuant to the provisions of this Act."

- The Commission shall be composed of the President of the Republic of the Philippines who shall serve as the Chairman, and three (3) Commissioners to be appointed by the President, one of whom shall serve as the Vice Chairperson of the Commission.

- The LGUs as frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas, shall formulate their Local Climate Change Action Plan, consistent with the provisions of the Local Government Code, the Framework, and the National Climate Change Action Plan.

- Inter-local government unit collaboration shall be maximized in the conduct of climate- related activities.

1.1.2. The National Climate Change Action Plan (NCCAP) as cornerstone of the Local Climate Change Action Plan (LCCAP)

The Municipality of Santa Fe Local Climate Change Action Plan (LCCAP) 2018-2023 is paralleled to the formulation of the National Climate Change Action Plan (NCCAP) in response to climate change adaptation and mitigation on the national and local scale. Apprehended by an inclusive approach, NCCAP is initiated through multi-sectoral and multi-stakeholder analysis to gather and assess relevant data and to bridge gaps concerning climate change. Simultaneously, the plan will entail engagement of the public and private sectors to optimize opportunities towards sustainable development and to provide a precise analysis and needs assessment on both sectors. Furthermore, this process will also give a clearer outlook of the vulnerable sectors, specifically, the marginalized and deprived. In line with this, public funding will be very crucial for the formulation and implementation of the LCCAP because the reduction and mitigation of vulnerabilities and threat level of the municipality is dependent on the provision of resources. Ultimately, the LCCAP aims to make every sector resilient to climate change, build the adaptive capacities of men and women, and optimize mitigation measures towards sustainable development.

Thus, the Santa Fe Local Climate Change Action Plan (LCCAP) 2018-2023 will translate climate change adaptation and mitigation measures into programs, projects and activities (PPAs) which will aid the amplification of adaptive capacities and resiliency of different sectors in the municipality. This will also serve as a guideline to achieve sustainable development goals, specifically, Goal 13: Climate Action or to take urgent action to combat climate change and its impacts.

Through the influence given by the framework laid by the NCCAP, the Local Climate Change Action Plan of the Municipality of Santa Fe is governed by the following principles:

1. **Food Security** - The objective of the national strategic priority on food security is to ensure availability, stability, accessibility, and affordability of safe and healthy food amidst climate change.

2. **Water Sufficiency** - In light of climate change, however, a comprehensive review and subsequent restructuring of the entire water sector governance is required. It is important as well to assess the resilience of major water resources and infrastructures, manage supply and demand, manage water quality, and promote conservation.

3. **Environmental and Ecological Stability** - Ecosystem resilience and environmental stability during the plan period is focused on achieving one immediate outcome: the protection and rehabilitation of critical ecosystems, and the restoration of ecological services.

4. **Human Security** - The objective of the human security agenda is to reduce the risks of women and men to climate change and disasters.

5. **Climate-Friendly Industries and Services** - NCCAP prioritizes the creation of green and eco-jobs and sustainable consumption and production. It also focuses on the development of sustainable cities and municipalities.

6. **Sustainable Energy** - NCCAP prioritizes the promotion and expansion of energy efficiency and conservation; the development of sustainable and renewable energy; environmentally sustainable transport; and climate-proofing and rehabilitation of energy systems infrastructures.

7. **Knowledge and Capacity Development** - The priorities of the NCCAP on knowledge and capacity development are:
    a. Enhanced knowledge on the science of climate changes;
    b. Enhanced capacity for climate change adaptation, mitigation and disaster risk reduction at the local and community level; and
    c. Established gendered climate change knowledge management accessible to all sectors at the national and local levels

1.2. BRIEF PROFILE OF THE MUNICIPALITY

1.2.1. HISTORICAL BACKGROUND

Prior to the Spanish occupation, the Municipality of Santa Fe is believed to be inhabited by negritos or aetas, which are locally known as “ati” or “agta”, through a land bridge during the Paleolithic era. The aetas were then followed by the Malays on the twelfth century which is assumed to be the origin of the ethnicity and genetic make-up of the majority in this municipality. Conversely, the Spanish occupation has no written record of the municipality because of its small population during the time of Don Miguel Lopez de Legazpi.

However, the first written history of Osigan, also known as Tablas Island today, was found in the year 1570 through the exploration of Martin de Goiti still under the administration of Don Miguel Lopez de Legazpi. According to de Goiti, there is an existing population of around 250 in the island which source of livelihood is through gathering wax, almacega, domesticating animals and farming. The presence of native pintados was also observed throughout the reconnaissance. On the other hand, the visitation of Don Miguel Lopez de Loarca, a Spanish census officer, confirmed that the natives of the island were converted to Christianity. The name Tablas was coined through an incident involving Loarca’s men and some natives. The natives were asked; “Como se llama estesitio?” (What is the name of this place?), but they did not understand the question. However, Loarca’s men saw a native with a finger pointed to a pile of lumber, which is also known as Tablas in Spanish. From then on, the island was called Tablas. It was on the arrival of Father Pedro Cubero Sebastian, a Spanish missionary and explorer, when the first depiction of Santa Fe was recorded. Father Sebastian interpreted Santa Fe as a terrain of rolling hills and the island’s lowest elevation.

The Panay Visayans are believed to reside on the island of Tablas prior to the foundation of early settlements. Majority of these people were presumed to be renegades, therefore they preferred to be itinerant than to settle in a community. Collectively, it is believed that the island of Tablas is inhabited by Negritos, Mangyans and Panay Visayans, from the northern region of Andagao (now Caltarava) to the southern seacost of Sitio Cabalian in Santa Fe, on its precedent.

The dictatorship and oppression of the Spanish Colonization was agonizing and cruel. It had driven the ill-treated and persecuted Filipino people to run away and migrate to mountains. These people were called “boyong” or outlaws. In several cases, these outlaws fled to different islands in search for independence. Many of the boyong settled in Tablas Island. At around 1620, Francisco Geguillan, a boyong from Antique, escaped from the Spanish government through “baroto” crossing the precarious Tablas Strait. Later that evening, Geguillan wafted ashore on what is now called Barangay Poblacion. He called the place Catolog, which means the place where he slept. Then, Geguillan met some agta who he was acquainted fom Dalanas in Antique. These agta assisted him on building his house and making kaingin on his land for farming rice, corn, camote and vegetable. After the harvest, Geguillan came back to Antique and took his family with him and returned to his new-found home in Catolog.

Subsequently, three unknown fishermen from Panay (now Aklan) were brought by massive waves caused by typhoon. They discovered the productive and immense plains of Catolog with few of its hospitable residents. The fishermen seized the opportunity of nurturing a family on that paradise. Right there and then, these fishermen brought their respective families and started a life in the progressing village of Catolog. Kapitan Andong and Kapitana Embay were among the migrants. The couple used to occupy a large area of land on what is now called Barangay Pandan. Kapitana Embay took off to Antique to fetch Osfia and Rita Visca with their families and made them their tenants.

The Moro piracy had been a pressing issue on the precedent of Santa Fe. This practice forced the residents to resettle on the interior of Catolog (presently Barangay Magsaysay). Little did they know that a tribe of ati was living in Sitio Layog. Thereafter, the tribe was forced to relocate to the core of Tablas and reside at Barangay Patoo in Odiongan.

On the 31st of May 1837, Capiz was declared a province by the Spanish government, making Romblon part of its territory. Capiz was governed by a “politico military commandante”. In this era, education is compulsory for children. The school taught the children to read the cartilla. Conversely, the adults were compelled to work for

the government without rational compensation and to pay taxes regardless. On that same year, Ignacio Patino was proclaimed the leader of the settlement of Catolog while in 1842; Guinbirayan was established by Pedro Ganoria.

Myths are believed to be the reason for the present name of the municipality. It was adapted from a lady named Fe, an exquisite daughter from the early settlers of Catolog. This lady is comparable to "Maria Clara", a fictional character from a novel written by Jose Rizal. However, Fe was tormented by an unknown and incurable disease which caused her ghastly and untimely death. In memory of her, the people renamed the place Fe which later on became Santa Fe because of her honored disposition. On 1876, Santa Fe developed into a municipality. Under the Spanish government, a municipality is spear-headed by a governadorcillo. Macario Antaran was the first governadorcillo of the Municipality of Santa Fe.

In 1886, the Spanish provincial governments were amended. The executive powers were given and appointed to governors. Don Jose Fernandez de Teran was the first appointed governor of Capiz. Catolog was made a barrio during the "tiempo in Teran". A cabeza del barrio was appointed to lead Catolog. Governon Teran declared the coastal part of Catolog as Santa Fe while the inner area of the barrio retained its name, which was later called as Barangay Magsaysay. In addition, the governor designated the family names of the residents. He imposed the planting of additional crops for local consumption and for trade. Rice, corn, domestic animals, cattle and even parcels of land are transacted during barter, hence, making some migrant owners on Santa Fe and Catolog.

In 1898, after the Spanish forces were defeated in the war against Filipino and American soldiers, the pueblos and barrios were deserted. The people on the mountains returned to their respective homes and farms. Despite trounce, some of the Spanish nationals dwelled in the Philippines and married Filipino women; Lucas Carralero, Domingo Lopez, Joaquin Villar and Francisco Casas were among them. These people settled in Santa Fe and considered business, specifically cattle ranch, as a source of living. Carralero built a cattle ranch in Barangay Agmanic, Lopez at Barangay Mat-I, Villar in Campong and Canyayo, and Casas at Guinda, Barangay Pandan and Barangay Catolog,

particularly, Palate, Layug and Maambong. People labelled Santa Fe as "The Little Spanish Town" afterwards.

The American government persuaded the Filipinos to recognize the sovereignty of the United States of America, but the Filipinos refused. This event set off the war between the Americans and the Filipinos. However, the Filipinos yielded to the prevailing forces of the Americans in 1902. This capitulation paved the way for Santa Fe to be a municipality with Guinbirayan, Agmanic, Busay, Agcogon and Lanas as its barrios. Juan Gutierrez, Sr. was appointed the municipal president (also known as municipal mayor today). Schools were constructed under the Gutierrez administration. However, enrolment was limited that time. Due to insufficient municipal income, the municipality was regressed to a barrio and became a part of the Municipality of Looc in 1906.

In 1940, by the virtue of Commonwealth Act No. 485, which was formulated by Representative Leonardo Festin, Santa Fe became a municipal district. Agmanic, Guinbirayan, Agcogon, Busay, Lanas and Poblacion were considered as territorial barrios. In accordance to Act 581, Rafael Gomez was elected as a member of the *ayuntamiento*. Thus, the power and the function of a mayor were appointed to Gomez as the district councillor of the municipal district of Santa Fe.

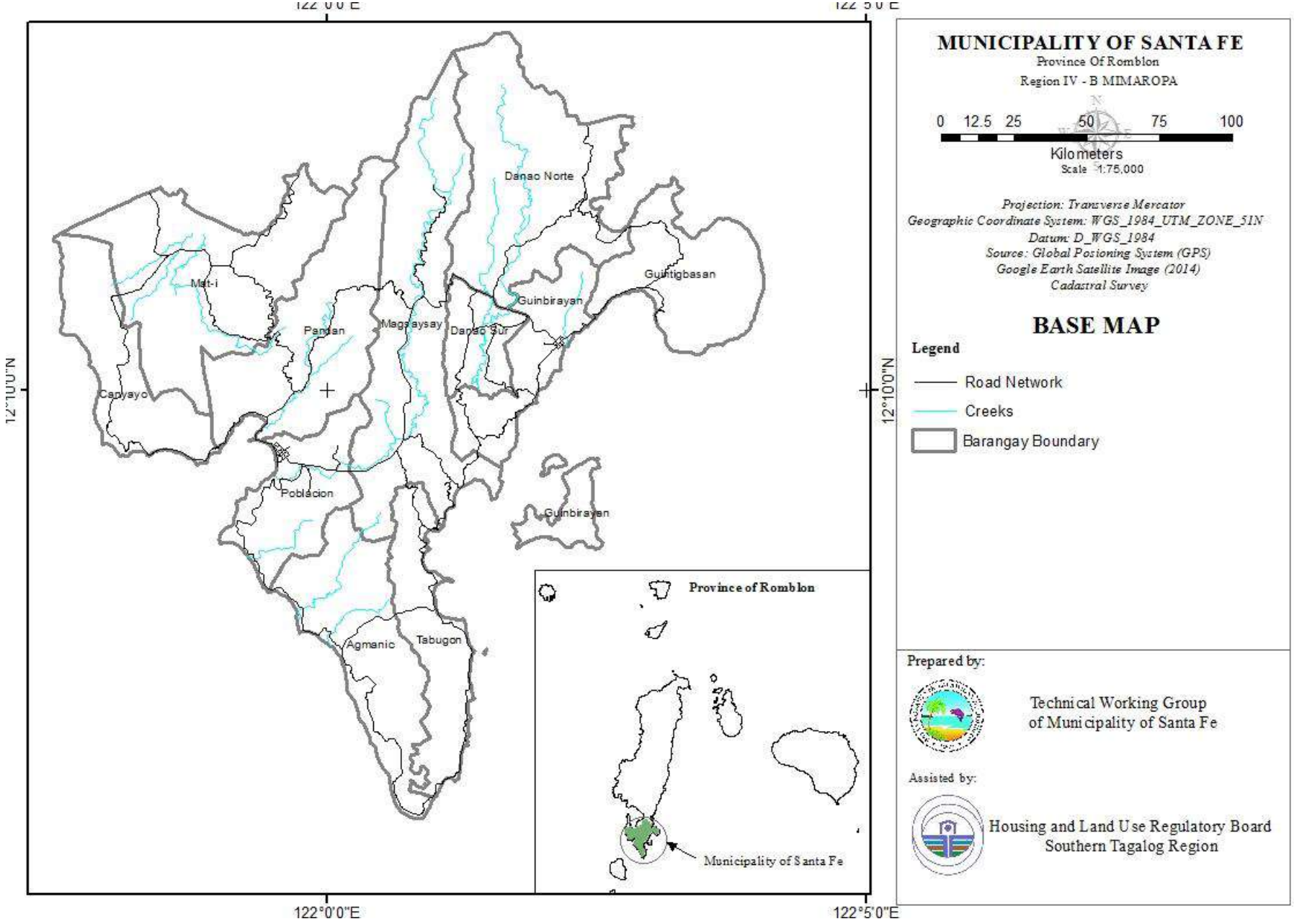
In 1941, the Japanese military forces attacked the pacific islands, particularly Pearl Harbor, without declaration of war. Thereafter, the United States of America declared war against the Axis. The government was consigned under military control; schools were closed and abandoned. Unforeseen, Rafael Gomes was appointed as Police Inspector of Romblon while Juanito Sanchez was appointed as mayor to replace Gomez. Santa Fe regained its municipal status in 1946. Subsequently, Gervacio Lopez was elected as its first municipal mayor until 1951. Lopez was succeeded by Gaudencio Molina, Sr. from 1952 to 1959; Amador B. Medina from 1960 to 1967; Perfecto M. Condes, Jr. from 1968 to 1979; and Conrado M. Medina from 1980 to 1986. During the transitional administration of President Corazon Aquino, Fred R. Dorado was appointed as officer-in-charge in July 1, 1986 to December 1, 1987. Leo M. Machon won the 1988 election which gave him the mayoralty until 1995. Machon was then succeeded by Asher C. Visca from 1995 to 2004; Elsie D. Visca from 2004 to 2007; again Asher C. Visca from 2007-2016;

and again Elsie D. Visca from 2016 up to present. On June 23, 1969, by the virtue of R.A. 3423, the barangays; Agcogon, Busay, Lanas, Lendero and Pinamihagan, was separated from Santa Fe and formed the Island Municipality of Romblon, hence, San Jose.

1.2.2. PHYSICAL AND NATURAL PROFILE

Geographic Location

The Municipality of Santa Fe is one of the nine (9) municipalities of Tablas Island in the province of Romblon. It is a 5th class municipality located in the southernmost part of the island that is bounded by the Municipality of Looc on its northwest, Alcantara on its northeast, Tablas Strait and Santa Fe Bay on its west, and Sibuyan Sea and Guinbirayan Bay on its east and south (Map 1). Geographically, the Municipality of Santa Fe is situated at 12'9' latitude and 121'59' longitude with a total land area of 7,309.3437 hectares. It is composed of eleven (11) barangays, namely: Agmanic, Canyayo, Danao Norte, Danao Sur, Guinbirayan, Guintigbasan, Magsaysay, Mat-i, Pandan, Poblacion and Tabugon.


MUNICIPALITY OF SANTA FE
Province Of Romblon
Region IV - B MIMAROPA
0 12.5 25 50 75 100
Kilometers
Scale 1:75,000
Projection: Transverse Mercator
Geographic Coordinate System: WGS_1984_UTM_ZONE_51N
Datum: D_WGS_1984
Source: Global Posioning System (GPS)
Google Earth Satellite Image (2014)
Cadastral Survey
BASE MAP
Legend
Road Network
Creeks
Barangay Boundary
Prepared by:
Technical Working Group
of Municipality of Santa Fe
Assisted by:
Housing and Land Use Regulatory Board
Southern Tagalog Region
Danao Norte
Mat-i
Pantan
Magtaysay
Danao Sur
Guintigbasan
Guinbirayan
Canyayo
Poblacion
Guinbirayan
Agmanic
Tabugon
Province of Romblon
Municipality of Santa Fe
122°0'0"E
122°5'0"E
12°10'0"N

Topography and Slope

Generally, the topography of Santa Fe is rolling. The barangays and its boundaries are characterized by hilly and mountainous landscapes. Mount Malbog and Calatong Hill are some of the prominent landscapes in the municipality. Inland waters like Magsaysay River, Pandan River, Manhac Creek, Guinbirayan River, Guintigbasan Creek, Binaluca Creek and Tinago River maintain the natural surface drainage of the municipality. These inland waters flow all the way through Tablas Strait and Sibuyan Sea. In terms of slope, Santa Fe has varying characteristics ranging from level to very steep. Except from Tabugon, majority of the barangays have 18 to 30 percent slope values.

Soil

There are three (3) types of soil that can be found in the municipality, namely: Santa Fe Loam, Santa Fe Sandy Loam and Hydrosol with a soil cover distribution of 21 percent, 74 percent, and five (5) percent, respectively. The Santa Fe Loam is suitable for production of coconuts, rice, corn, root crops and other fruit trees while the hydrosol is suitable for fishpond development. Generally, Santa Fe has medium to low soil fertility because of its very strong acidic to neutral reaction from PH 4-5 to 7.0, correspondingly. There is also an observed medium to low organic content, while nitrogen ore and phosphorous level is at moderately low and moderate levels, respectively. On the other hand, the exchangeable potassium is low (less than 15ppm/100) while the exchangeable calcium and magnesium is at high level. In terms of soil drainage, the municipality is characterized by slow external drainage while moderately well to poorly drained internal drainage. Areas with higher slopes are considered as well to moderately drained.

Geology

The surface area of Santa Fe is categorized into the following five (5) types of rock formation:

a) Romblon Metamorphics (Crm) – schistose and banded rocks consisting predominantly of chlorite-quartz-serisite schist, quartz-albite mica schist and

amphibolite; with thin, vari-colored banded marble interbeds; thick and massive marble overlie the schistose rocks as in Romblon Island.

b) Quarternary Alluvium (Qal) – unconsolidated and unsorted floodplain deposits and beach sand.
c) Binoog Formation (Nb) – buff to light pink, massive limestone and alternate layers of calcarenite and argillite or calcisiltite with local intercalation of igneous rocks.
d) Peli Formation (QNp) – conglomeratic limestone, sandy shale, lithic fragments of volcanic rocks, schist, shale and limestone.
e) Sibuyan Ultramafics (PKsu) – undifferentiated ultramafic suite consisting of peridotite, pyroxenite, dunite and gabbro.

1.2.3. DEMOGRAPHIC PROFILE

Based on the 2015 census, the province of Romblon has a recorded population of 292,781. Among the municipalities, Odiongan has the highest number of population with approximately 15.5 percent of the whole province of Romblon. According to the Socio-economic and Physical Profile (2017) of Santa Fe, the municipality has a total population of 16,098 or equivalent to 5.50 percent in the total population of the province. Moreover, the population of Santa Fe is increasing steadily based on the 1975 to 2007 censal years. The rate of natural increase of the municipality is 16.87 per 1000 persons; hence, the growth rate is at 1.687 percent in terms of natural increase.

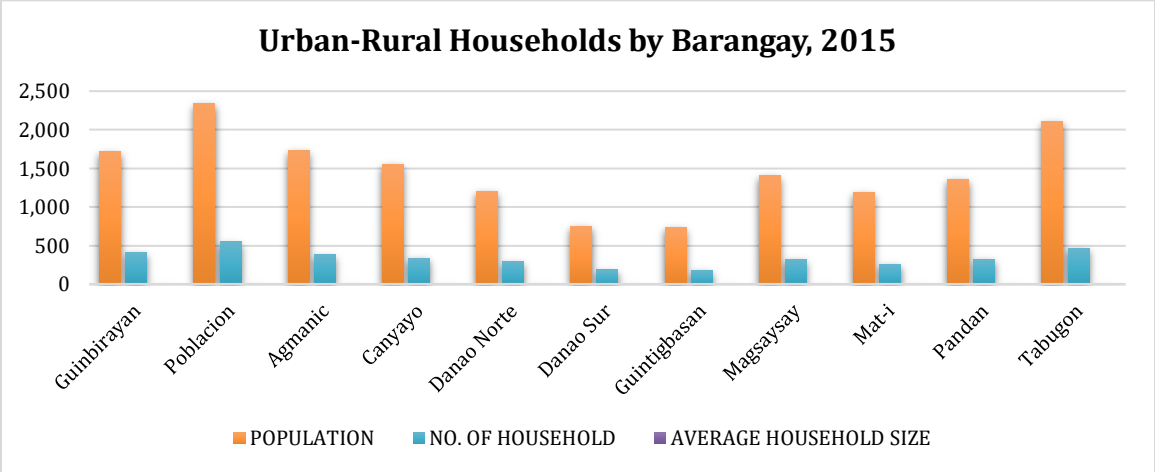


Figure 1. Household Distribution per Barangay, Sta. Fe, Romblon
Source: Socio-economic and Physical Profile of Santa Fe (2017)

According to Census 2015, the most populous barangays in the municipality were Poblacion and Tabugon with 2,342 (14.55 percent) and 2,109 (13.10 percent), respectively. On the other hand, Guintigbasan has the least population with 741 (4.60 percent). In terms of urban and rural household distribution, 25.20 percent of the population resides in urban barangays composed of Poblacion and Guinbirayan, while the rest are distributed in the rural barangays (Fig 1).

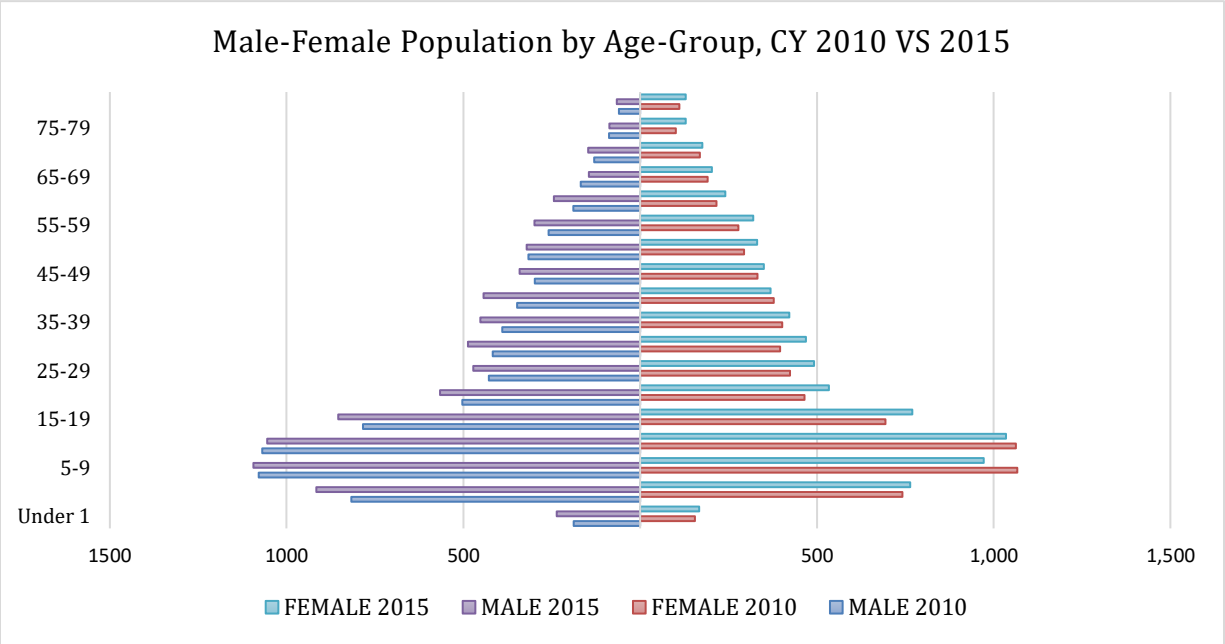


Figure 2. Population pyramid, Sta. Fe, Romblon
Source: Socio-economic and Physical Profile of Santa Fe (2017)

Generally, the population of the municipality is expansive (Fig 2). The age cluster of 0-24 years old was identified to have the most number of people with 55.68 percent of the total population. Conversely, the male population is higher than the female population based on the 2010 and 2015 census, where the sex ratio is 1.11. This indicates that there are 111 males for every 100 females. In terms of dependency ratio, 83:100 was the result based from the computation. This means that every 100 labor force has 83 dependents. The dependents were further subdivided into young and old with 85 percent and 15 percent, respectively. In addition, the most number of individuals belong to the labor force with 9,859 or 61 percent of the total population while the remaining 44 percent is accounted to the school going age population (Socio-economic and Physical Profile, 2017).

In accordance to the municipality's total population of 16,098 and total land area of 7,309.3437 hectares, the municipal gross density of Santa Fe is 2.20 persons per hectare. Barangay Poblacion has the highest population density with 6 persons per hectare while Magsaysay, Mat-I and Danao Norte have the least with a population density of one (1) person per hectare. This indicates that the population of Santa Fe is sparsely distributed.

1.2.4. SOCIAL SERVICES

Education

The Municipality of Santa Fe has a total of 20 schools in which 17 are public schools and three (3) are private schools. The three (3) private schools only offer preschool education while the 14 public schools offer preschool and elementary education. On the other hand, two (2) public schools offer secondary education. The Romblon State University-Santa Fe Campus is the only tertiary education located within the municipality. This university offers three undergraduate courses, namely: Bachelor of Science in Fisheries, Bachelor in Elementary Education, and Bachelor in Secondary Education.

Health and Sanitation

In terms of health, Santa Fe has a rural health unit located at Barangay Poblacion. However, the facility is in need for rehabilitation as of 2016. Only this facility has the capacity for in-patient statuses like minor surgeries, maternal services and dental services. The barangay health centers for the remaining barangays need new upgrades, construction and repairs.

Sanitation has been a priority in the municipality. According to the SEPP of Santa Fe (2017), 2,395 households use a toilet type with water-sealed flush to sewerage with owned septic tank. However, there are still 381 households with no access to toilet facilities while 45 households resort to open pits. With regards to solid waste, there are no functional material recovery facilities (MRF) in the municipality; however, there is a designated dump site in Barangay Magsaysay for disposal of wastes.

Protective Services

For protective services, there is an existing police headquarters in Barangay Poblacion. It has 25 personnel, one unit of Toyota Hi-Lux and Mahindra Enforcer for patrolling, and one motorcycle. However, the Toyota Hi-Lux was identified not functional. Generally, the municipality is peaceful and orderly with only 57 registered crime incidences for the years of 2015 and 2016. In terms of fire protection, the municipal fire station has one (1) fire truck in custody. The employees are equipped with fire boots, helmets, gloves, and firefighting equipment such as fire hoses and nozzles. Through the efforts of the Bureau of Fire Protection (BFP), fire drills are successfully conducted on major institutions to enhance safety in case of fire incidence. For the past few years, only two (2) incidents of fire were recorded, one in 2015 and another in 2016 which was caused by kerosene lamp and charcoal stove, respectively.

Sports and Recreation

Santa Fe has invested for sports and recreation services for the past few years. There are existing basketball courts and multi-purpose halls in all barangays. Other than multi-purpose hall and basketball court, Poblacion has a municipal plaza and a cockpit arena. As of 2016, all facilities are in fair to good condition. However, its maintenance must be observed for better service. With regards to burial ground, there are four (4) cemeteries within the municipality, namely; Roman Catholic Cemetery, Poblacion Public Cemetery, Lotereña Private Cemetery and Guinbirayan Public Cemetery, three (3) of which are for public use while the remaining is privately owned. Generally, all existing burial grounds are in good condition. However, Roman Catholic Cemetery is already congested which requires expansion for continuous utilization.

1.2.5. INFRASTRUCTURE

Transportation

Currently, there are two accessible routes from Odiongan to Santa Fe and vice versa. The first route is through Looc, which is the usual route taken by public utility vehicles while the other route is through Alcantara. The passage through Alcantara is normally used by private vehicles, particularly, by trucks for delivery purposes. Collectively, the road length of the municipality is 79.45 kilometers which is composed of 38.60 percent provincial road, 3.41 percent municipal roads, and 57.99 percent barangay roads. In terms of materials used, the provincial road is constituted of 55 percent concrete and 45 percent earth, while the municipal road is 100 percent concrete. On the other hand, majority of the barangay roads has earth surface (Table 1).

Table 1. Inventory of Roads, Santa Fe, Romblon

ROADS BY SYSTEM CLASSIFICATION	ROAD SURFACE TYPE						Right of Way (km)	Total Length (km)
	Concrete			Earth				
	Km	%	C	Km	%	C		
PROVINCIAL ROAD	16.87	55	GOOD	13.80	45	FAIR	6	30.67
MUNICIPAL ROAD	2.71	100	GOOD	-	-	-	6	2.71
Agmanic	2.33	35	GOOD	4.33	65	FAIR	4	6.66
Canyayo	1.38	25	GOOD	4.13	75	FAIR	4	5.51
Danao Norte	0.55	20	POOR	2.22	80	POOR	4	2.77
Danao Sur	2.58	85	GOOD	0.45	15	FAIR	4	3.03
Guinbirayan	1.44	35	POOR	2.67	65	FAIR	4	4.11
Guintigbasan	0.15	15	GOOD	0.86	85	FAIR	4	1.01
Magsaysay	2.98	40	GOOD	4.47	60	POOR	4	7.45
Mat-i	0.84	35	GOOD	1.57	65	POOR	4	2.41
Pandan	2.33	55	GOOD	1.90	45	FAIR	4	4.23
Poblacion	4.20	85	GOOD	0.74	15	POOR	4	4.94
Tabugon	2.37	60	GOOD	1.58	40	POOR	4	3.95
TOTAL								79.45

Source: Socio-economic and Physical Profile of Santa Fe (2017)

On the other hand, Table 2 shows the list of bridges in the municipality. There is a total of 13 bridges in all 11 barangays.

Table 2. Inventory of Bridges, Santa Fe, Romblon

BRIDGE NAME	LOCATION	TYPE	ROAD CAPACITY (Tons)	PHYSICAL CONDITION
Sitio Capdang Bridge	Agmanic	Concrete	5	Fair
Atic Bridge	Guinbirayan	Concrete	10	Fair
Danao Sur Bridge	Danao Sur	Concrete	5	Good
Santol Bridge	Danao Norte	Concrete	10	Good
Guinbirayan Bridge	Guinbirayan	Concrete	10	Good
Guba Footbridge	Guinbirayan	Timber	1	Fair
Magsaysay Bridge	Magsaysay	Concrete	10	Fair
Palati Bridge	Magsaysay	Concrete	10	Good
BRIDGE NAME	LOCATION	TYPE	ROAD CAPACITY (Tons)	PHYSICAL CONDITION
Pandan Bridge	Pandan	Steel/I-BEAM	15	Poor
Magsaysay-Pandan Bridge	Pandan	Concrete	10	Good
Sitio Longa-og Bridge	Poblacion	Concrete	10	Fair
Barusbos Bridge	Poblacion	Concrete	5	Good
Tabok Bridge	Poblacion	Concrete	5	Excellent

Source: Socio-economic and Physical Profile of Santa Fe (2017)

Power

Tablas Island Electric Cooperative (TIELCO), in the Municipality of Odiongan, is the only electrical energy source in the island. TIELCO is in cooperation with Sunwest Water and Electric Co. Inc (SUWECO) and National Power Corporation (NAPOCOR) for the sustainable provision of electricity in Tablas Island. With the efforts of the National Electrification Administration (NEA), barangay associations were founded for the maintenance of the equipment and the electric lines. These associations are responsible for the reading and billing of respective members and users as well. As of 2016, 3,440 households were served by electricity. It is equivalent to 92.25 percent of the potential number of households which was identified by TIELCO (Figure 3).

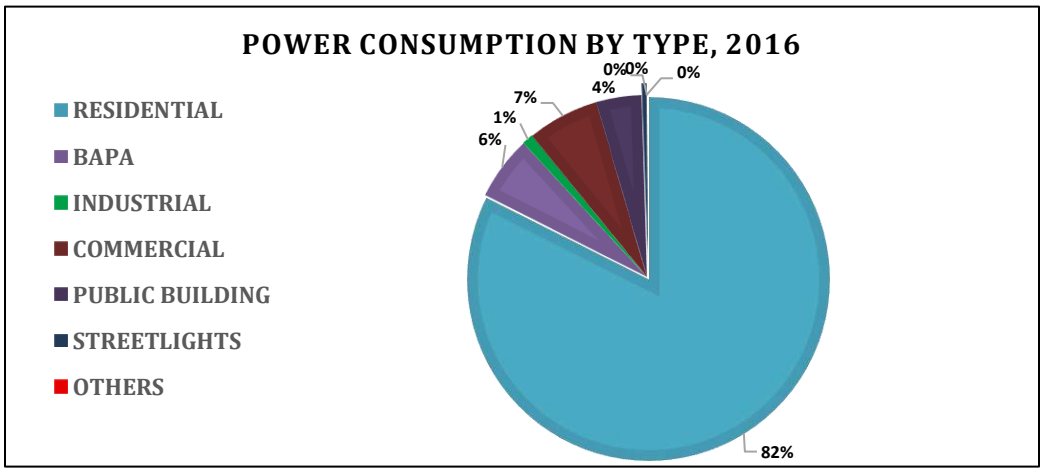


Figure 3. Power consumption by type, Sta. Fe, Romblon
Source: Socio-economic and Physical Profile of Santa Fe (2017)

Water Supply

There are two (2) existing cooperatives which provide water for the municipality, namely, Barangay Water System Association (BAWASA) and *Sagana at Ligtas na Tubig Para sa Lahat* (SALINTUBIG); these associations provide water through deep wells. Water pipes are also connected to Mount Calatong in Barangay Guintigbasan to suffice the municipality's water supply. According to the Community-Based Monitoring System (CBMS), there are three types of water sources existing in the municipality, level I, II and III. Level I water sources came from rain, stream or well, while level II came from communal faucet systems. The water source from BAWASA and SALINTUBIG is categorized as level III. As of 2015, majority of the households obtain water from level I sources with 72.81 percent of the total households. Conversely, level II and level III water sources have served 15.44 percent and 8.52 percent of the total households, respectively (Table 3).

Table 3. Water Supply System by Type and No. of Households Served, Sta. Fe, Romblon

BARANGAY	HOUSEHOLD	LEVEL I	LEVEL II	LEVEL III	DOUBTFUL SOURCE
AGMANIC	379	333	78	7	0
CANYAYO	338	314	0	6	0
DANAO NORTE	292	2	257	6	29
DANAO SUR	185	178	2	3	0
GUINBIRAYAN	416	201	84	100	13

GUINTIGBASAN	180	64	55	67	0
MAGSAYSAY	321	326	0	13	0
MAT-I	259	309	34	1	0
PANDAN	324	252	16	47	0
POBLACION	549	365	66	58	0
TABUGON	468	358	4	8	0
TOTAL	**3,711**	**2702**	**573**	**316**	**42**

Source: Socio-economic and Physical Profile of Santa Fe (2017)

Communication

In remote areas, communication services are usually rare. The municipality of Santa Fe has two (2) identified providers of telecommunication services: Globe Telecommunication Inc. and Smart Telecommunication Company. The two companies have two (2) cell sites which provide signal for the municipality. These telecommunication services enable users to call, text and connect to the internet.

Table 4. Inventory of Communication Services

NAME OF COMMUNICATION SERVICE FACILITY	TYPE OF COMMUNICATION SERVICE FACILITY	BARANGAY	OWNERSHIP	
			Public	Private
Santa Fe Postal Office	Postal Services	Guinbirayan	1	0
Santa Fe Cable and Internet/CATV	Internet, Broadcast & Television Network	Poblacion	0	1
G-Satellite	Broadcast and Television Network	Poblacion	0	1
Cignal/ Dream Satellite	Broadcast and Television Network	Poblacion	0	
Internet Providers (Smart and Globe)	Cell Site Network	Magsaysay Poblacion	0	2

Source: Socio-economic and Physical Profile of Santa Fe (2017)

1.2.6. LOCAL ECONOMY

Agricultural Production

The economy of the municipality is primarily dependent on agriculture. It is widely known for its seaweed production in Region IV-B. Thus, Santa Fe ranked second on seaweed production in the region through the efforts of the Bureau of Fisheries and Aquatic Resources (BFAR) in the year 2010. Generally, Santa Fe is the only municipality in the province of Romblon that distributes dried and fresh sea weeds in the country, specifically to Cebu, Lucena and Manila.

The agricultural utilization in the Municipality of Santa Fe is not limited to seaweed production. Aside from seaweed, Santa Fe also focuses on the production of livestock and poultry, crops, and other marine products which are sold locally or in the adjacent towns, cities or municipalities and provinces, particularly to Looc, San Jose, Odiongan, Panay Island, Mindoro, Batangas, Lucena, and Manila. There are events also where Santa Fe import goods from neighbouring towns due to hasty increase in demand and population in the municipality. Some of imported products comprise vegetables, marine products and rice. The vegetables sold in the public market of Barangay Poblacion often come from the Municipality of Looc. Conversely, marine products such as *nile tilapia* and milk fish are imported from Batangas. However, to apprehend the demand for rice in the municipality, Santa Fe imports rice to the Municipality of Odiongan and Looc.

Forest Resources

The forest area in the municipality is categorized as timberland. This timberland is utilized to make houses, banig through pandan china, and sawali, and, balsa and floating cottage through bamboo. There are also non-timber resources like nipa which is used for making *pawid*, a type of roofing used for cottages and antique houses, and rattan which is used for making binding equipment. In terms of commerce and trade, there is an observed decline on the total number of businesses from 648 in 2015 to 418 in 2016, with a rate of 35.49 percent decrease. This is due to the negligence of owners. These people do not process permits on time which categorized their businesses under unlisted. Wholesaling and retailing are the primary activity in the commerce and trade sector followed by social and personal services. The industry in Santa Fe is subdivided into hollow block making, production of native goods, rice mills, and bakeries. There is only one industry of both hollow block-making and native goods in the municipality while rice mills and bakeries have 13 and 3, respectively.

Tourism

There are 26 tourism establishments in the municipality that caters both local and foreign clients. However, to ensure the growth of tourism in the municipality, the accessibility must be prioritized through improved transport facilities and infrastructures. The provision of such will attract more tourists and investors in the municipality which will be beneficial for the development of Santa Fe.

1.2.7. EXISTING AND IMPLEMENTED CLIMATE CHANGE PLANS AND PROGRAMS

The municipality of Santa Fe currently implements programs geared towards addressing the impacts of climate change. This part discusses the different programs, projects, and activities (PPAs) that are either completed or on-going.

Reforestation

Formerly, the Municipality of Santa Fe has unproductive hills and mountains due to rampant kaingin system which is used to convert land suitable for agricultural use. Realizing the need for forest rehabilitation, the municipality sought the help of the Department of Environment and Natural Resources (DENR). Through the reforestation program pioneered by the agency, Santa Fe was equipped with information and awareness on the importance of planting trees, specifically to combat climate change. An example of extreme climate phenomenon is El Niño which increases temperature drastically making the soil unproductive for agricultural activities. Conversely, its counterpart is La Niña which is characterized by excessive moisture and rainfall. This drowns the crops and causes soil erosion that is threatening not just in terms of agriculture but for individuals as well.

The Municipality of Santa Fe has an existing forest area comprises of 156.8545 hectares. The area is planted with Kamagong, Paper Tree, Mahogany, and Ipil-ipil, in accordance to the reforestation program. Consequently, this event drove the local government of Santa Fe to engage on conservation and protection practices with regards to

natural resources. Forest guards were authorized by the government in the reforestation areas to prevent the occurrence of kaingin. In addition, the operation of chalk, marble, and granite colliery in Barangay Guintigbasan has been ceased after its revealing.

Other implemented programs in the municipality related to addressing the changes in various climate variables and other climate-related hazards is shown in Table _. This shows the project name, the location of the project, implementing date, target completion, the project status and the remarks.

Table 5. List of Existing Climate Change Adaptation-Related Projects, Sta. Fe, Romblon

Project Name	Location	Date Started	Target Completion	Project Status (% of completion)	Remarks
Construction of Evacuation Facility	Poblacion	11/13/2017	3/18/2018	100%	Completed
Rehabilitation of Municipal Road	Poblacion	11/13/2018	4/30/2018	100%	Completed
Improvement of Access Road with RCBC	Danao Sur	7/12/2018	8/22/2018	100%	Materials have been completely delivered
Improvement of Access Road with RCPC	Magsaysay	6/18/2018	7/29/2018	100%	Materials have been completely delivered
Construction of River Control	Pandan	7/12/2018	8/22/2018	100%	Materials have been completely delivered
Construction of Shore Protection Wall (Poblacion) - Phase II	Poblacion	11/5/2018	12/7/2018	100%	Completed
Establishment and Operation of Materials Recovery Facility	Magsaysay	11/19/2018	12/7/2018	100%	Completed
Solid Waste Management Equipment	Magsaysay	N/A	N/A	N/A	On-going delivery of materials
Construction of Solid Waste Management Facility	Magsaysay	N/A	N/A	N/A	Not yet implemented
Improvement of Evacuation Centers	All Barangays	N/A	N/A	N/A	Not yet implemented
Rehabilitation of Local Access Road	Agmanic, Canyayo, Danao Sur, Pandan	10/1/2018	11/22/2018	100%	Completed
Rehabilitation of Local Access Road - Phase II	Guinbirayan, Guintigbasan, Mat-i, Poblacion, Tabugon	9/17/2018	11/29/2018	100%	Completed
Rehabilitation of Municipal Road	Poblacion	N/A	N/A	N/A	Materials have been procured and delivered; for project implementation

Source: MPDO, Municipality of Sta. Fe, Romblon

1.3. PLANNING APPROACH

1.3.1. LCCAP Framework

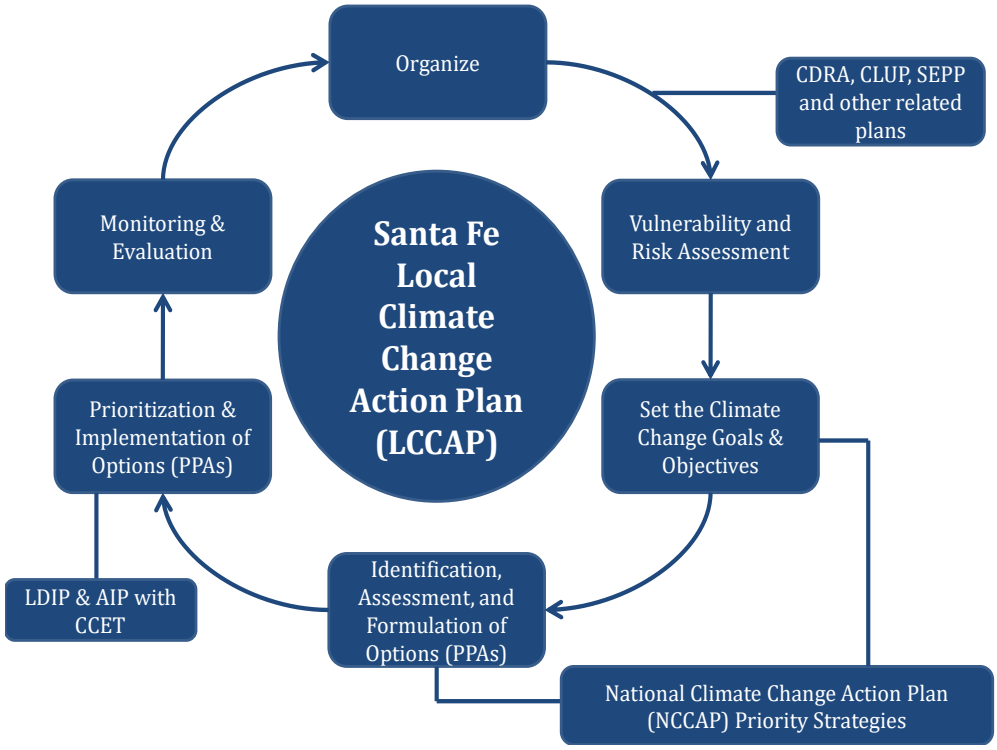


Figure 4. Santa Fe Local Climate Change Action Planning (LCCAP) Framework

The planning framework in formulating the Local Climate Change Action Plan (LCCAP) of Santa Fe, Romblon is illustrated in Figure 1. This is based on the LCCAP planning framework from the Enhanced Guidebook on the Formulation of LCCAP (Process Guide). The LCCAP of the municipality of Santa Fe consists of the following steps:

Organize

This step includes collation and consolidation of data from different development plans like Climate and Disaster Risk Assessment (CDRA), Comprehensive Land Use Plan (CLUP), and Socio-Economic and Physical Profile (SEPP which are vital to the formulation of the action plan. The technical findings from these planning documents will be the baseline and foundation of the mitigation and adaptation strategies that will be implemented.

Vulnerability and Risk Assessment

The thorough assessment of relevant results is required to apprehend the climate change effects and potentials on different sectors and decision areas. Likewise, the analysis incorporates the revalidation of the results from different concerned offices for better study and revision. This is also the stage wherein the participation of the stakeholders will be necessitated in order to represent the sectors evenly, thus, all issues and concerns from different sectors shall be equally addressed.

Set the Climate Change Goals and Objectives

The goals and objectives of the climate change action plan are systematized and formulated through a workshop with the core team and other stakeholders. The sectoral goals and objectives are adopted from different development plans such as CLUP and CDP, which are reviewed and reformulated, if necessary, to address the climate change concerns in the municipality based on the situational analysis. The objectives of Santa Fe LCCAP are inclined to the priority strategies of the National Climate Change Action Plan (NCCAP). These will serve as the drivers in realizing the programs, policies and activities (PPAs).

Identification, Assessment, and Formulation of Options

Various adaptation and mitigation strategies are formulated and assessed to achieve the climate change objectives and goals identified by the core team and involved stakeholders. These PPAs are aligned to the priority strategies of the NCCAP and aim to apprehend the adverse effects of climate change. These are divided into different sectors with different focus and concerned issues to ensure inclusive planning and multi-sectoral approach.

Prioritization and Implementation of Options

The identified and formulated PPAs will be prioritized according to a set of criteria set by the municipality. Usually, the PPAs that will concentrate on an urgent and pressing concern come first in the priority list, but it still depends on the LGU on what options to prioritize and implement immediately. However, there must be no bias on the process, it must be decided by the stakeholders and consolidated by the planning team. Furthermore,

the preferred options will be integrated in the Local Development Investment Program (LDIP) and Annual Investment Program (AIP) with Climate Change Expenditure Tagging (CCET) for financing and implementation.

Monitoring and Evaluation

The LCCAP will continue even after its implementation because it needs to be monitored and evaluated. The plan must still be aligned on the current situation and climate change concerns of the municipality. The monitoring and evaluation process will determine if there is a need to adjust and modify the LCCAP.

1.3.2. Guiding Principles

The Local Climate Change Action Plan (2018-2023) of Santa Fe, Romblon is anchored on the National Framework Strategy on Climate Change (NFSCC) which was adopted in April 2010 with the following Guiding Principles (Office of the President- Climate Change Commission 2010):

1. The Framework envisions a climate risk-resilient Santa Fe with healthy, safe, prosperous and self-reliant communities, and thriving and productive ecosystems.

2. The goal is to build the adaptive capacity of communities and increase the resilience of natural ecosystems to climate change and optimize mitigation opportunities towards sustainable development.

3. The precautionary principle guides the municipality's climate change framework and shall take precautionary measures to anticipate, prevent or minimize the causes of climate change and its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures.

4. The Framework is risk-based, and strategies/activities shall be formulated, with decisions made based on the causes, magnitude and impact of risks.

5. Climate change knowledge is science-based and shall draw from scientific contributions and best practices from communities taking into considerations local circumstances.

6. The key priorities shall be adaptation and mitigation, with an emphasis on adaptation as the anchor strategy. Whenever applicable, mitigation actions shall also be pursued as a function of adaptation.

7. Adaptation measures shall be based on equity, in accordance with common but differentiated responsibility; special attention must be given to ensure equal and equitable protection of the poor, women, children and other vulnerable and disadvantaged sectors.

8. Even with inadequate scientific information, anticipatory adaptation measures should be undertaken to prevent or minimize the causes and potential impacts of climate change, whenever necessary.

9. The Framework adopts the Philippine Agenda 21 for Sustainable Development, to fulfill human needs while maintaining the quality of the natural environment for current and future generations.

10. The principle of complementation shall be observed to ensure that climate change initiatives by one sector do not restrict the adaptation of other sectors.

11. The Framework recognizes the roles of agencies and their respective mandates as provided by law. The Framework also recognizes the principle of subsidiarity and the role of barangays as front-liners in addressing climate change.

12. The Framework recognizes the value of forming multi-stakeholder participation and partnerships in climate change initiatives, including partnerships with civil society,

the private sector and barangays, and especially with the urban poor and other marginalized groups most vulnerable to climate change impacts.

13. Policy and incentive mechanisms to facilitate private sector participation in addressing adaptation and mitigation objectives shall be promoted and supported.

CHAPTER II. VULNERABILITY AND ADAPTATION ASSESSMENT

This part discusses the results of the Vulnerability and Adaptation Assessment (VAA) of the municipality. This assessment focuses on the impacts of climate changes to the five sectors (social, economic, physical/infrastructure, environmental, and institutional) provided in the DILG Rationalized Local Planning System and the Local Planning Illustrative Guide for Preparing and Updating the Comprehensive Development Plan. The climate projections and patterns are based from PAGASA projections and firsthand experiences of the locality. Data from the Climate and Disaster Risk Assessment (CDRA) such as inventory of previous disasters, hazard inventory, exposure and sensitivity database, susceptibility and risk maps from MGB, and other relevant information in formulating interventions for climate change were also integrated in the results.

2.1. Climate Projections and Patterns of Change for Sta. Fe, Romblon

According to PAGASA, there are three (3) climate scenarios used to project climate changes in the Philippines: the high, medium and low-range scenarios. Since the medium-range emission scenario considers past emissions, it is proposed to be used in the Climate and Disaster Risk Assessment (CDRA).

The provincial level climate projections from the PAGASA report (2011) uses the baseline period from 1971-2000 and two timeframes which are 2020 and 2050 (Table 6). Climate variables in the projections include seasonal rainfall change, seasonal temperature change, frequency of extreme rainfall events, frequency of days with temperatures exceeding

35◦C, and frequency of dry days or days with rainfall less than 2.5mm. Moreover, these climate variables are divided and observed in four seasons: (1) DJF- December, January, and February or the northeast monsoon (amihan); (2) MAM- March, April, May or the summer season; (3) JJA- June, July, August or the southwest monsoon (habagat); and (4) SON- September, October, November which is the transitioning from southwest to northwest monsoon season.

Based on climate projections table (Table 1), the municipality of Sta. Fe is projected to have increased seasonal temperature (^{0}C) in all months from the observed baseline of 1971-2000 to 2020 and 2050. It is expected that the for the months of December, January, and February, the temperature will increase from 26.3^{0}C to 27.1^{0}C and 28.1^{0}C in 2020 and 2050, respectively. The same trend is expected in the months of March, April, and May, with an increase of temperature from 28.5^{0}C to 29.6^{0}C in 2020 and 30.7^{0}C in 2050. Temperature in June, July and August is also projected to increase from 28.1^{0}C in the observed baseline to 29^{0}C for 2020 and 30^{0}C for 2050. Lastly, for the months of September, October, and November, from 27.7^{0}C, there will be an increase in temperature in 2020 to 28.5^{0}C and for 2050, it is expected to be at 29.4^{0}C.

Projections for the seasonal rainfall change (mm) in the municipality are also illustrated in the table. It can be observed that the trend for seasonal rainfall change is also generally increasing. For December, January, and February, the seasonal rainfall is expected to increase from 357 mm to 389.1 mm in 2020 and 473.4 mm in 2050. In March, April, and May, from 224mm rainfall, it is projected to increase to 224.4 mm and 282.9 mm in 2020 and 2050, respectively. June, July and August also have increasing rainfall, having 652.9 mm in the observed baseline to 883.1 mm in 2020 and 1085.1 mm in 2050. The months of September, October, and November is expected to have dramatic increase in rainfall, from 778 mm to 953.8 mm in 2020 and 1,072.9 mm in 2050.

The extreme events considered by PAGASA include days with temperature higher than 35^{0}C and days with rainfall greater than 200 mm are also observed in the table. In terms of the number of days with temperature higher than 35^{0}C, the observed projection

shows that there will be a significant increase from the observed baseline to 2020 and 2050. As seen in the table, from 59 days in the observed baseline, this will increase to 235 days in 2020 and 756 days in 2050. The number of days with rainfall greater than 200 mm are also expected to increase from 4 days to 11 days in 2020 and 20 days in 2050.

As opposed to the trends of the previous climate variables, the number of dry days is projected to decrease from 7,628 during the observed baseline down to 6,125 and 5,663 in years 2020 and 2050, respectively.

Table 6. Climate Projections Under Medium-Range Emission Scenario, Sta. Fe, Romblon

Climate Variable	Observed Baseline (1971-2000)				2020 (2006-2035)				2050 (2036-2065)			
Seasons	**DJF**	**MAM**	**JJA**	**SON**	**DJF**	**MAM**	**JJA**	**SON**	**DJF**	**MAM**	**JJA**	**SON**
Seasonal Temperature Increases(◦C)	26.3	28.5	28.1	27.7	27.1	29.6	29.0	28.5	28.1	30.7	30.0	29.4
Seasonal Rainfall Change (mm)	357	224.0	652.9	778.0	389.1	224.4	833.1	953.8	473.4	282.9	1,085.1	1,072.9
No. of Days w/ Tmax >35◦C	59				235				756			
No. of Dry Days	7,628				6,125				5,663			
No. of Days w/ Rainfall 200 mm	4				11				20			

Source: DOST-PAGASA and CDRA, Municipality of Sta. Fe (2018)
**DJF-December, January, February; MAM-March, April, May; JJA-June, July, August; SON-September, October, November*

These climate variables were also assessed based on their effects to the different sectors of the municipality. Table 6 shows the summary of the climate impacts, the general changes expected, the information regarding the patterns of change of these climate variables, and the potential impact areas.

Table 7. Summary of Climate Change Impacts, Sta. Fe, Romblon

Climate Variable	General Changes Expected in Climate Variables	Information about Patterns of Change	Possible effects to the different sectors					Potential Impact Area/s
			Social	Environmental	Institutional	Economic	Urban Use	
Rainfall	Decrease in rainfall by 2020 and increasing by 2050 during DJF Decrease in rainfall by 2020 and 2050 by MAM Increase in rainfall by 2020 and 2050 by JJA Increase in rainfall by 2020 and 2050 by SON	Reduction in rainfall during summer of 2020 & 2050 Increase in rainfall during Habagat of 2020 & 2050 Increase in rainfall during Amihan (SON) in 2020 & 2050 Wetter Amihan months in DJF in 2020 and 2050	Prevalence of waterborne and vector-borne diseases due to flooding Decrease in income of farming dependent households due to flooding and landslide	Decrease in forest cover due to landslide and flash floods. Mangrove degradation due to storm surge caused by frequent typhoons Eutrophication from run-off due to flooding will lessen crop and can cause fish kill	Damaged government and health services due to flooding Disruption of communication services due to rainfall Higher demand for evacuation centers	Reduced yield due to drought, flooding and erosion Disruption of economic and social services Lower income from production-dependent livelihood	Disruption of power and water supply Inaccessible roads and bridges Damage or loss of property due to flooding or landslide Prevalence of vermin and pests Damages to different critical infrastructures	Increase in rainfall affect all barangays; Rain-induced landslides mostly affect Danao Norte, Danao Sur, Guinbirayan, Guintigbasan, and Mat-i
Number of Hot days	Increase number of hot days (exceeding 35^0C)	Significant increase in the number of hot days expected in 2020 and 2050	Increase health risks such as diseases and discomfort	Higher carbon emissions due to increase in energy demand Forest cover loss due to forest fires Coral bleaching, ocean acidification and loss of fish habitat	Higher demand for health facilities	Possible water shortage due to increase in demand Low crop yields due to drought and incidence of pest and diseases outbreak	Higher demand for water and power supply Poor roads resulting to road accidents and delay of different goods and services while vehicular traffic jams will lead to more fuel consumption and huge time loss	All barangays

Climate Variable	General Changes Expected in Climate Variables	Information about Patterns of Change	Possible effects to the different sectors					Potential Impact Area/s
			Social	Environmental	Institutional	Economic	Infrastructure and Land Use	
Number of Dry days	7, 057 days with <2.5 mm of rain in 2020 6, 902 days with <2.5mm of rain in 2050	Decrease number of dry days (<2.5mm of rain)	Prevalence of water-borne and vector-borne diseases due to flooding Possible loss of lives due to flooding and landslide Decrease in income of farming-dependent households due to flooding and landslide	Mangrove degradation due to storm surge caused by frequent typhoons Decrease in forest cover due to erosion	Higher demand for health facilities Delay in the provision of health and social services due to higher demand to these services	Reduced yield due to flooding Disruption of economic and social service Damage or loss of property due to flooding or landslide Prevalence of vermin and pest	Inaccessibility of roads and bridges due to flooding Development of cracks within a short period after road construction Higher temperatures and increased solar radiation may also reduce the life of asphalt road surfaces	All barangays
Extreme daily Rainfall Events	Heavy daily rainfall >200mm increasing in 2020 and 2050	More extreme daily rainfall expected (>200mm) in 2020 and 2050	Prevalence of waterborne and vector-borne diseases due to flooding Possible loss of lives due to landslide and storm surge Decrease in income of farming- and fishing-dependent households due to flooding	Decrease in forest cover due to landslide and flash floods Mangrove degradation due to storm surge caused by frequent typhoons Siltation of rivers and estuaries which results to decrease of marine species	Disruption of government and health services due to flooding Disruption of communication services due to rainfall Higher demand for evacuation centers	Reduced yield due to flooding or landslide Disruption of economic and social service Prevalence of vermin and pests	Damage or loss of property due to flooding or landslide Disruption of power and water supply and communication services Roads and bridges can be inaccessible due to flooding Damage to critical infrastructures Water contamination	All barangays
Sea Level Rise		Increase in sea level	Displacement of coastal communities leading to loss of livelihood Contamination of water supply due to salt water intrusion	Salt water intrusion to farmlands and freshwater resources Decrease in coastal biodiversity due to habitat destruction	Disruption of services and facilities near the coast	Decrease in income of farming- and fishing-dependent households due to coastal flooding, erosion, storm surge and the likes	Roads located near coastal areas can be submerged and be inaccessible Damage of properties and displacement of coastal communities Salt intrusion on water facilities	Agmanic, Tabugon, Guinbirayan, Poblacion, Pandan, Danao Norte and Guintigbasan

Source: CDRA, Sta. Fe, Romblon (2018)

2.2. Hazard Characterization

The municipality of Santa Fe, being at the southernmost tip of Tablas island and surrounded by water bodies, is susceptible to various hydro-meteorological hazards such as storm surge, sea level rise, and rain-induced landslides, as well as geological hazards including earthquake and tsunami. However, this Vulnerability and Adaptation Assessment (VAA) only focused on flood, rain-induced landslides and tsunami. Although the LCCAP relies mostly on hydro-meteorological hazards, the LGU also considered other hazards that exacerbate climate projections such as tsunami.

All hazard maps use a scale of 1:22,500 to cover all barangays affected by the different hazards. These maps were projected to WGS 1984 UTM Zone 51N and produced using ArcGIS. Through consultations with the LCCAP core team using the data and records available and based on their firsthand experiences, the likelihood of occurrence, magnitude, speed of onset, and frequency/duration for flood, landslide, and tsunami were identified.

Table 8. Hazard Characterization Matrix, Sta. Fe, Romblon

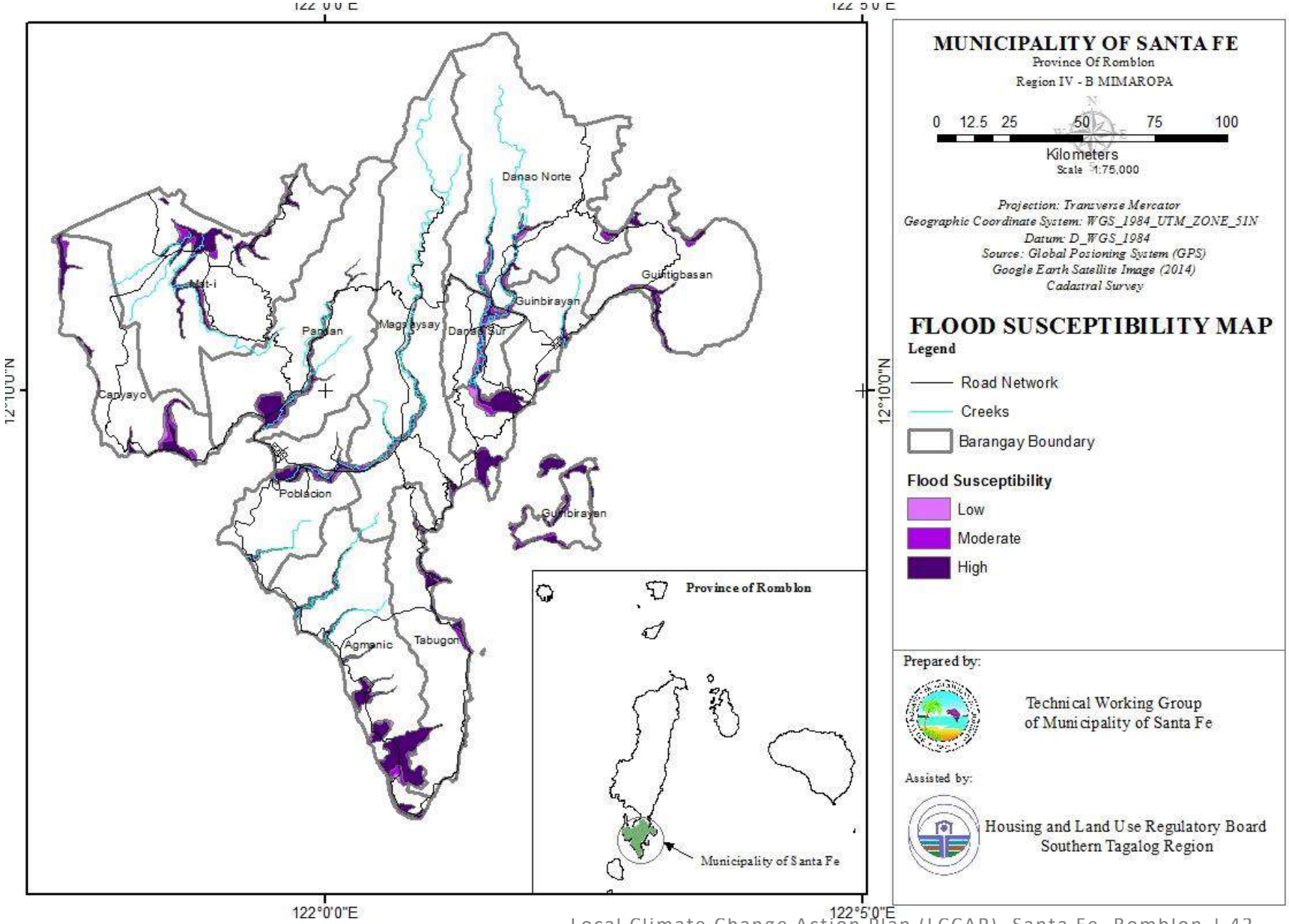
Hazard Maps	Map Information			Hazard Description				
	Source	Scale	Format/ Date/ Reference System	Likelihood of Occurrence (score)	Magnitude	Speed of Onset	Frequency	Areas Covered
Flood	MGB	1:22,500	JPEG/2017 /WGS 1984 UTM Zone 51N	5	0.4m	Slow	Every 3 to 10 years	All barangays
Landslide	MGB	1:22,500	JPEG/2017 / WGS 1984 UTM Zone 51N	3	Low intensity	Slow	Every 30 to 100 years	All barangays
Tsunami	PHIVOLCS	1:22,500	JPEG/2017 / WGS 1984 UTM Zone 51N	2	No recorded data	No recorded data	Every 100 to 200 years	Agmanic, Canyayo, Guinbirayan, Magsaysay, Pandan, Poblacion, Tabugon

Source: CDRA, Sta. Fe, Romblon (2018)

2.2.1. Flood

Flooding is defined as the “abnormal progressive rise in the water level of a stream that may result in the overflowing by the water of the normal confines of the stream with the subsequent inundation of areas not normally submerged” (DOST-PAGASA). Simply put, it is the overflowing of a large amount of water beyond its normal confines, especially over what is normally dry land.

The occurrence of flood is common in Santa Fe as it is observed to have level to undulating low lying areas. As seen in the flood susceptibility map (Map 2), 485.77 hectares or 7.56 percent of Santa Fe are susceptible to flood. About 338.66 hectares is highly susceptible, 99.13 hectares is moderately susceptible, and 47.98 hectares has low susceptibility to flood.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Projection: Transverse Mercator
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Datum: D_WGS_1984
Source: Global Posioning System (GPS)
Google Earth Satellite Image (2014)
Cadastral Survey
FLOOD SUSCEPTIBILITY MAP
Legend
Road Network
Creeks
Barangay Boundary
Flood Susceptibility
Low
Moderate
High
Prepared by:
Technical Working Group
of Municipality of Santa Fe
Assisted by:
Housing and Land Use Regulatory Board
Southern Tagalog Region
Danao Norte
Guintigbasan
Guinbirayan
Magtaysay
Danao Sur
Mat-i
Pandan
Canyayo
Poblacion
Guinbirayan
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Tabugon
Province of Romblon
Municipality of Santa Fe
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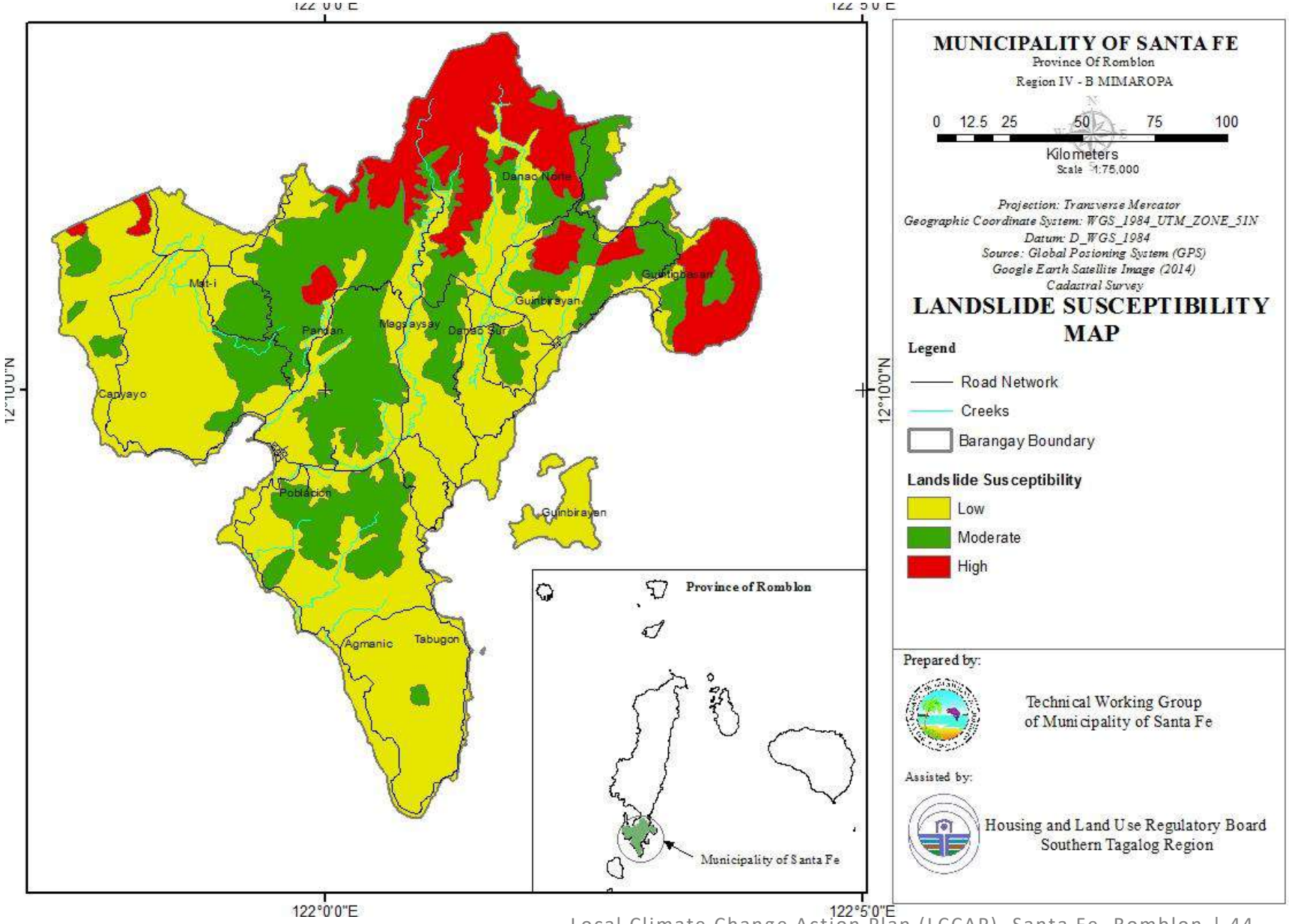
2.2.2. Landslide

According to the USGS definition, landslide is characterized as the "movement of a mass of rock, debris, or earth down a slope. Landslides can be initiated in slopes already on the verge of movement by rainfall, snowmelt, changes in water level, stream erosion, changes in ground water, earthquakes, volcanic activity, disturbance by human activities, or any combination of these factors." Those areas lying in proximity to the fault line are more susceptible to landslides. For this report, the LGU focuses on landslides caused by rainfall events that occurred in the municipality.

Rain-induced landslides are the type of landslide commonly experienced in Santa Fe. This phenomenon is usually experienced during heavy downpour and in areas with on-going riprap construction. Based on the landslide susceptibility map (Map 3), earthquakes, tremors, and deforestation. Rain-induced landslides are experienced in Santa Fe. According to the susceptibility maps from MGB, about 6,424.84 or 99.98 percent are susceptible to landslide. About 960.37 hectares is highly susceptible to landslide, 1,868.36 hectares is moderately susceptible, and 3,596.12 hectares has low susceptibility to landslide.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LANDSLIDE SUSCEPTIBILITY MAP
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Road Network
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Barangay Boundary
Landslide Susceptibility
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Cajayo
Poblacion
Guinbirayan
Agmanic
Tabugon
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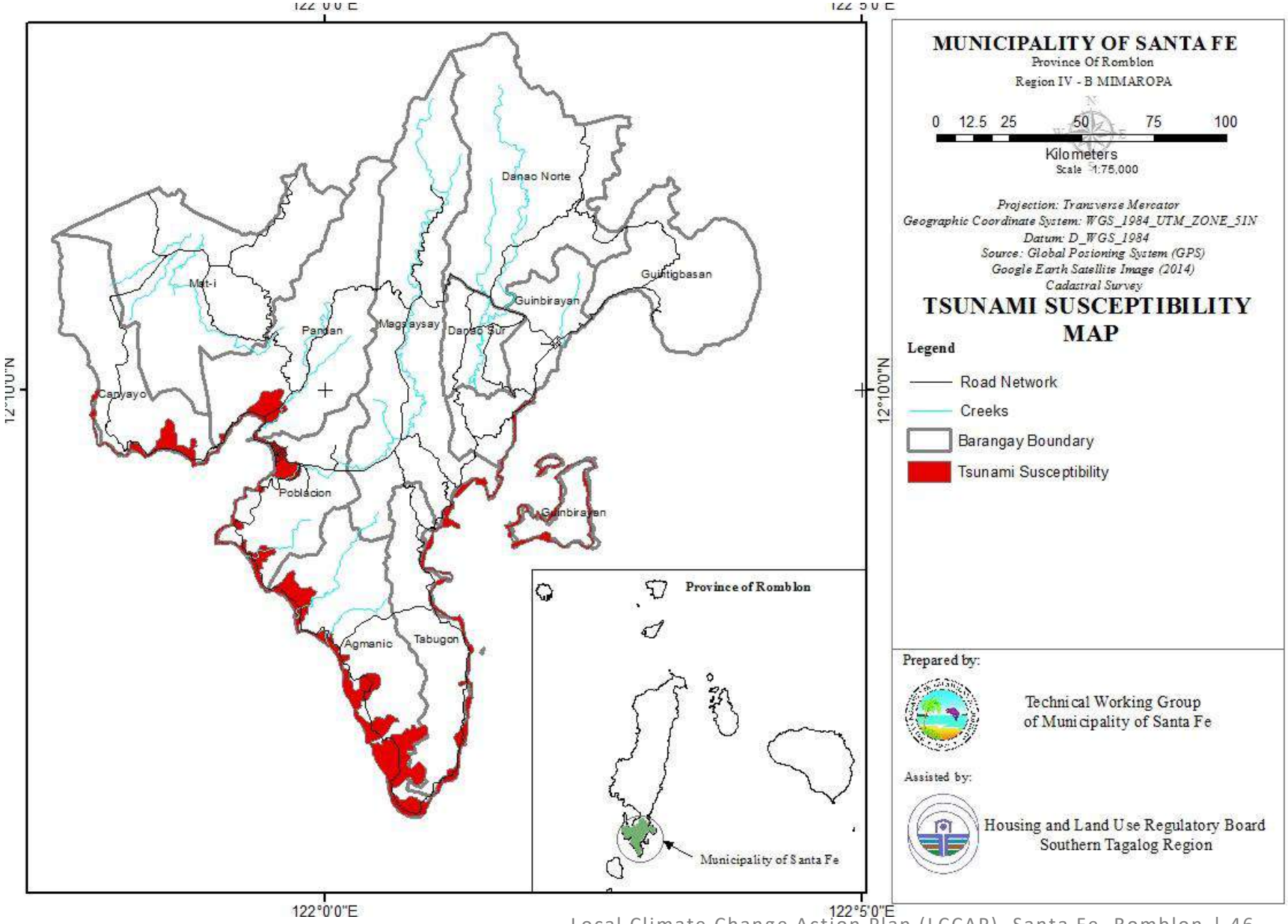
Municipality of Santa Fe

2.2.3. Tsunami

Tsunami is considered as a geologic hazard since it involves internal earth processes, particularly movements on the earth's crust. As defined by DOST-PAGASA, a tsunami is "an ocean wave produced by a submarine earthquake, landslide, or volcanic eruption that may reach enormous dimensions and have sufficient energy to travel across oceans."

Areas that are prone to tsunami include barangays Agmanic, Canyayo, Guinbirayan, Magsaysay, Pandan, Poblacion, and Tabugon. According to the tsunami susceptibility map (Map 4), a total area of 399.16 hectares is susceptible to tsunami based from the tsunami hazard map released by Philippine Institute of Volcanology and Seismology (PHIVOLCS). Although this hazard has never occurred in the municipality, it is important for the municipality to be prepared since it is susceptible to this hazard.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Municipality of Santa Fe
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2.3. Records of Previous Disasters

The municipality of Santa Fe recorded five (5) major disasters from 1984 to 2013 according to their Rapid Needs Assessment Report (Table 9), all of which affected all barangays in the municipality. Typhoon Nitang in 1984 was the earliest recorded disaster in the report, which had a peak intensity of 275 kilometers per hour (kph), followed by Typhoon Ruping in 1990 with a peak intensity of 150 kph, Typhoon Senyang in 2006 having a peak intensity of 155kph, Typhoon Frank in 2008 with 170 kph peak intensity, and lastly, Typhoon Yolanda in 2013 which had the highest peak intensity of 315 kph.

Although Typhoon Yolanda had the strongest intensity among the disasters that occurred, Typhoon Senyang caused the most damage to properties, costing a total of 17,000,000 PhP. This disaster resulted in 10,000,000 PhP damages in infrastructure, 2,500,000 PhP in agricultural assets, 3,000,000 PhP in institutional properties, and 3,000,000 PhP worth of damages to commercial establishments.

Table 9. History of Previous Disasters, Municipality of Sta. Fe, Romblon

Hazard Events and Description	Affected Barangays	No. of casualties (No. of individuals)			No. of Affected		No. of houses damaged		Damage to properties in Philippine Pesos (PHP)					Source of Information
		Dead	Injured	Missing	Persons	Families	Totally	Partially	Infra-structure	Agri-culture	Insti-tutional	Private/ Commercial	Total	
Nitang (Sept. 3-6, 1984) @ 275kph peak intensity	All barangays	0	0	0	6,000	1,200	20	70	2,000,000	1,000,000	500,000	300,000	3,800,000	**Rapid Disaster Needs Assessment Report**
Ruping (Nov. 14, 1990) @150kph peak intensity	All barangays	1	0	0	0	0	0	0	0	30,000	0	0	30,000	
Senyang (Dec. 10, 2006) @ 155km/h peak intensity	All barangays	0	12	0	10,000	815	212	530	10,000,000	2,500,000	3,000,000	3,000,000	17,000,000	
Frank (June 23, 2008) @170kph peak intensity	All barangays	0	0	0	0	0	0	0	0	500,000	0	0	500,000	
Super Typhoon Yolanda (Nov. 7-8, 2013) @ 315km/h peak intensity	All barangays	0	0	0	14,000	550	0	15	300,000	-	0	0	300,000	

Source: CDRA, Sta. Fe, Romblon (2018)

2.4. Hazard Inventory

Among the identified hazards that affect the municipality, only flood, landslide, storm surge and sea level rise affect all 11 barangays of Santa Fe, while tsunami only affects barangays Agmanic, Canyayo, Guinbirayan, Magsaysay, Pandan, Poblacion, and Tabugon which are in proximity to the water bodies surrounding the island. The hazard inventory matrix below (Table 10) shows the hazards and the climate change impacts present in each barangay of Santa Fe which includes flood, rain-induced landslide, storm surge, tsunami, and sea level rise. However, this assessment only focused on three of these hazards, flooding, rain-induced landslide, and tsunami.

Table 10. Barangay-Level Hazard Inventory Matrix, Sta. Fe, Romblon

Barangay	Flood	Rain-Induced Landslide	Storm Surge	Tsunami	Sea Level Rise
AGMANIC	x	x	x	x	x
CANYAYO	x	x	x	x	x
DANAO NORTE	x	x	x	x	x
DANAO SUR	x	x	x		x
GUINBIRAYAN	x	x	x	x	x
GUINTIGBASAN	x	x	x	x	x
MAGSAYSAY	x	x	x	x	x
MAT-I	x	x	x	x	x
PANDAN	x	x	x	x	x
POBLACION	x	x	x	x	x
TABUGON	x	x	x	x	x

Source: CDRA, Sta. Fe, Romblon (2018)

2.5. Climate Change Influence Analysis

The climate change influence diagrams presented in this analysis considered the climate variables identified in the climate projections by PAGASA particularly, the varying rainfall, temperature, and the changes in extreme events. The changes in temperature and rainfall have significant effects on the different ecosystems of Santa Fe. The primary, secondary, and tertiary impacts of these climate variables to the various sectors of these four major ecosystems—forest, agriculture, coastal, and urban, were analyzed.

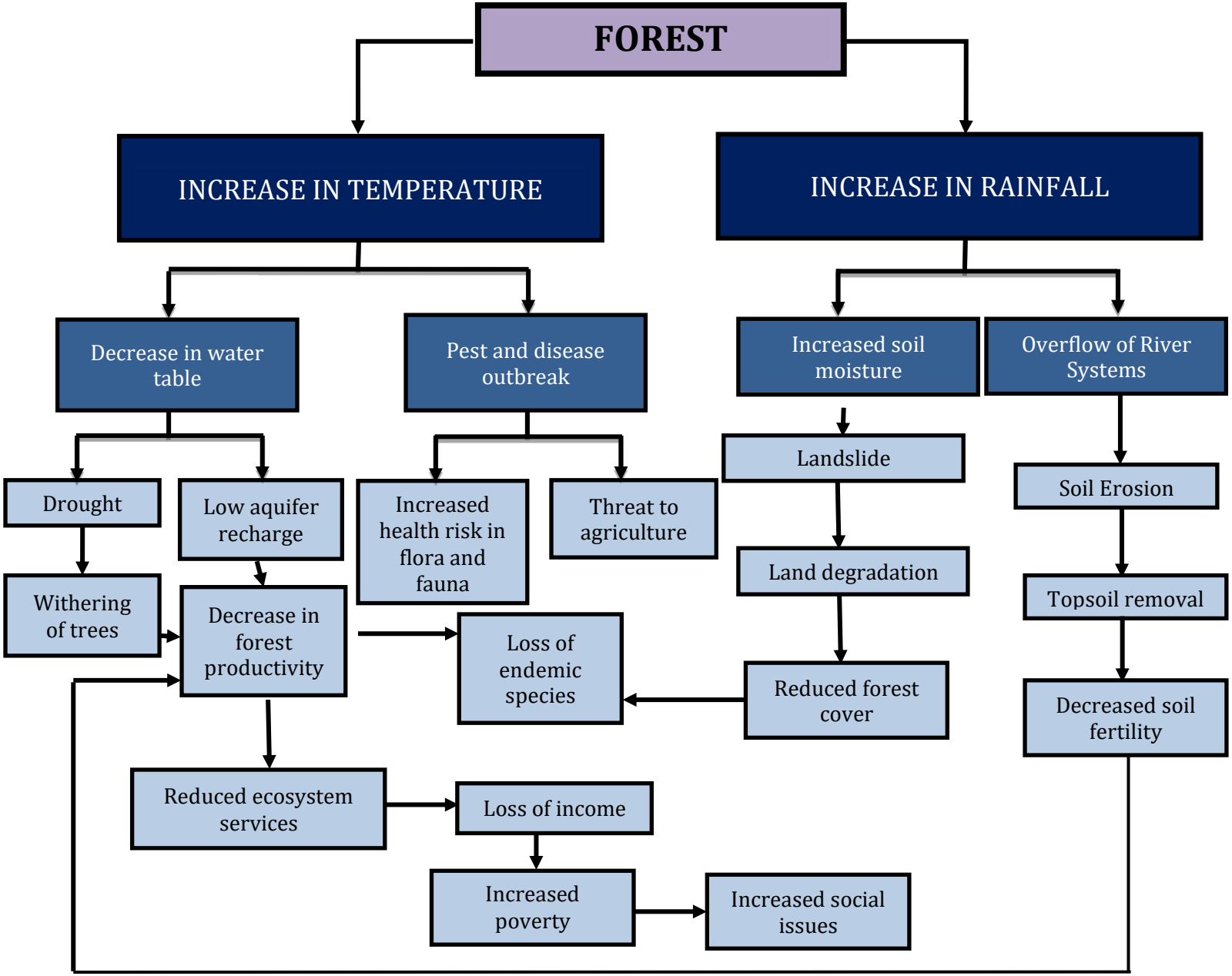


Figure 5. Impact Chain Diagram for Forest Ecosystem

2.5.1. Forest Ecosystem

The diagram in Figure 5, shows the effects of the changes in climate variables to the various sectors of the forest ecosystem. Climate is a crucial factor in ensuring forest productivity. Various threats due to climate change may endanger the forest ecosystem and impede the functions and services it delivers. The changes in temperature and precipitation are the main climate variables assessed.

As illustrated in the diagram (Fig. 5), increase in temperature may lead to decrease in water table which can cause drought and low aquifer recharge. Higher temperature in forests means more water losses through evaporation and evapotranspiration and reduced water use efficiency of trees and plants, leading to withering (Mortsch, 2006). Higher temperature may also cause disturbances such as pathogens and forest fires (Moore, et al., 2008). The warmer temperature enhances the reproduction of pests causing diseases and pest outbreak. This can increase the health risk of the flora and fauna species in the forests and eventually, loss of endemic species.

On the other hand, increased rainfall is expected in humid tropics or those areas lying near equatorial belt (IPCC, 2007). Higher precipitation means increase in soil moisture and overflowing of river systems in forests. The increased moisture in soil can cause landslide and erosion which can lead to the removal of topsoil in the affected areas. This can further degrade the soil quality and decrease soil fertility which can also contribute to the lower productivity in forests and eventually, decrease the forest cover of the municipality.

Decreased forest productivity which means reduced ecosystem services of forestlands. The various sectors relying on forest production will, in turn, be affected as well. Raw materials that are produced from forests may also be affected. The municipality will incur lower income from forest production, which can lead to higher poverty incidence and social issues.

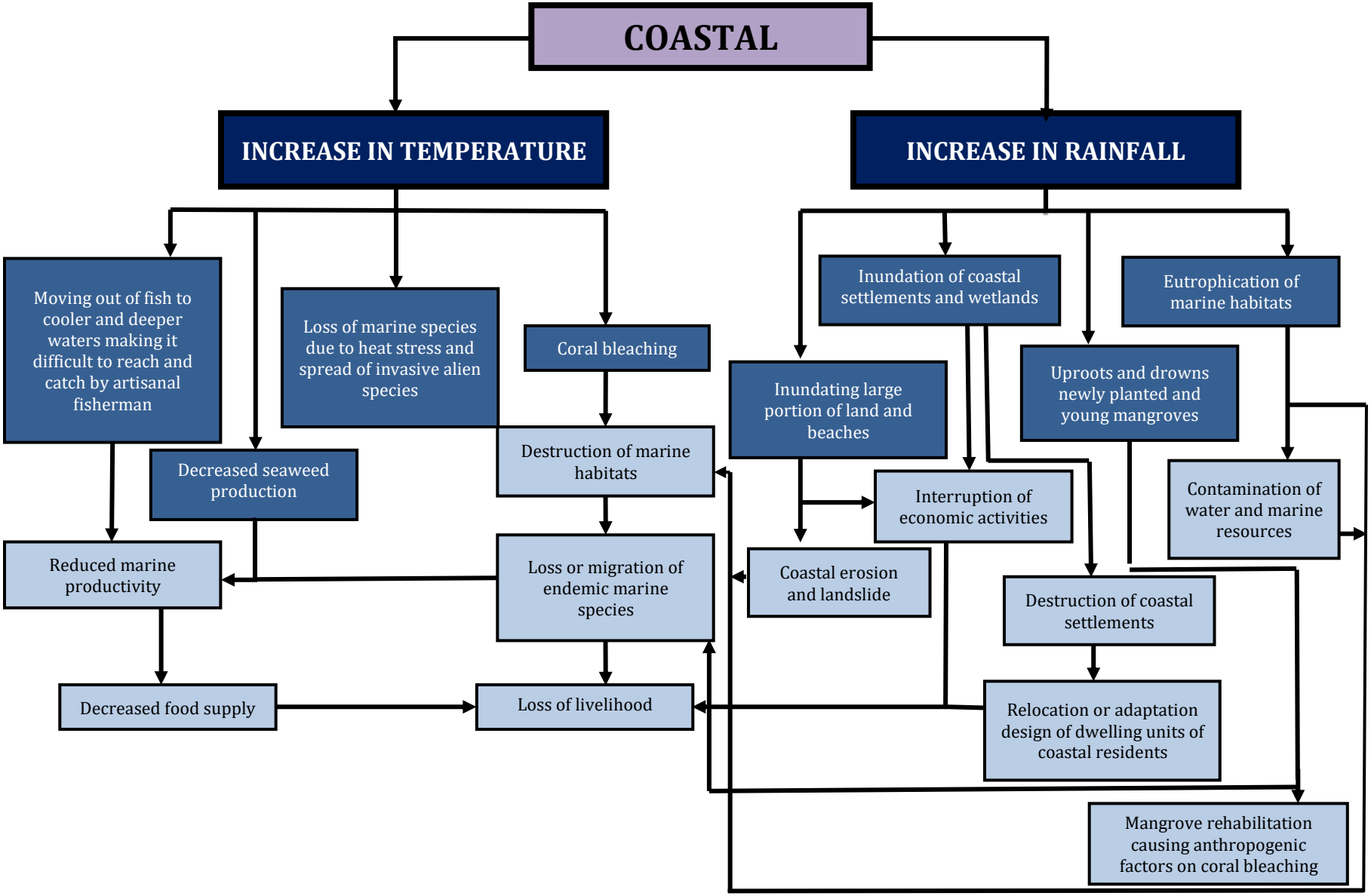


Figure 6. Impact Chain Diagram for Coastal Ecosystem

2.5.2. Coastal Ecosystem

Majority of the barangays in the Municipality of Santa Fe is along and dependent on the aquatic resources; coastal ecosystem is a potential target with regards to climate impacts. Increase in temperature and precipitation levels pose a variety of threat on marine biota which in effect may jeopardize the different sectors in the municipality (Figure 6). Through a chain of adverse effects initiating from a climate variable, Santa Fe must be ready to combat the effects of climate change on the coastal ecosystem. Illustrated in Figure 6 are the effects of increasing rainfall and temperature to the coastal ecosystem.

Primarily, the increase in temperature will set off coral bleaching which causes destruction to marine habitats (Paice and Chambers, 2016). Carbonate-dependent organisms such as coral communities will not be able to produce calcium carbonate hastily, because of ocean acidification that is caused by increase in temperature. These organisms are essential for sustaining coral reef formation that serves as habitats for aquatic organisms. Therefore, ocean acidification decreases the capacity of organisms to produce the necessary calcium carbonate for coral reef structuring, hence, endangering the habitats of aquatic biota which may further cause endangerment of marine species (BIMP-EAGA, 2015). The extreme weather brought about by the increase in temperature will further cause migration of endemic marine species which is detrimental for the people in the municipality.

Socially, it will cause a major effect in the livelihood of people who are dependent on the aquatic resources, particularly, artisanal fishermen. Furthermore, loss of livelihood may also be provoked by reduction of marine productivity due to prior migration of fishes. This event will also trigger a decrease on food supply, specifically on fish and other seafood. Aside from the social issue brought about by decrease of marine productivity, this will also negatively affect the economy of the municipality. The commerce and trade industry of Santa Fe in terms of marine products has been prominent throughout the years. However, these events may pose a future decline on the economic activities that gave prolong support to the market and wealth of the municipality. The increase in temperature may also lead to loss of

marine species due to heat stress and spread of invasive alien species which may further result to disruption of balance on the coastal ecosystem.

Another climate variable that may threaten the coastal ecosystem is the increase in precipitation. With regards to marine biota, eutrophication is the primary stressor of this climate variable. Eutrophication in coastal waters is caused by nitrogen input from river run-off. This process contaminates water and marine resources through algal blooms (Sinha, et al., 2017). In addition, it depletes the nutrients in the water, primarily, oxygen because of the presence of algae. In the long run, eutrophication will destroy marine habitats, thus, loss of endemic marine species. Like the effect of increase in temperature, the loss of endemic species will further result to loss of livelihood.

In terms of coastal settlements, increase in precipitation levels causes inundation and displacement of land, specifically, sand and soil on nearby shoreline. This event causes land to erode and eventually trigger landslide from occurring. The incidence of landslide will bring damage to the development sectors, especially on infrastructures. In addition, this climate variable causes the mangroves to uproot and drown. In effect, there will be a need for mangrove rehabilitation which will cause anthropogenic factors such as coral bleaching.

Generally, the most vulnerable will be greatly affected by the adverse effects of climate change, specifically, the poorest and marginalized. The need for an adaptive, inclusive, equitable, risk sensitive, and climate and disaster resilient development, is pressing and critical because the risk that climate change may bring is unpredictable and unimaginable. Therefore, the municipality must act towards climate and disaster resiliency.

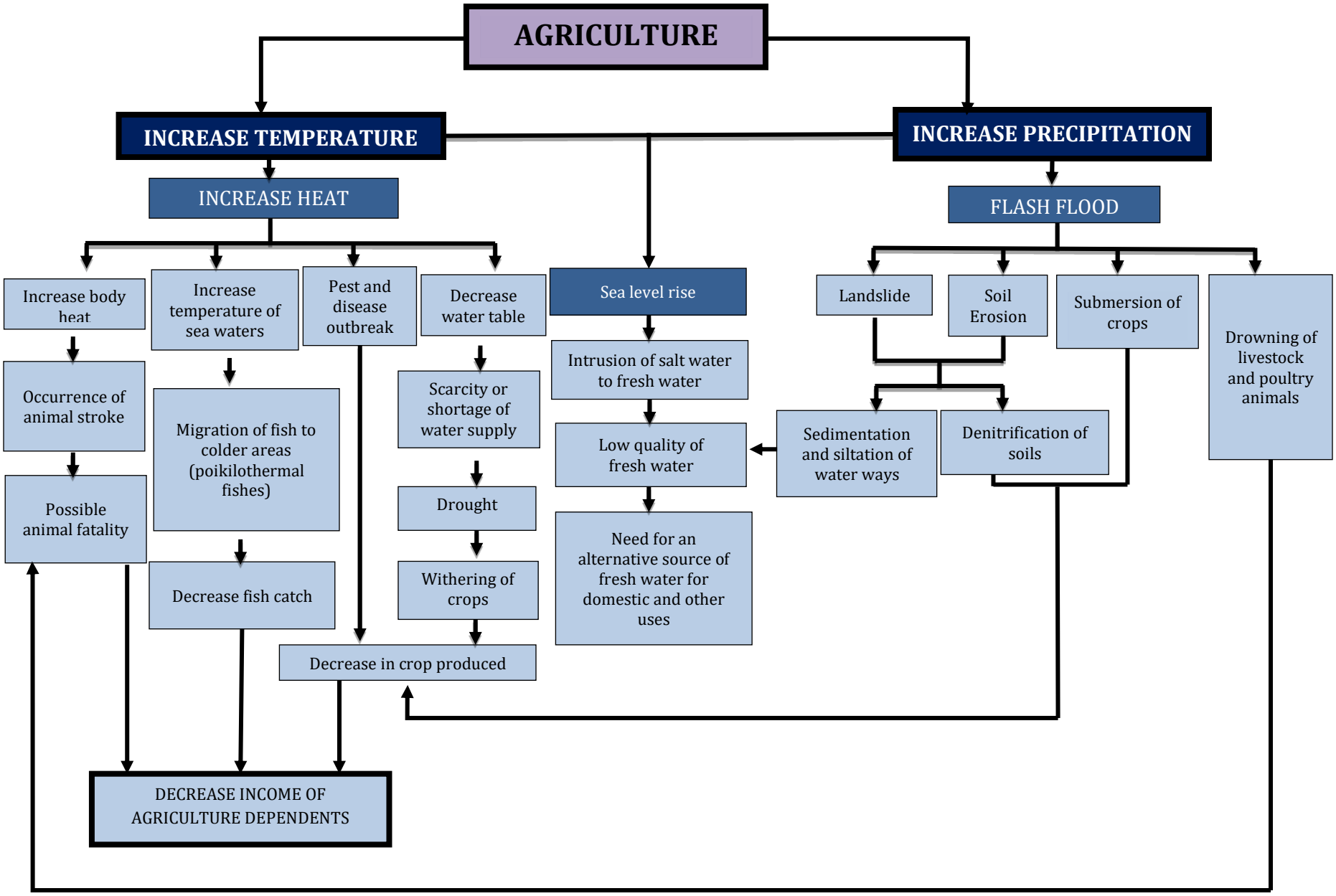


Figure 7. Impact Chain Diagram for Agriculture Ecosystem

2.5.3. Agriculture Ecosystem

The municipality of Santa Fe predominantly relies on their agriculture ecosystem. Preservation of these agricultural lands through various mitigation and adaptation strategies and interventions is of paramount importance in order to ensure the economic productivity and food security in the municipality. Mitigation and adaptation measures are also crucial in order to combat the effects of climate change. In Figure 7, the effects of the changing climate variables in agriculture is presented in a diagram to illustrate the impacts to the different sectors of the ecosystem.

Two of the most evident factors that affect the agriculture sector is the El Niño Southern Oscillation (ENSO) and La Niña. These phenomena are further aggravated by the increase in temperature and increase in rainfall in a geographic area. The increase in temperature causes heat waves which aggravates stress on crop production, livestock, and poultry industries. Higher temperature leads to a decrease in water table since there is a need for more withdrawal of water from various sources such as rivers, groundwaters, and water reservoirs to supply the increasing demand of water. Increased extractions from these water sources may have effects on water quality, stream ecosystems, and public health (Backlund P. et al, 2008). The scarcity of water may lead to further decrease in soil moisture, which can cause the soil to become arid, and drought for irrigation. This may lead to withering and impediment of crop growth, which in turn, can cause decreased crop productivity. Higher temperature can also lead to pest and disease outbreak which can also contribute to a reduced crop yield. The high temperature reduces the availability of water for livestock and poultry can cause animal stress and eventually, fatality due to of intense body heat and other complications.

Aside from crop production, the municipality greatly relies on fishing. The increase of temperature in sea waters may endanger the various species inhabiting the municipal waters. This may lead to the migration of poikilothermal fishes which can only thrive at specific temperatures, and eventual decrease in fish catch of the fisherfolks in the municipality.

Increased precipitation is another climate variable which may affect the agriculture sector. Higher volume of rain may lead to flooding in agricultural areas. Flooding may also intensify landslides and soil erosion, affecting the low-lying areas. Both landslide and soil erosion cause denitrification or removal of nitrates in the soil leading to decrease in soil nutrients and soil fertility. Also, due to landslide and soil erosion, sedimentation and siltation of waterways can occur, blocking the flow of water which can affect the quality of freshwater as experienced in Catolog River, Atik River, and in Pandan River. Flooding, which is the effect of increased rainfall, also causes the livestock and poultry animals to drown.

Both increased precipitation and temperature can cause sea level rise. Thermal expansion of the water basin due to heat absorption and addition of water from land-based sources are the main factors of sea level rise (National Research Council, 2010). When sea level rise occurs, there is a possibility for intrusion of saltwater to freshwater which can affect the fishponds and sources of drinking water. These effects further contribute to the decrease in agriculture productivity of the municipality and can lead to lower income for farmers, fisherfolks, and other agriculture-dependent households.

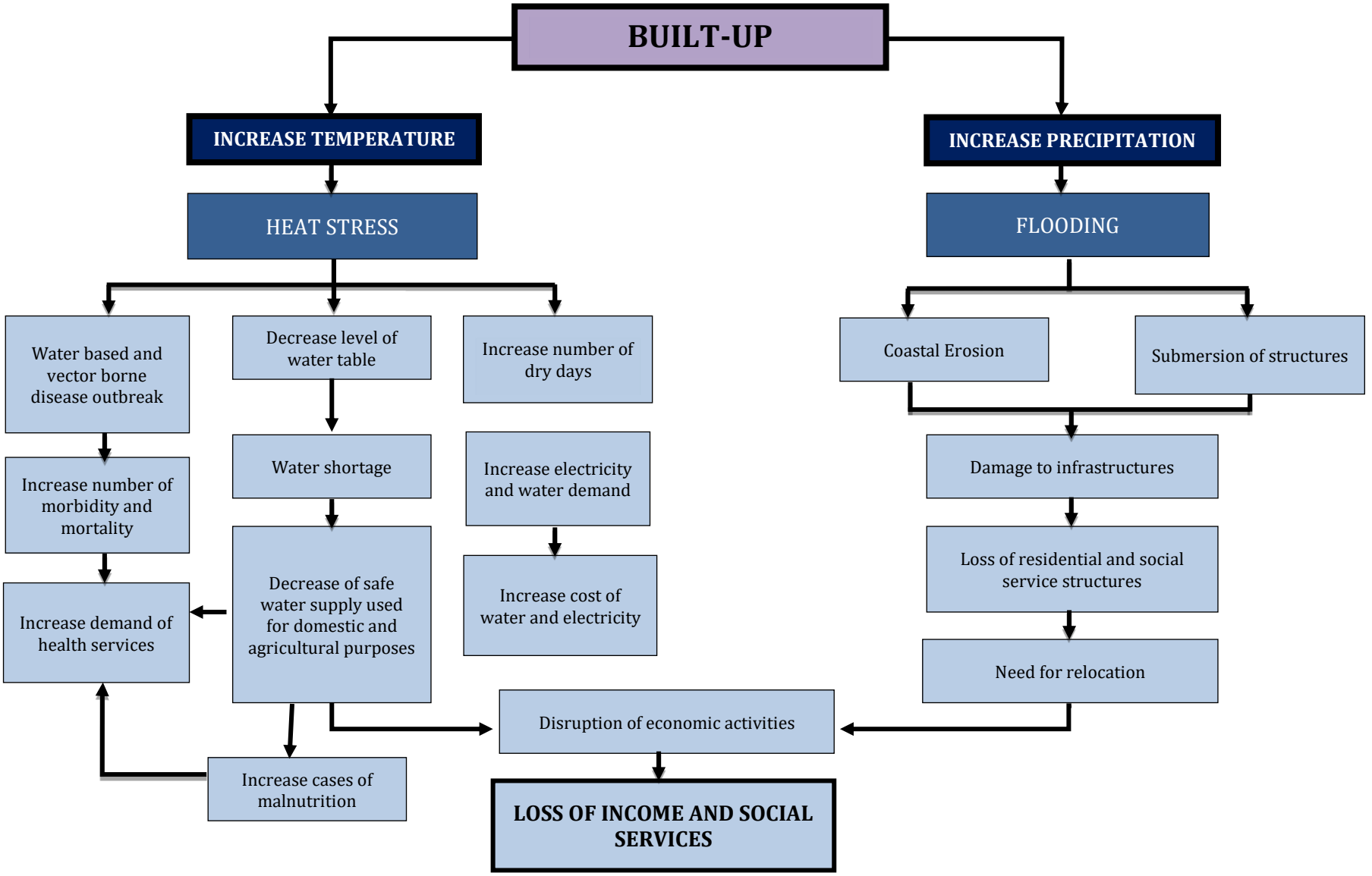


Figure 8. Impact Chain Diagram for Built-Up Ecosystem

2.5.4. Built-Up Ecosystem

The built-up ecosystem is another crucial ecosystem in terms of climate change adaptation. Increasing temperature and precipitation pose threats to the services and functions in built-up areas. Settlements and public health are the primary concerns of this ecosystem, although the climate variable also affect other sectors such as physical and natural environment and economy. The most vulnerable are the young and old dependent, as well as the persons with disability, and should be prioritized in addressing the impacts of climate change. The effects of an increase in temperature and precipitation are shown in the diagram in Figure 8.

Higher temperature increases the risk of heat stress which can lead to water and vector-borne diseases such as malaria and diarrhea. This increase the morbidity and mortality rate which would lead to a higher demand for health services such as health personnel and facilities, medicine, and vaccines. Heat stress from increased temperature can also decrease the water tables or water reserves which can cause lower water supply for domestic and agricultural uses. According to the BIMP-EAGA (2015), changes in climate variables can threaten the water quality and quantity. The limited supply of safe drinking water and water supply for agricultural purposes which threatens food security, can lead to higher malnutrition cases in the municipality.

Increased temperature and heat stress also contribute to the increase of dry days. Drought in agriculture also poses risks not only to food security but also to the agriculture-dependent households, which can increase the rate of rural-urban migration (UN-Habitat, 2004). Because of this, there is a higher demand for water and electricity in built-up areas. Higher electric bills and health maintenance costs are needed in order to reduce health risks caused by high temperature.

In terms of increased precipitation, flooding is the primary concern in built-up areas. Structures, particularly along the coasts, have high risk of experiencing the effects of rainfall-induced hazards. Infrastructures in low-lying areas may be submerged in the event of a flood.

Those in higher elevations may experience rainfall-induced landslides. Damages to infrastructures in built-up areas can cause road blockage which in turn, can delay different social and economic services. Areas that are inaccessible to roads and transportations services are the most vulnerable during these times (Morrow,1999; Cutter et al, 2003; and Flanagan et al, 2004). With this, the possible interventions include relocation and retrofitting of infrastructures. However, relocation may force them to alter their livelihoods and economic activities.

2.6. Exposure Information, Sensitivity Analysis and Adaptive Capacity Assessment

In order to determine the threat level of the various sectors to the different climate-related hazards identified, there is a need to assess which elements per sector are exposed to these hazards, the sensitivities/vulnerabilities of the exposed elements, and the capacity of these elements to adapt to the climate-related hazards they are exposed to.

The following sectors are the focus of this assessment: social/population sector, natural resources and economic sector which are integrated into natural resource production areas, urban uses, and lastly, the infrastructure sector which is composed of lifeline utilities and institutional facilities, which is also based on the recommended sectors of the DILG Rationalized Local Planning System and the Local Planning Illustrative Guide for Preparing and Updating the Comprehensive Development Plan and the exposure units assessed in CDRA.

2.6.1. Exposure Information

Exposure refers to the elements that are within the danger or hazard zones which are subjected to potential losses according to the definition of the IPCC Working Group II, Climate Change (2001) based on the HLURB Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan.

This exposure database provides the baseline information of the exposed sectors to the identified hazards (flood, landslide, tsunami) in the municipality, which are also threats of climate change. The exposure information of these sectors is from the Climate and Disaster Risk Assessment (CDRA) conducted by the Municipality of Santa Fe, Romblon in 2018.

Social/Population

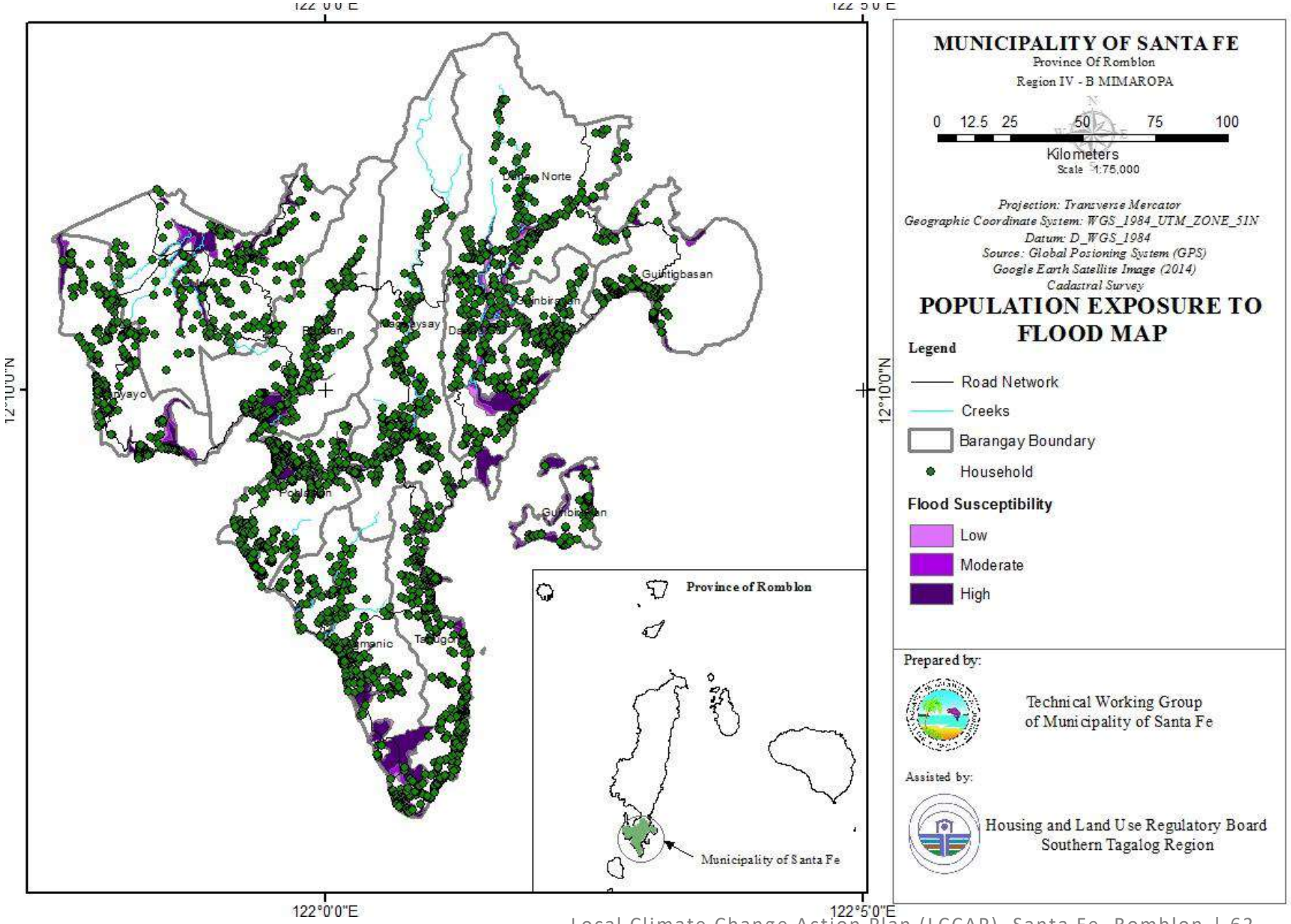
The population exposure information indicates the potentially affected persons and their demographic characteristics in the event of a hazard. Information on the data for population is based on the 2016 population record from Community-Based Monitoring System (CBMS). According to the record, there is a total of 14,777 population and 3,387 households in the municipality.

Flood Exposure

Based on the CDRA (2018) and the maps provided by the Mines and Geosciences Bureau (MGB), all the 11 barangays in the municipality are exposed to flood. Population exposed to flood are those in low-lying areas or settlements near rivers and creeks, or other inland waters.

In terms of the areas with populations affected by flood, there are 48.70 hectares with high susceptibility to flooding, 14.72 hectares with moderate susceptibility, and 57.60 hectares with low susceptibility, for a total of 121.03 hectares of exposed areas to flood.

For the number of affected populations, there are 2,209 people which are highly susceptible to the occurrence of flooding, 663 are moderately susceptible, and 2,882 people with low susceptibility to flood, with a total of 5,754 people in all the barangays exposed to flood. Barangay Tabugon has the highest number of people affected by flood with 1,426 persons while Danao Sur has the least with 18 inhabitants only. Map 5 shows the spatial location of the populations exposed to flood.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POPULATION EXPOSURE TO FLOOD MAP
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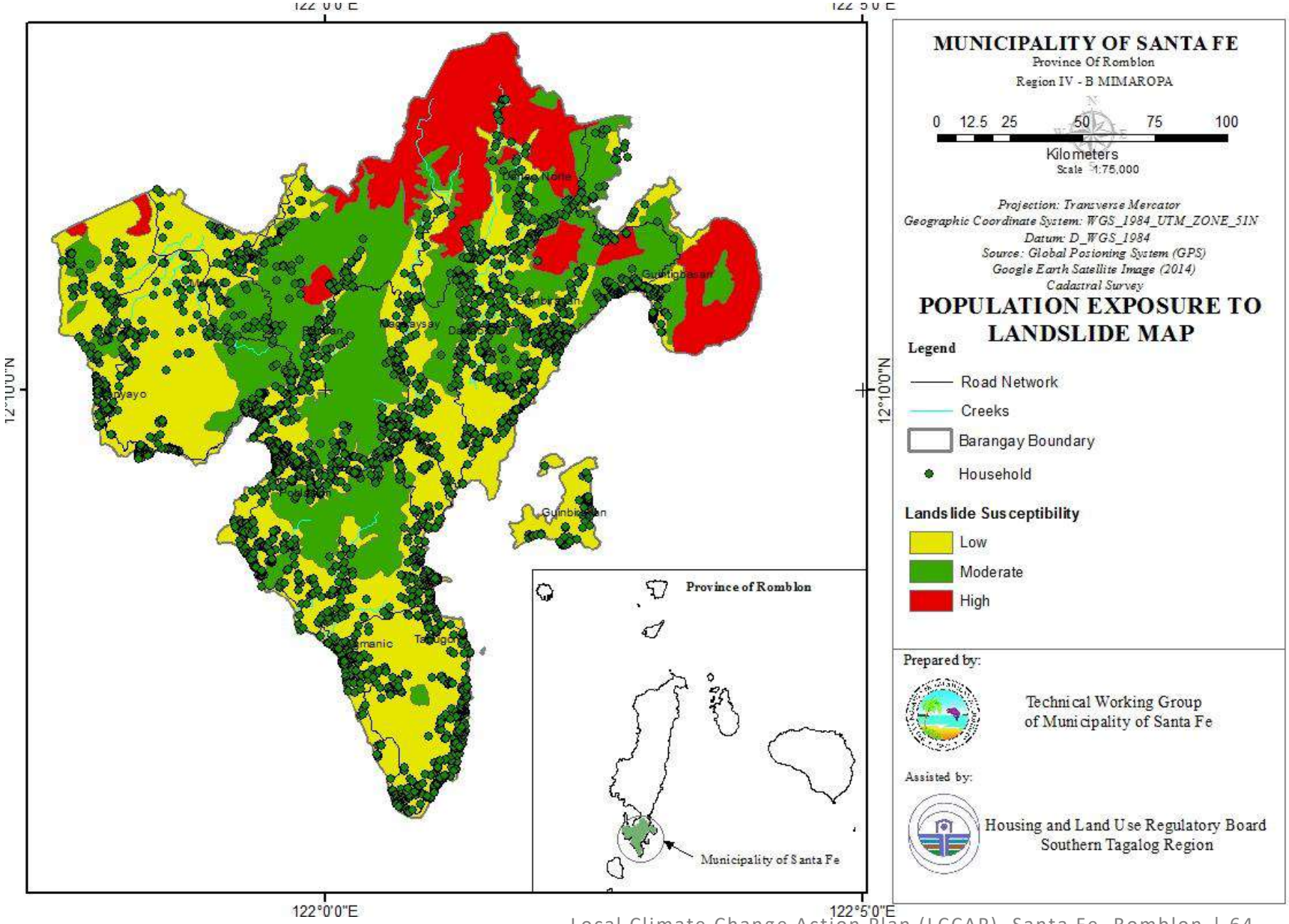
Guintigbasan
Norte

Landslide Exposure

All barangays of the municipality are also exposed to landslide. This is due to the presence of hills and mountain ridges dividing each barangay in Santa Fe. Barangay Magsaysay has the highest number of population affected by landslide with 569 persons while Barangay Poblacion has the lowest with 21 persons. Regarding the extent of areas with populations susceptible to landslide, there are a total of 30.01 hectares of areas with exposed populations to landslide occurrence. For the total number of populations affected by landslide, there are 1,683 people susceptible to landslide.

The CDRA (2018) of the municipality and the maps from the MGB shows that all 11 barangays have populations that are lowly susceptible to landslide. Barangays Canyayo, Danao Norte, Danao Sur, Guinbirayan, Guintigbasan, Magsaysay, Mat-i, Pandan, and Poblacion have populations with moderate susceptibility to landslide and only Barangay Pandan has populations that are highly susceptible to this hazard. Map 6 shows the population exposure of the municipality to landslide.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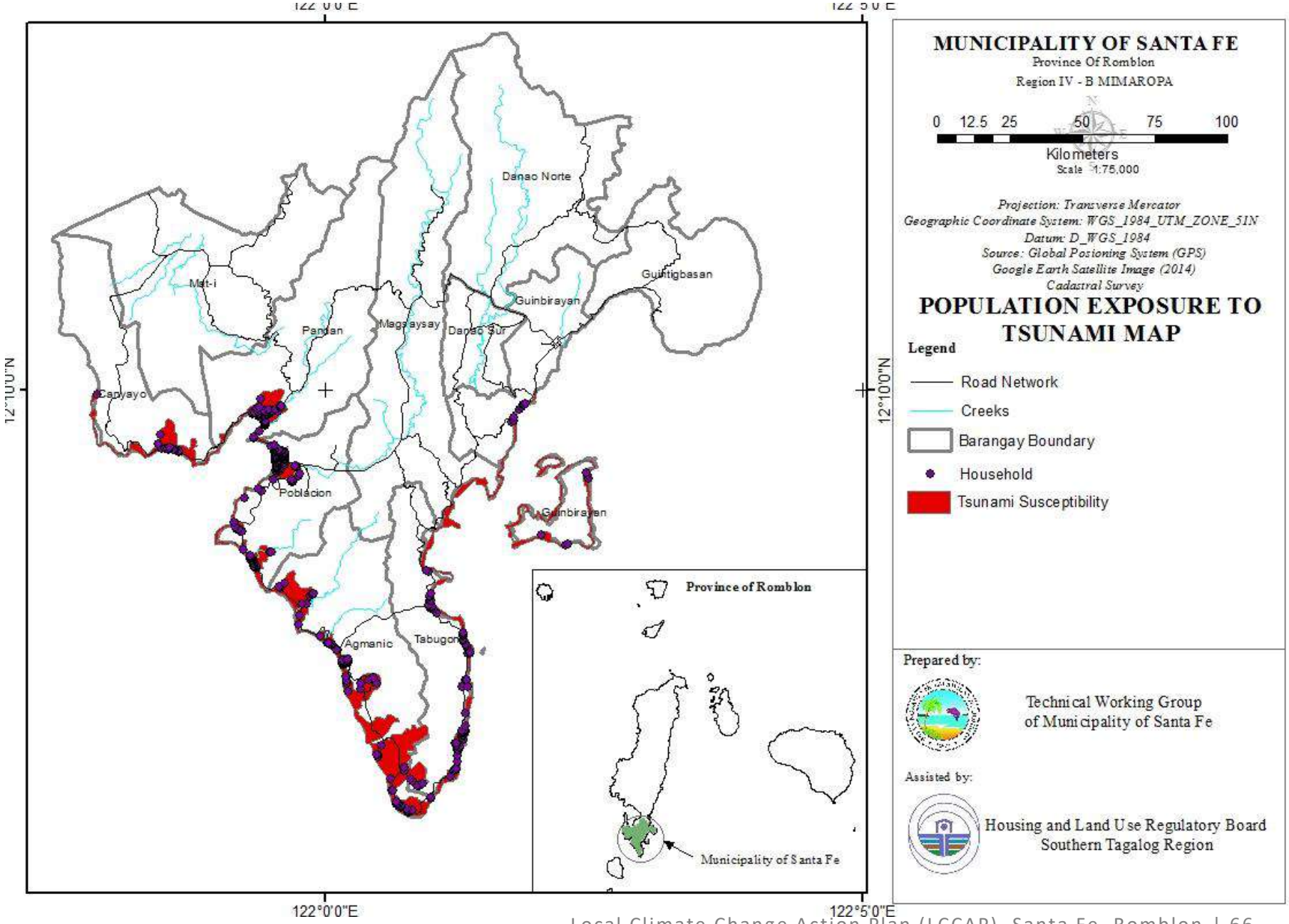
Tsunami Exposure

With regards to tsunami susceptibility, only barangays Agmanic, Guinbirayan, Pandan, Poblacion and Tabugon are exposed. The affected areas for tsunami only have low susceptibility, with a computed total of 47.141 hectares.

A total of 1,926 people is exposed to tsunami occurrence, all of which are lowly susceptible. Barangay Poblacion has the highest number of people affected by tsunami with 760 while the least is Guinbirayan with 69 persons. The population exposed to tsunami are shown in Map 7.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Province Of Romblon
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0 12.5 25 50 75 100
Kilometers
Scale 1:75,000
Projection: Transverse Mercator
Geographic Coordinate System: WGS_1984_UTM_ZONE_51N
Datum: D_WGS_1984
Source: Global Posioning System (GPS)
Google Earth Satellite Image (2014)
Cadastral Survey
POPULATION EXPOSURE TO TSUNAMI MAP
Legend
Road Network
Creeks
Barangay Boundary
Household
Tsunami Susceptibility
Prepared by:
Technical Working Group of Municipality of Santa Fe
Assisted by:
Housing and Land Use Regulatory Board Southern Tagalog Region
Danao Norte
Mat-i
Pandan
Magtaysay
Danao Sur
Guintigbasan
Guinbirayan
Canyayo
Poblacion
Guinbirayan
Agmanic
Tabugon
Province of Romblon
Municipality of Santa Fe
122°0'0"E
122°5'0"E
12°10'0"N

Natural Resource-Based Production

Natural resource-based production areas refer to lands used for agricultural production, mainly includes crop production, poultry industries, marine and forest production. For the municipality of Santa Fe, natural resource-based activities are the main economic drivers in the municipality. The natural products are being exported to neighboring cities and municipalities such as Looc, Panay Island, and Lucena. Aside from their agricultural produce, the municipality of Santa Fe particularly known for their seaweed production in which both dry and fresh products are exported nationwide.

For the municipality, the production areas are primarily categorized into rice production (irrigated and rain-fed), mixed fruit-bearing trees (include coconut, mango, and banana), forest areas, and grasslands which are used as pasture areas for livestock production, and fishponds. There are production areas that are also located along the coasts. There is a total of 6,088.52 hectares of agricultural areas in Santa Fe. Assessment for the environment sector are incorporated in the discussion for economic production since it includes the natural resources of the municipality.

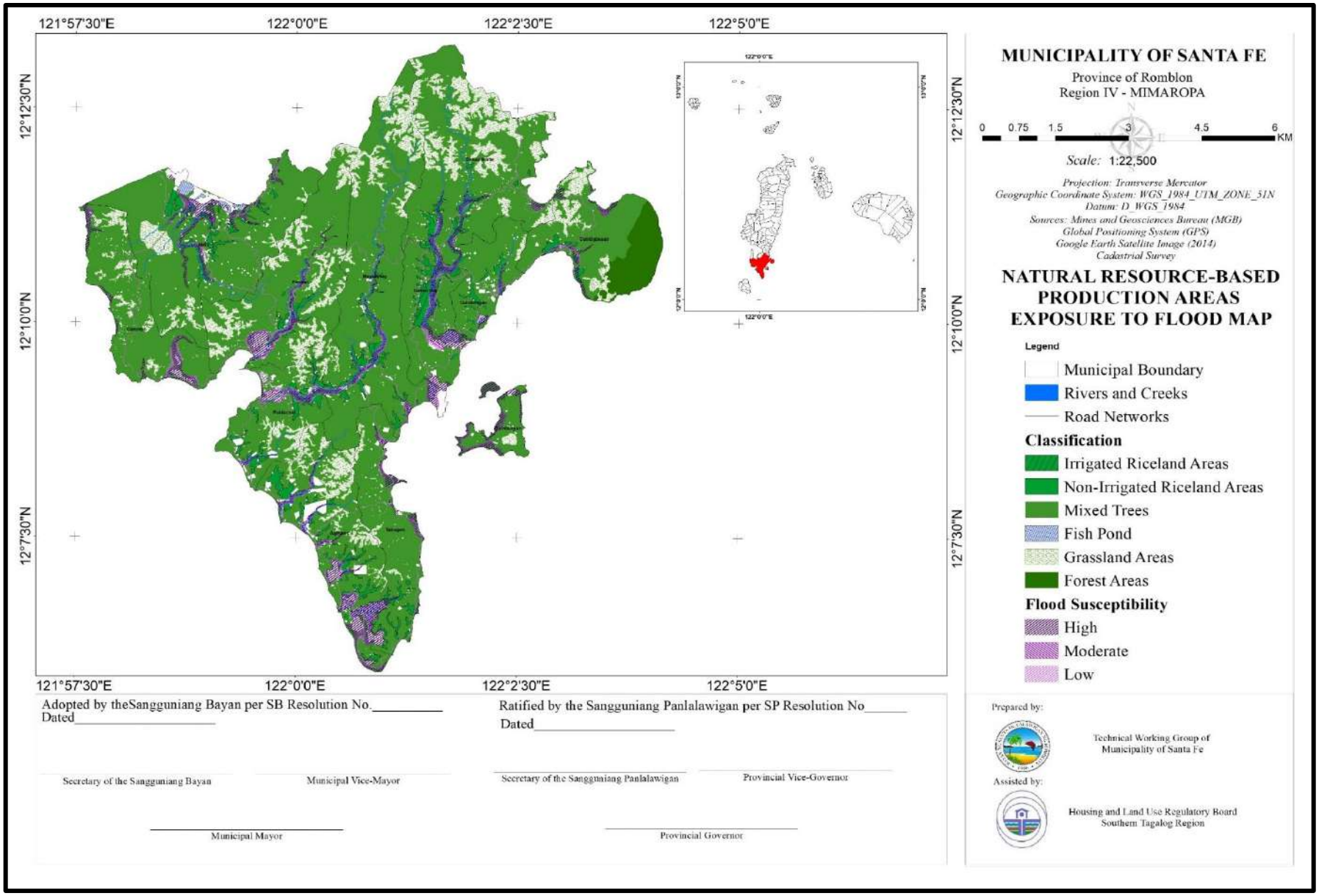
Flood Exposure

Exposure for the natural resources in the municipality is derived using GIS computations. Forest and grassland areas are not susceptible to flooding. From a total of 5,109.46 hectares of areas with mixed fruit-bearing trees and rice fields, 4,752.23 hectares are susceptible to flood. The mangrove swamps in the municipality comprises of 58.26 hectares according to GIS, and all of these are susceptible to flooding. Around 62.27 hectares of fishponds are found in Santa Fe and 44.29 hectares of these are exposed to flood. All 28.52 hectares of rivers and creeks are exposed to flooding as well. Lastly, from the computed area for swamp, which is approximately 81.55 hectares, 80.11 hectares are exposed to flooding.

In terms of economic production, the areas and the value of production per area are computed. From the CDRA (2018) of Santa Fe and the hazard maps provided by MGB, all the

barangays have production areas susceptible to flood. There is a total of 364.03 hectares from the 6,088.52 hectares of agricultural lands that are exposed to flood occurrence—237.62 hectares are highly susceptible to flooding, 84.10 hectares are moderately susceptible, while 42.32 hectares are lowly susceptible to the occurrence of flooding in the municipality.

Based on the average output (PhP) per hectare of agricultural land categorized by the dominant crop/product and the extent of area affected by flood, approximately PhP 31,861,376.06 is the total estimated cost of damages caused by flooding in all barangays in the municipality of Santa Fe. The natural resources-based areas exposure to flood is shown in Map 8.

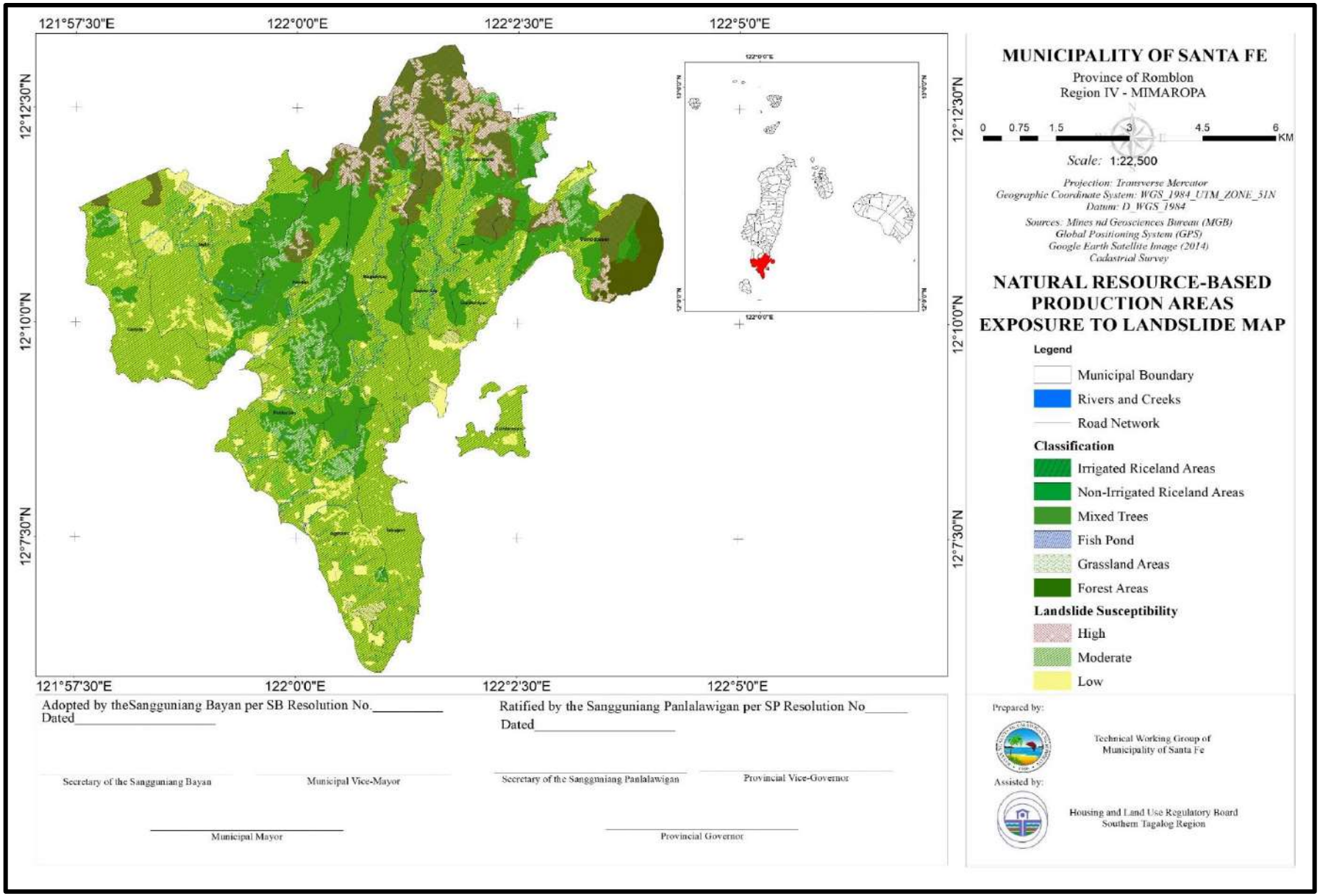


Map 8. Natural Resource-Based Production Areas Exposure to Flood Map, Sta. Fe, Romblon

Landslide Exposure

All natural resources are affected by landslide. The GIS-derived area of the forests in the municipality totals to 133.92 hectares, all of which are exposed to landslide. The combination of mixed trees and rice fields comprises a total area of 2,082.71 hectares that are susceptible to landslides as well. The landslide exposure of grasslands has a total area of 434.29 hectares. Conversely, the mangrove areas, fish ponds, swamps, rivers, and creeks have a collective area of exposure to landslide that totals to 157.76 hectares.

According to CDRA (2017) of Santa Fe, an estimated 2,808.68 hectares or 46.60 percent of the natural resource-based production areas are exposed to the occurrence of landslide. For the affected value of the economic products in these areas, a total of PhP 117,500,907.55 is the anticipated damages caused by landslide. This is computed based on the average output per hectare of the agricultural lands (PhP) based on the dominant product/crops produced. Map 9 shows the natural resource-based production areas exposed to landslide.



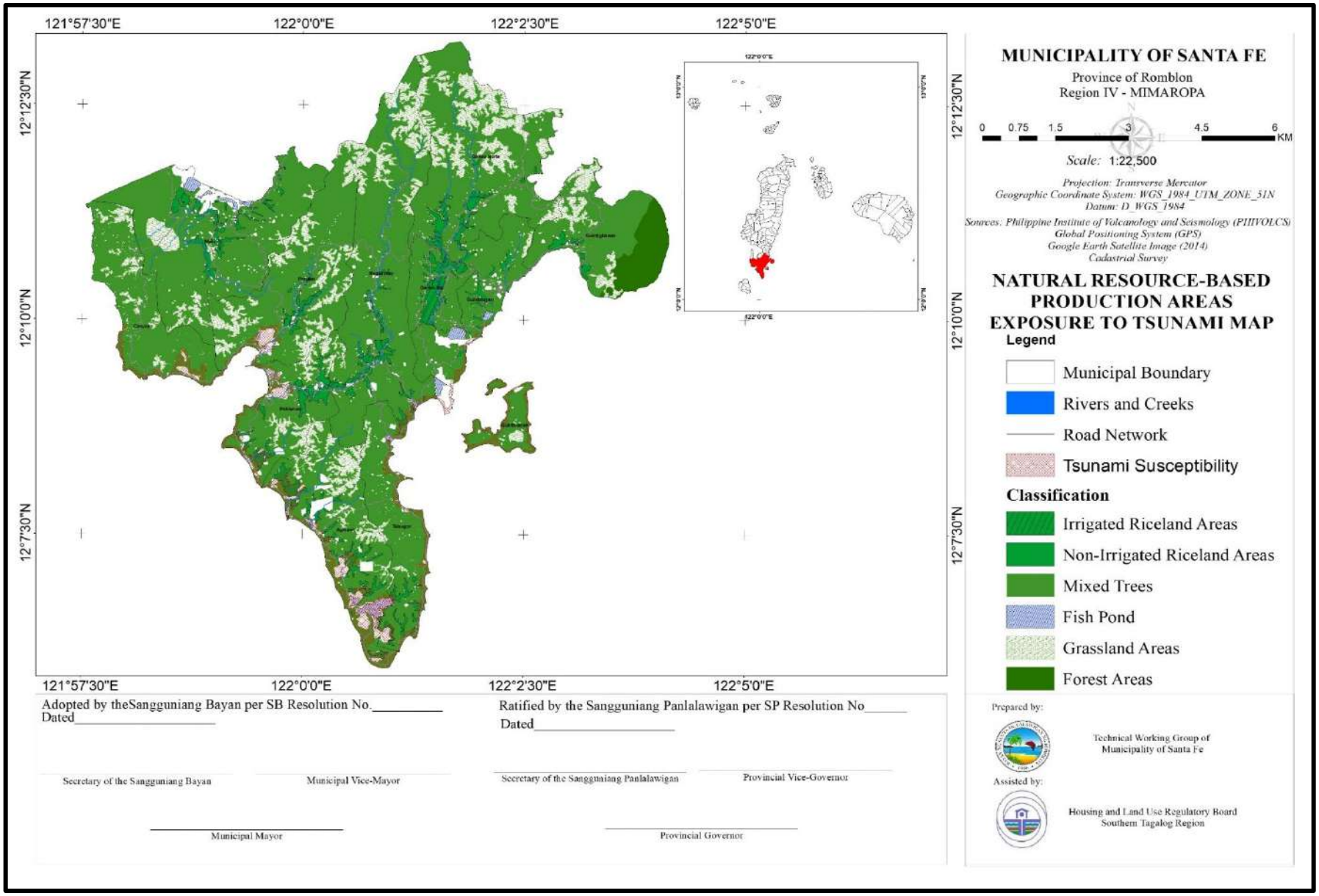
Map 9. Natural Resource-Based Production Areas Exposure to Landslide Map, Sta. Fe, Romblon

Tsunami Exposure

The natural resources that are exposed to tsunami include mixed trees and rice fields, which constitutes a total of 2,551.22 hectares according to GIS computations, mangrove areas with 3.88 hectares exposed, fishponds which have 30.86 hectares susceptible, 28.52 hectares of rivers and creeks, and lastly, an affected area of 55. 45 hectares for swamps.

In terms of the economic production, areas that are susceptible to tsunami hazard includebarangays Agmanic, Canyayo, Guinbirayan, Magsaysay, Pandan, Poblacion, and Tabugon. From the maps provided by the PhiVOLCS, there is a total of 307.99 hectares of production areas susceptible to tsunami.

An amount of PhP 23,549,964.91 is the computed estimated losses from the damages caused by the occurrence of tsunami in the municipality. Map 10 shows the exposed natural resource-based production areas to tsunami.



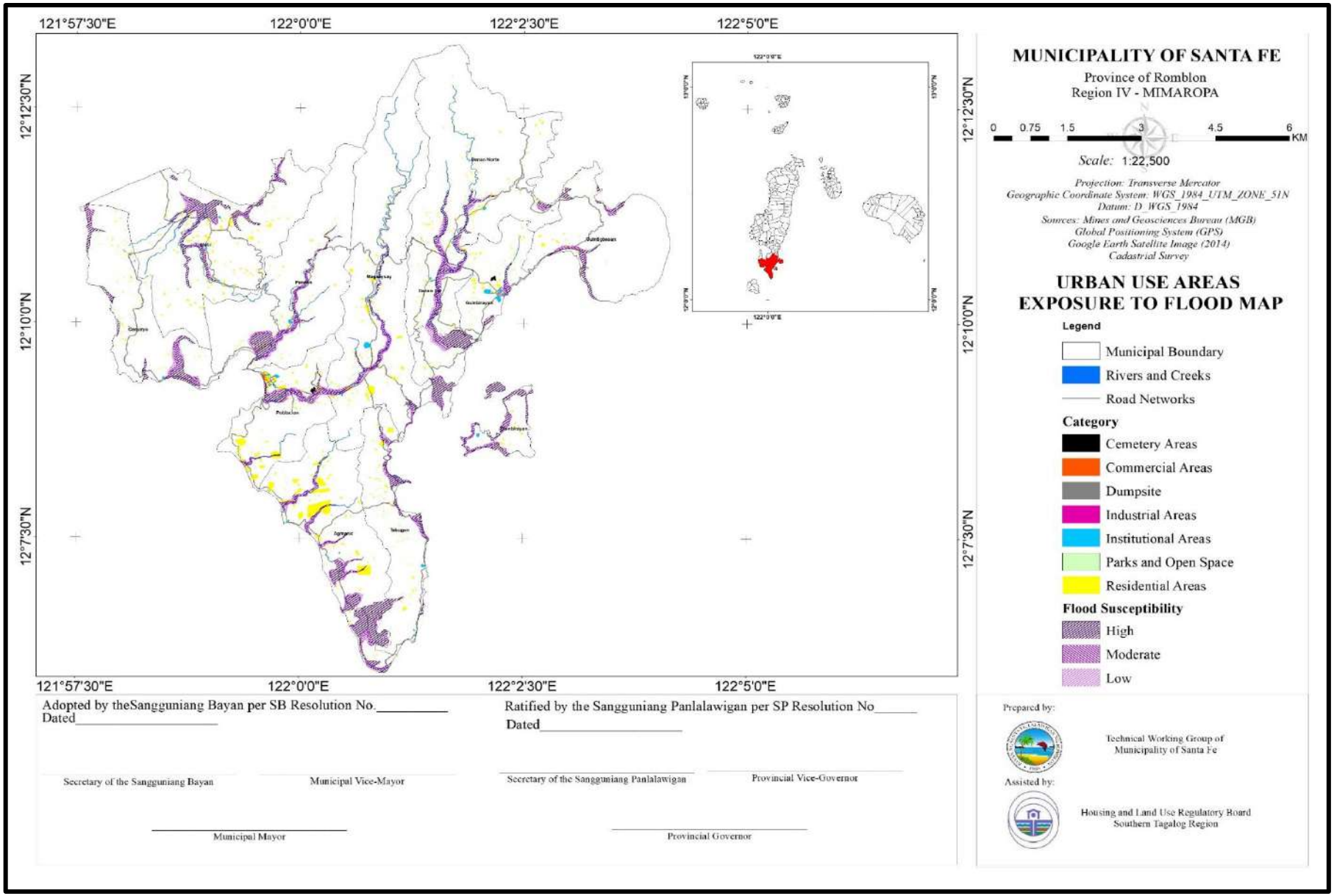
Map 10. Natural Resource-Based Production Areas Exposure to Tsunami Map, Sta. Fe, Romblon

Physical Land Use

The built environment which are utilized for the various land uses such as residential, commercial, institutional, parks and open spaces, industrial areas, and dumpsites comprises this part of the assessment. The land uses are extracted based from the existing land use map of the municipality. The residential areas which has a total of 128.37 hectares, 8.30 hectares of institutional uses, parks and open spaces with 0.14 hectares, cemeteries which are composed of 1.46 hectares, commercial areas with 1.38 hectares, industrial areas which are made up of 0.008 hectares, and dumpsites with an area of 0.46 hectares, are what constitutes the land area covered. The exposure information of the physical land use is based from the CDRA (2018), using the urban use areas baseline information.

Flood Exposure

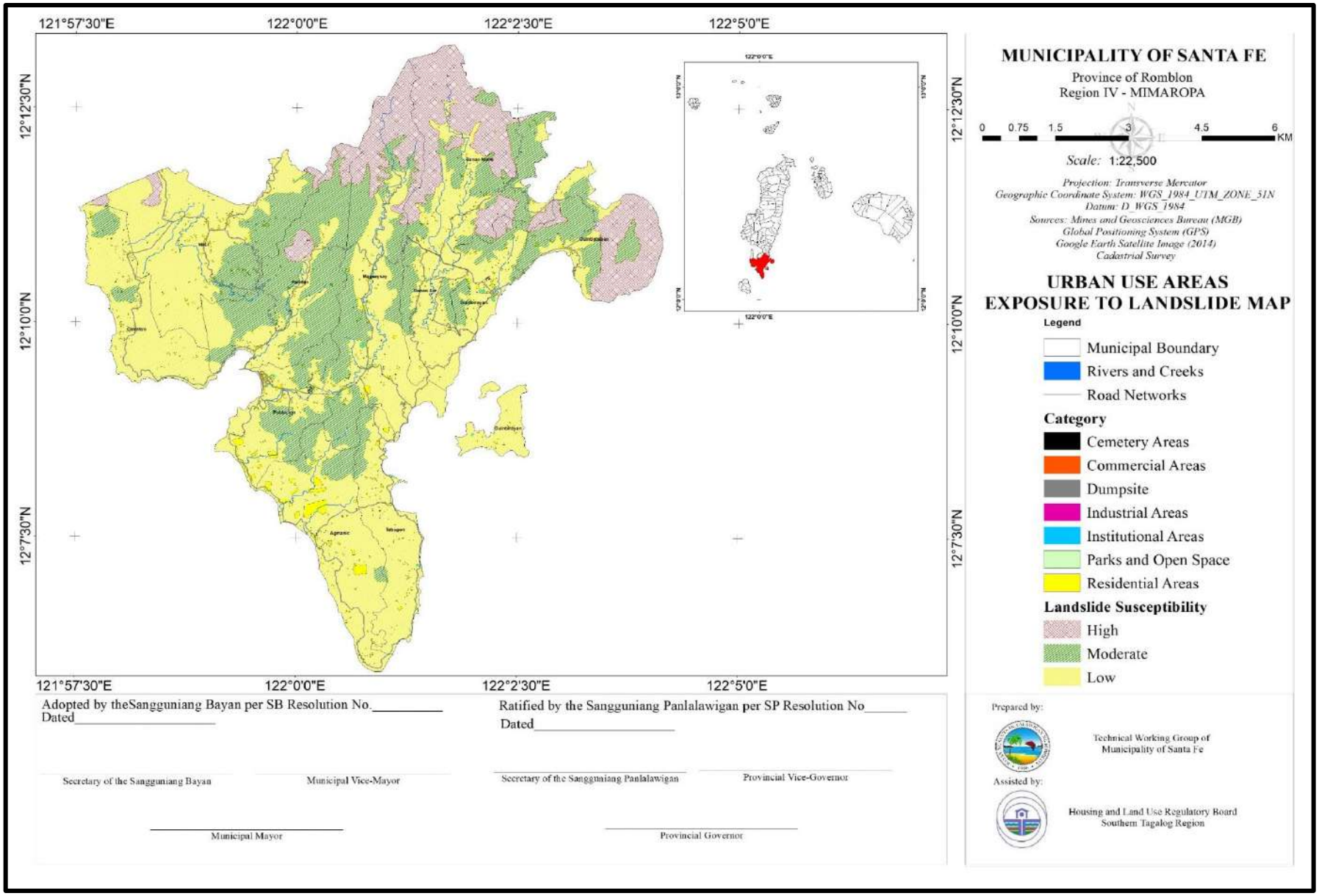
There is a total of 17.28 hectares of land uses exposed to flooding. The areas which are highly susceptible has a total of 9.46 hectares of residential areas, 0.15 hectares of commercial areas 0.55 hectares of institutional areas, 0.0052 hectares of landfill, and 0.12 hectares of the parks and open spaces in the municipality. According to the CDRA (2018), among the 11 barangays that are exposed to flooding, Barangay Poblacion has the most land uses that are exposed to flood with a total of 3.49 hectares. On the other hand, Guinbirayan has 0.25 hectares of land uses exposed to flood, which is the least among all the barangays. The total replacement cost of the exposed land uses to flood amounts to PhP 20,383,430.50. Map 11 shows the exposure of the various land uses in the municipality to flood occurrence.



Map 11. Urban Use Areas Exposure to Flood Map, Sta. Fe, Romblon

Landslide Exposure

For the landslide exposure, according to CDRA (2018) of Santa Fe, all barangays have land uses which are susceptible to landslide; these land uses are residential, commercial, institutional, and cemetery. The total area of exposure for residential areas in all barangays is 15.58 hectares, majority of which came from Mat-i with 3.91 hectares. In terms of commercial areas, only Danao Norte and Danao Sur have susceptible areas with 0.002 hectares and 0.0004 hectares, respectively. With regards to landslide exposure of institutional areas, four (4) barangays are exposed, namely: Danao Norte, Magsaysay, Mat-i, and Pandan. Collectively, the area of exposure for institutional areas is 0.14 hectares. For cemetery, only the burial ground in Poblacion which has 0.18 hectares is exposed to landslide occurrence. Map 12 shows the landslide exposure map of the urban uses in Santa Fe.

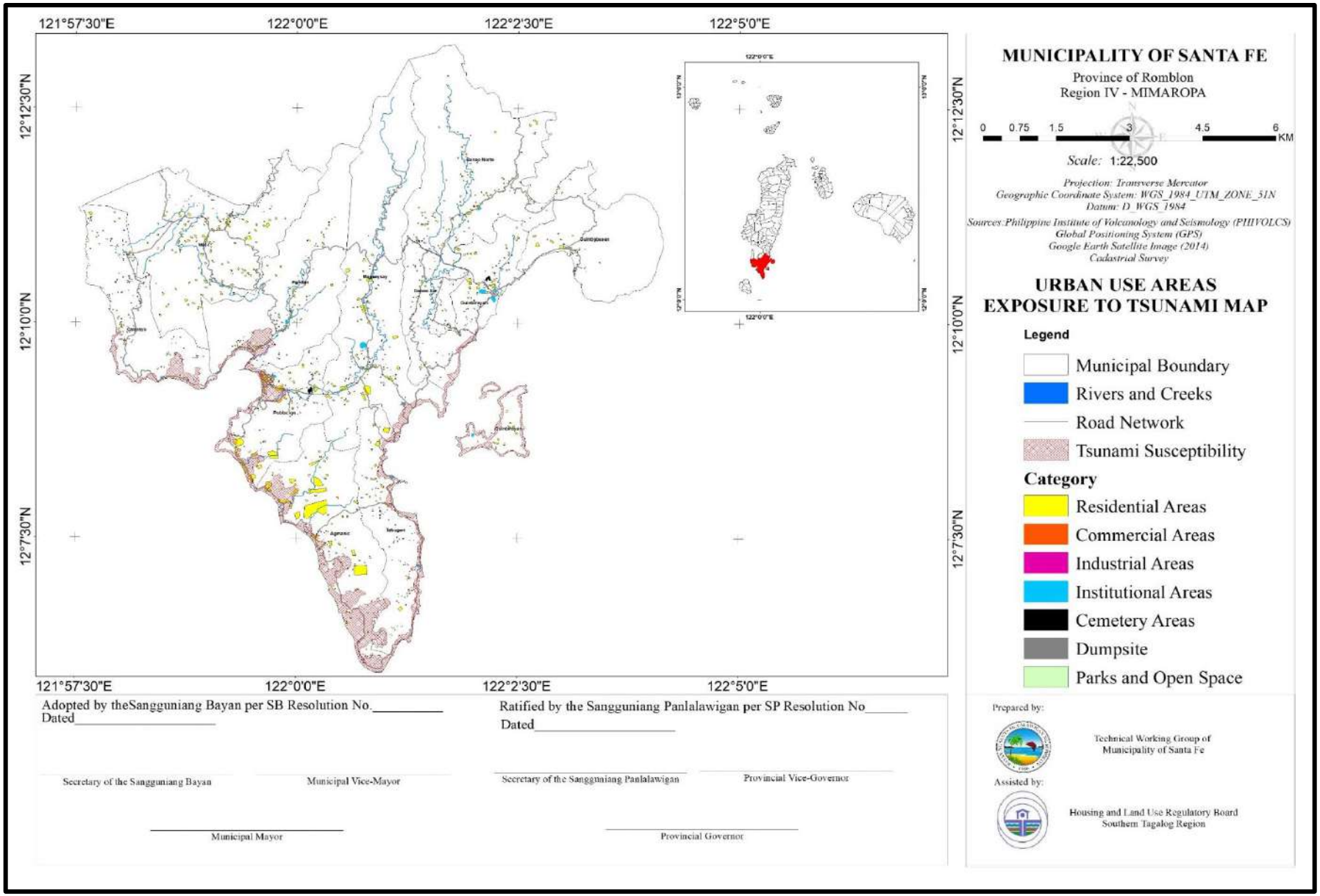


Map 12. Urban Use Areas Exposure to Landslide Map, Sta. Fe, Romblon

Tsunami Exposure

Out of the 11 barangays only six are susceptible to tsunami occurrence. These are barangays Agmanic, Canyayo, Guinbirayan, Pandan, Poblacion, and Tabugon, all of which have low susceptibility to tsunami. These areas have a total of 18.50 hectares and categorized into residential areas, which are made up of 15.84 hectares, commercial areas with 0.79 hectares, institutional areas with 1.83 hectares, 0.008 hectare of industrial areas and a total of 0.03 hectares of parks and open spaces.

Although the municipality has not yet experienced tsunami, which is why the likelihood of experience is low, it is still important to prepare and anticipate for this hazard as well. The different land uses susceptible to tsunami are shown in Map 13.



Map 13. Urban Use Areas Exposure to Tsunami Map, Sta. Fe, Romblon

Lifeline Utilities

Lifeline utilities are the major linkage and distribution systems related to transportation within the municipality, power and water lines, and communication systems. The lifeline utilities in Santa Fe are constituted by roads, bridges and power lines.

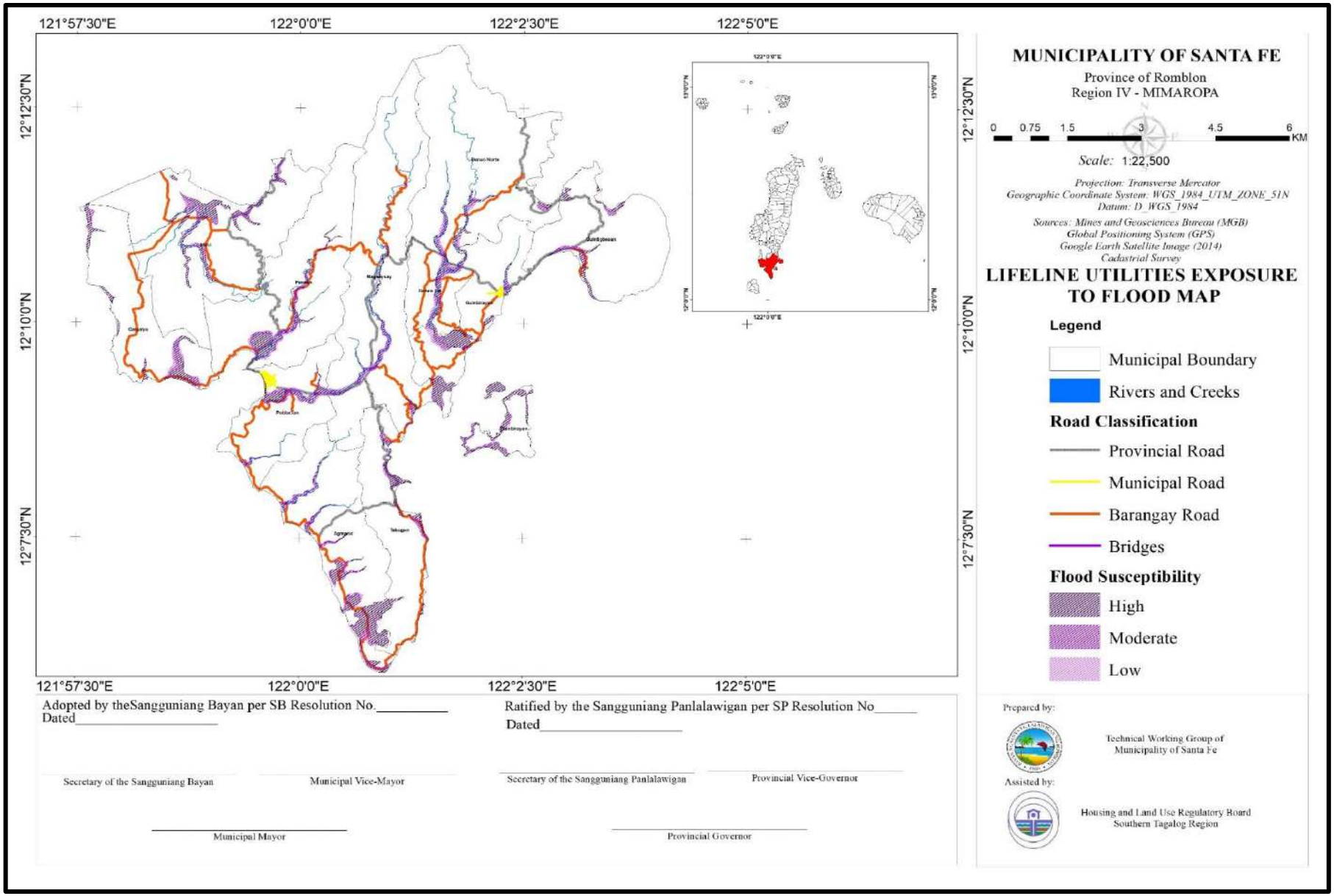
There is approximately 79.57 kilometers of roads in the municipality which are divided into three categories, namely: barangay, municipal and provincial. A total of 30.67 kilometers comprise the provincial roads, 2.71 kilometers of municipal roads, and 46.09 kilometers of barangay roads.

In terms of bridges, it is estimated that the total length is 0.101 kilometers. There are 11 bridges in the municipality assessed—Capdang bridge in Agmanic, Santol bridge in Danao Norte, Danao Sur bridge in Danao Sur, Guinbirayan and Atic bridges in Guinbirayan, Magsaysay and Palate bridges in Magsaysay, Pandan bridge in Pandan, and Tabuk, Barusbos, and Longa-og bridges in Poblacion.

The Tablas Island Electric Cooperative (TIELCO) supplies the electricity of the municipality. There are around 310 electric posts in the 11 barangays of the municipality. These are also included in the assessment for exposure to the different hazards.

Flood Exposure

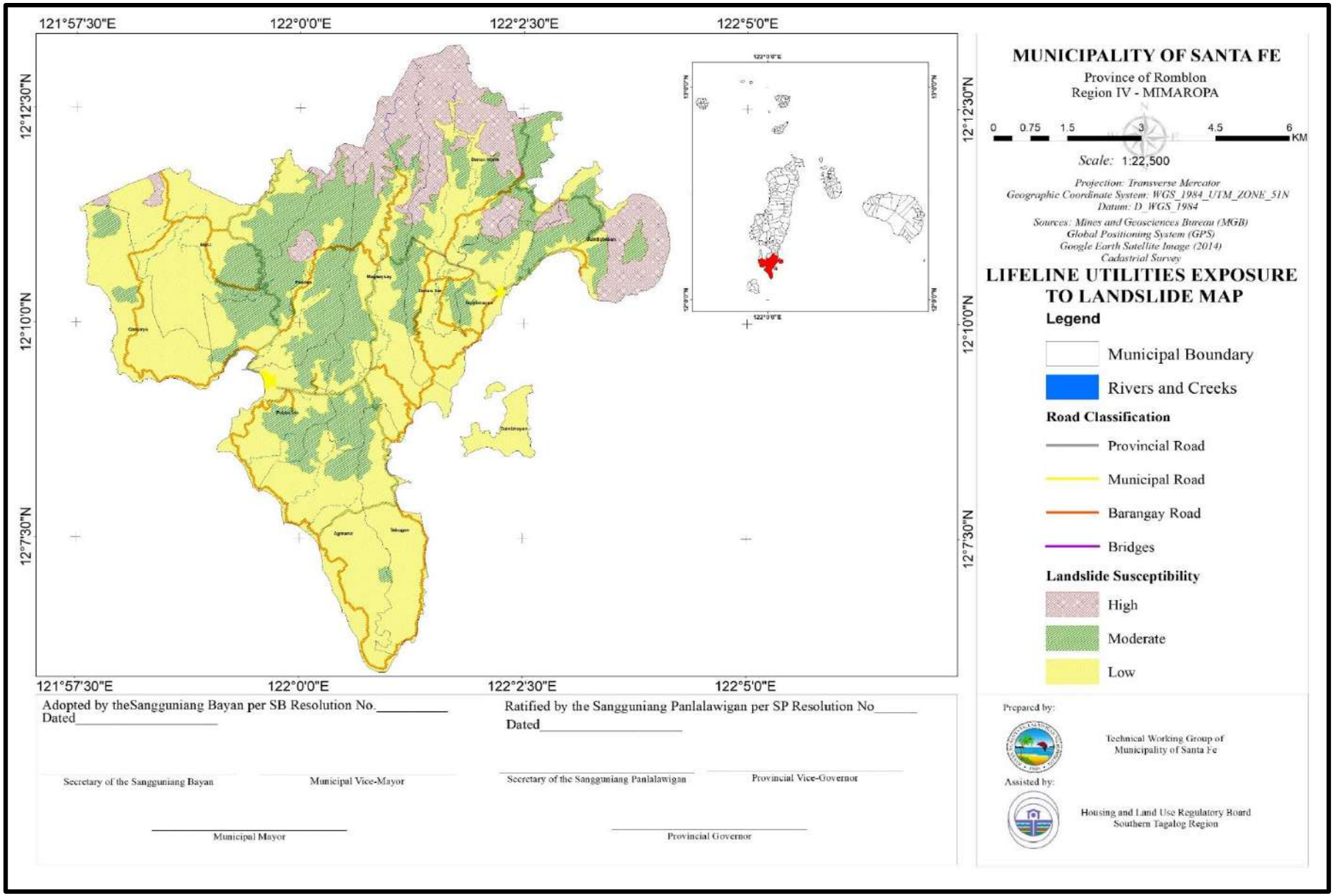
A total of 14.09508 kilometers of roads are exposed to flooding in which 1.55094 kilometers are lowly susceptible, 3.48974 kilometers are moderately susceptible, and 9.05440 kilometers are highly susceptible. With regards to bridges, there are 11 bridges exposed to flooding, namely: Agmanic and Cadpang Bridge in Agmanic, Santol Bridge in Danao Norte, Danao Sur Bridge in Danao Sur, Guinbirayan, Guba and Atic Bridge in Guinbirayan, Magsaysay and Palate Bridge in Magsaysay, Pandan Bridge in Pandan, and Bulangan and Longa-og Bridge in Poblacion. A total of 0.241 kilometers of these bridges are highly susceptible while 0.013 is moderately susceptible to flooding. On the other hand, 68 electric posts are exposed to flooding wherein 10 posts have low susceptibility, 22 are moderately susceptible, and 36 electric posts have high susceptibility susceptible to flooding. Map 14 shows the lifeline utilities that are exposed to the occurrence of flood.



Map 14. Lifeline Utilities Exposure to Flood Map, Sta. Fe, Romblon

Landslide Exposure

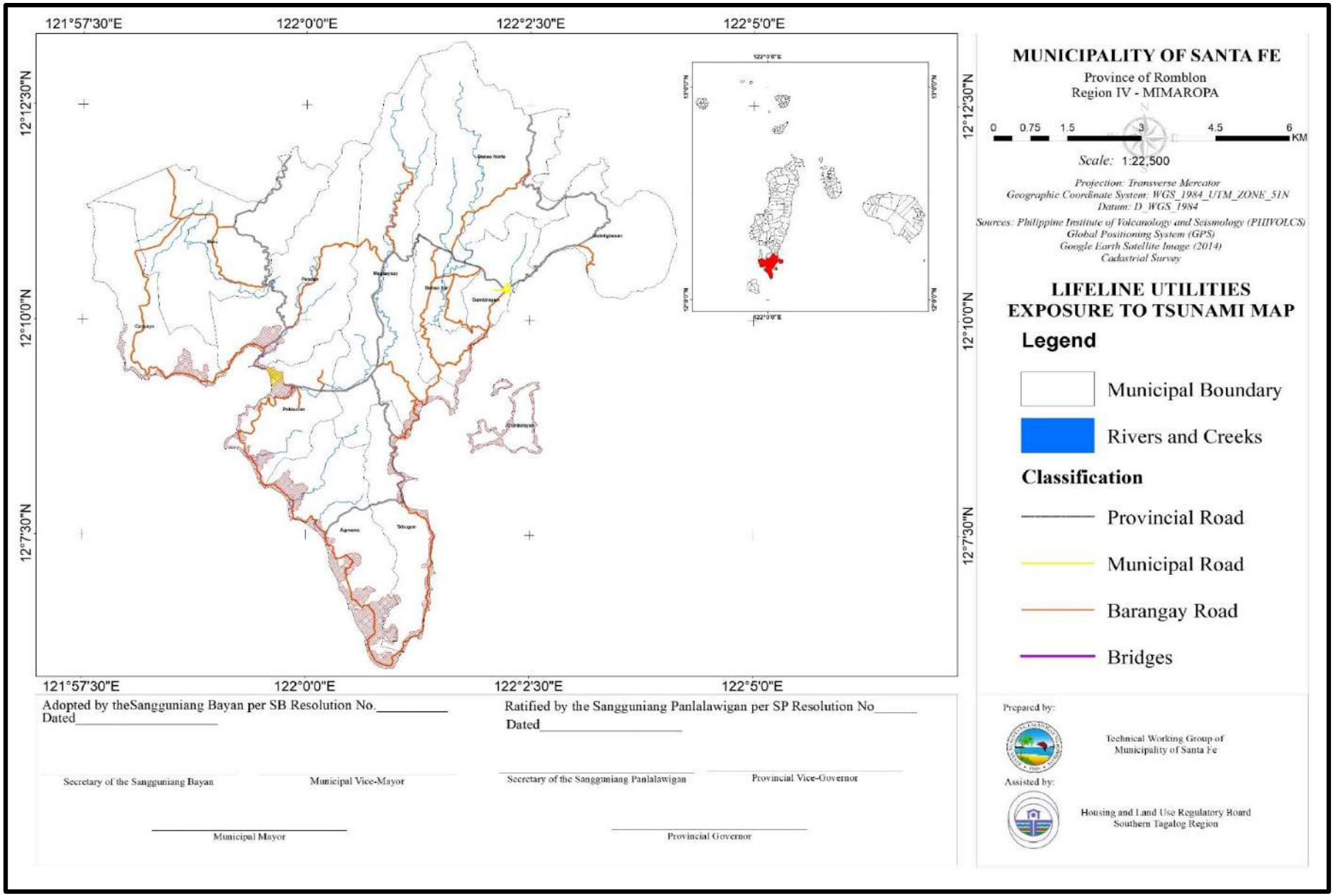
Approximately 15.186 kilometers of roads in the municipality are exposed to landslide in which 10.89 kilometers are provincial roads and 4.3 kilometers are barangay roads. In terms of electric posts only post numbers 21 to 43, 45 to 63, 141, 158 to 160, 216 to 219, 225 to 233, 256 and 257 are susceptible to landslide occurrence. These electric posts are located in barangays Guinbirayan, Guintigbasan, Magsaysay, Mat-i, Pandan, and Tabugon. Conversely, no bridges are susceptible to landslide occurrence. It is shown in Map 15 the exposed lifeline utilities to landslide.



Map 15. Lifeline Utilities Exposure to Landslide Map, Sta. Fe, Romblon

Tsunami Exposure

On the occurrence of tsunami, a total of 19.213975 kilometers of roads are exposed to this hazard. Likewise, all exposed roads are lowly susceptible. In terms of bridges, only Agmanic, Guba and Bulangan are exposed with a total length of 21.8398 meters. On the other hand, 25 electric posts located in Agmanic, Pandan, Poblacion and Tabugon are exposed to tsunami, all of these are at low susceptibility. Map 16 shows the lifeline utilities exposed to the occurrence of tsunami.



Map 16. Lifeline Utilities Exposure to Landslide Map, Sta. Fe, Romblon

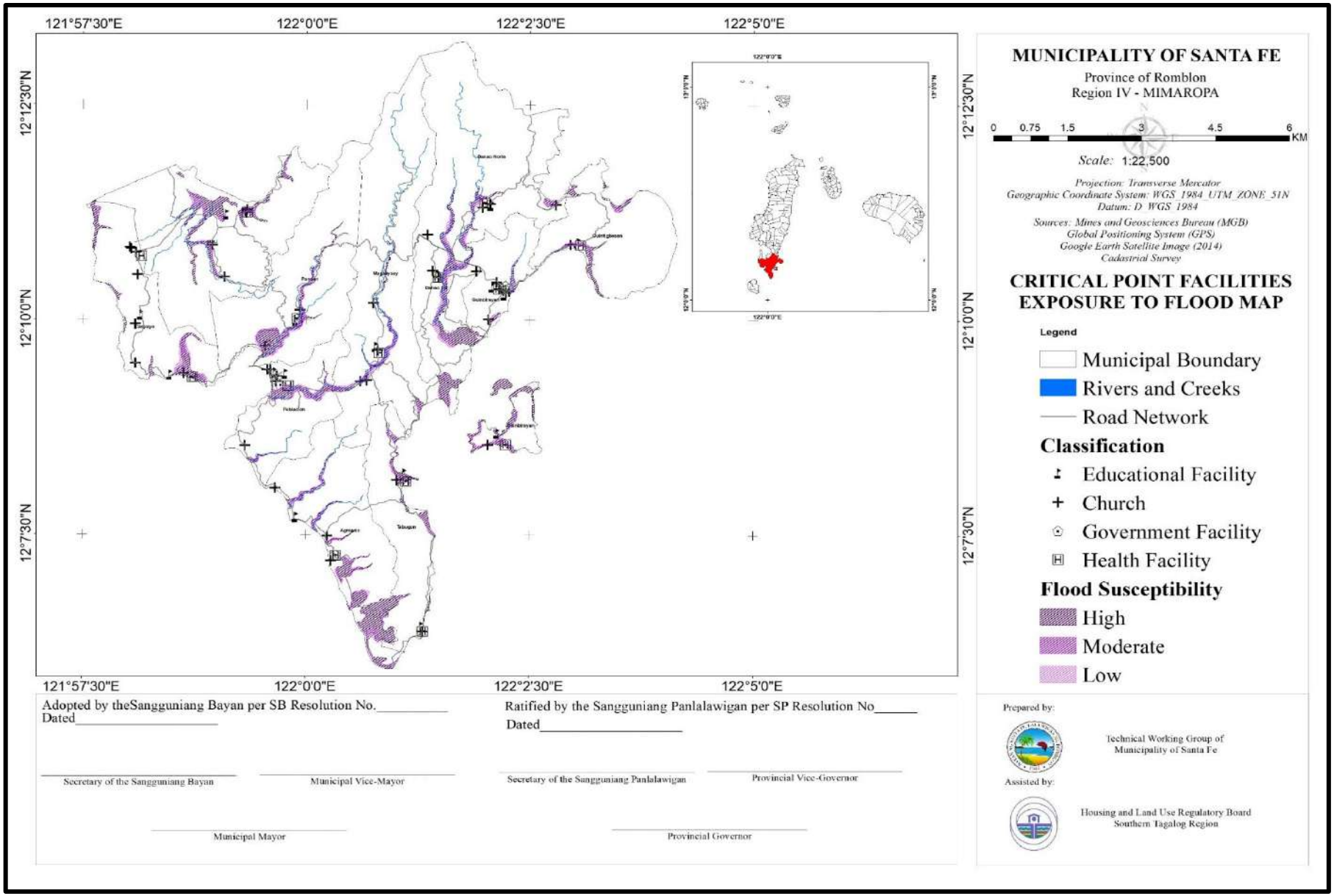
Institutional Facilities

The exposure information for the institutional facilities is based from the baseline information provided for the critical point facilities in the CDRA (2018). These are the facilities that provide critical socio-economic services and functions in the municipality such as the schools, hospitals/rural health units, government buildings, bridges, aiports/seaports, communication towers, and other power and water-related facilities as well as other facilities that provide basic social services for each barangay

Flood Exposure

Only eight (8) of the 11 barangays are susceptible to flooding which include Canyayo, Guinbirayan, Guintigbasan, Magsaysay, Mat-i, Pandan, Poblacion, and Tabugon and a total of 31 institutional facilities from these barangays are exposed.

According to the CPF exposure to flood map in Map 17, there is a total of 18 facilities from these barangays that are highly susceptible to flooding comprising of six churches, six day care centers, two health facilities, three barangay halls, and one public plaza. Moreover, there are 11 facilities moderately susceptible to flooding which is made up of three churches, two elementary schools, two day care centers, two health centers, one Rural Health Unit, and one barangay hall. Lastly, a total of three facilities are lowly susceptible to flood including one day care center, one barangay hall, and one public plaza.

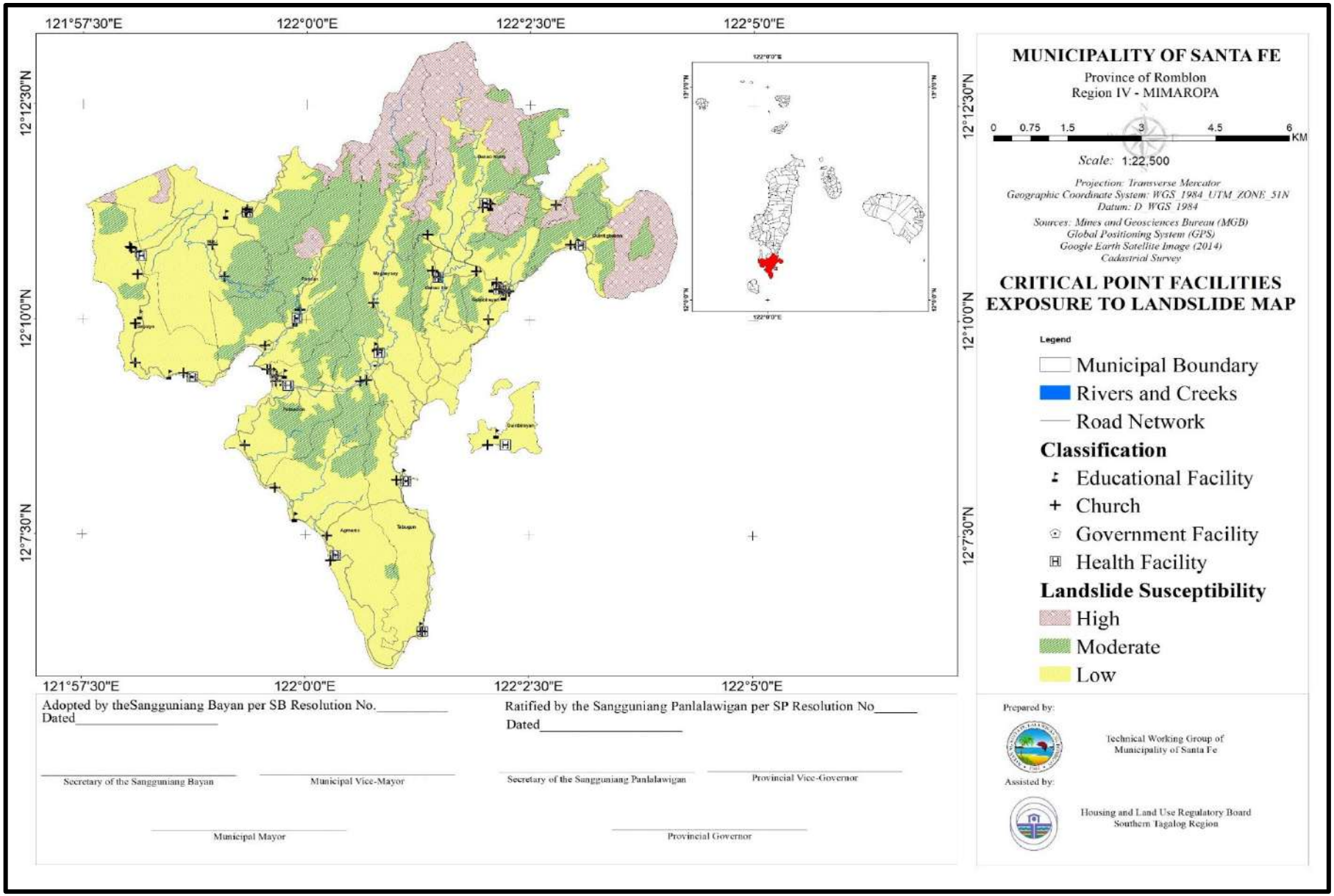


Map 17. Critical Point Facilities Exposure to Flood Map, Sta. Fe, Romblon

Landslide Exposure

For the exposure of institutional facilities to the occurrence of landslide, Danao Norte, Guinbirayan, Mat-i, Pandan, Poblacion and Tabugon only are the barangays which has exposed institutional facilities. Collectively, 13 facilities were found exposed to this hazard.

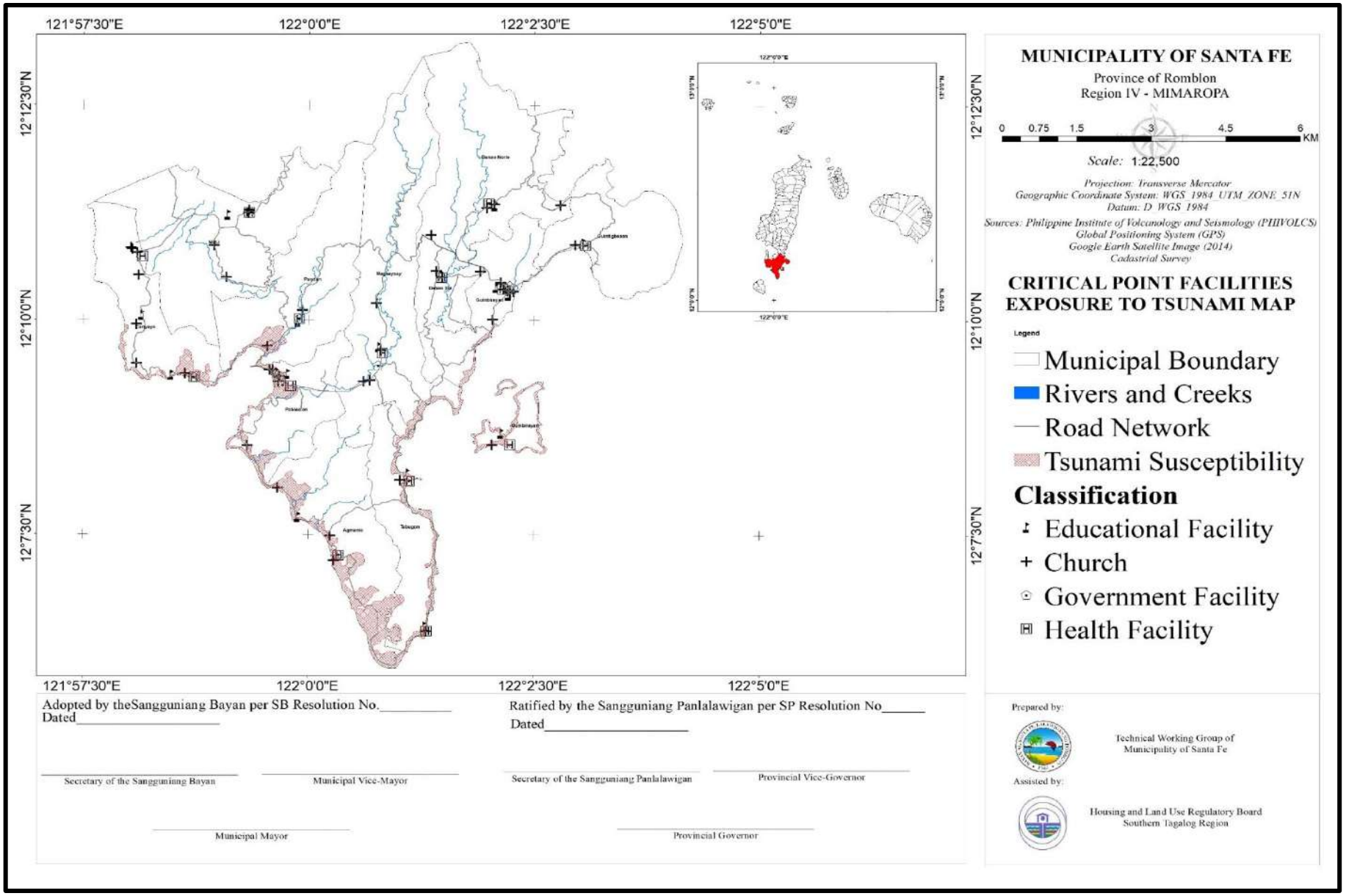
Only the Baptist Church in Danao Norte has high susceptibility level on landslide occurrence while the remaining 12 facilities have moderate exposure. These 12 facilities consist of two (2) churches, eight (8) schools, one (1) evacuation center, and the Bureau of Fire Protection (BFP) in Poblacion. Map 18 shows the critical point facilities exposed to landslide.



Map 18. Critical Point Facilities Exposure to Landslide Map, Sta. Fe, Romblon

Tsunami Exposure

For the exposure of the critical facilities to tsunami, it was observed that there are 47 institutional facilities susceptible. Only barangays Agmanic, Canyayo, Guinbirayan, Pandan, Poblacion, and Tabugon have institutional facilities susceptible to tsunami. Among these barangays, Tabugon has the highest number of facilities exposed to this hazard, with 6 facilities or 85.71% of all its critical facilities are susceptible to tsunami. Observed in Map 19 is the exposure of the critical point facilities in the municipality.



Map 19. Critical Point Facilities Exposure to Tsunami Map, Sta. Fe, Romblon

2.6.2. Sensitivity Analysis

According to the IPCC, Working Group II, Climate Change (2001) which was lifted off from the HLURB Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risk in the Comprehensive Land Use Plan, sensitivity refers to the level to which the element exposed is affected directly or indirectly by a climate stimuli or hazard, either beneficially or adversely.

Social/Population

The parameters used in assessing the vulnerability/sensitivity level of the population or social sector include the percentage of the population who are informal settlers, those living in housing units with walls made from light materials, the percentage of the population with young (less than 15 years of age) and old (greater than 65 years of age) dependent, percentage of population below poverty threshold, the percentage of malnourished individuals, and the persons with disabilities (PWDs) in the municipality.

Based on the results from the CDRA (2018) of Santa Fe, more than half of the total population are below the poverty threshold, specifically, 59.70 percent of the population in the municipality. Barangay Canyayo has the highest percentage people living below the poverty threshold, with a percentage of 87.32 percent while Barangay Agmanic has the lowest with a percentage of 46.06 percent of the barangay population.

Furthermore, almost half or 49.54 percent of the population are living in dwelling units made from light materials. The barangay with the highest percentage is also Barangay Canyayo, with 59.37 percent of the population while Danao Sur, with 35.26 percent has the lowest percentage among all the barangays.

Informal settlers comprise about 2.35 percent of the population. Barangay Poblacion has the most number of informal settlers with 5.61 percent of the total barangay population while Barangay Magsaysay has the lowest, with 0.33 percent of its population.

The young and old dependents in the municipality is about 25.68 percent of the total population of Santa Fe. Danao Norte has the highest percentage of young and old dependents with 29.78 percent while the lowest, with 21 percent is Barangay Canyayo.

Malnourished individuals and persons with disabilities are also included in the vulnerability of the social sector. The percentage of malnourished population is estimated to be about 2.41 percent while the PWDs constitutes 1.38 percent of the population. Barangay Agmanic was found to have the most malnourished individuals and PWDs, with 4.17 percent and 2 percent, respectively. On the other hand, the barangay with the least number of malnourished individuals is Mat-i with 0.78 percent of the barangay population while the barangay with the least population who are PWDs is Barangay Canyayo, having a percentage of 0.60 percent.

In order to address these sensitivities, it is crucial for the municipality to reduce the risk and exposure of its population to the different climate-related hazards through various interventions.

Economic Production and Natural Resources (Natural Resource-Based Production Area)

Vulnerability parameters for the natural resource-based production areas include current production practices, with consideration to the use of hazard-resistant crop varieties or climate adapted production techniques, the percentage of farmers who attended climate field schools, access to hazard information and early warning systems, areas with flood-infrastructure coverage, and areas covered with irrigation.

The barangay with the highest proportion of farming families who attended climate field school is Barangay Mat-i with 67 percent while the lowest, with 12.37 percent is Barangay Guinbirayan.

In terms of the barangay with the highest proportion of farming families that employs sustainable farming techniques is Barangay Magsaysay with 20 percent of its farming families, while the barangay with the least number of farmers using sustainable techniques are Danao Norte, Guintigbasan, Pandan, and Tabugon, all at 10 percent.

Moreover, the barangay with the highest number of farmers with access to hazard information is Barangay Tabugon with 79 farmers while Barangay Canyayo has the lowest, with a total of 43 farmers.

Additionally, the barangay with the highest number of farming families with access to early warning system is Barangay Poblacion, with a total of 89 families, while the lowest is at Barangay Canyayo, having only 45 families.

For the number of production areas with flood infrastructure coverage, Barangay Tabugon, together with Barangay Danao Sur, has the highest number, both having 25 production areas. On the other hand, Barangay Mat-i has the lowest, with only 4 production areas with flood infrastructure coverage.

Lastly, regarding the areas with existing irrigation coverage, it has been found that barangays Agmanic, Canyayo, Danao Norte, Guintigbasan, Mat-i, Poblacion and Tabugon have no existing irrigation coverage. Aside from this, all barangays have no production areas with water impoundment.

Since the economic activities of the municipality predominantly relies on agriculture, addressing the vulnerabilities of the natural resources of Santa Fe is necessary, not only for the economic development of the municipality but also for the conservation of the environment.

Infrastructure/Physical Land Use

For the various land uses in the municipality, the sensitivity indicators used include assessing the structural design and the current conditions of the structures in each land use category. It considered the proportion of building walls made with light to salvageable materials, the percentage of structures which employ hazard-resistant building design, percentage of structures with access or with area coverage to infrastructure-related mitigation measures, and capacity and willingness of the owners in the different land uses to retrofit or relocate and conform with new regulations.

In terms of the building structure, the barangay with the highest percentage of buildings with light to salvageable materials is Canyayo with 60 percent while the barangay with the lowest percentage of 35 percent is Danao Sur.

On the other hand, Canyayo, and Poblacion have the highest proportion of structures employing hazard-resistant design which is 18 percent. Meanwhile, the barangay with the lowest percentage is Barangay Danao Sur with a percentage of 8 percent.

Additionally, Barangay Poblacion has the highest percentage of structures with access to infrastructure-related mitigation measure which is 52 percent while the lowest is Danao Norte, having a total of 22 percent.

Barangay Poblacion also have the highest proportion of owners with capacity and willingness to retrofit at 39 percent. Conversely, Danao Sur which has 12 percent, is the barangay with the least proportion of inhabitants wiling to retrofit or relocate and conform to new regulations.

The vulnerabilities identified for the urban uses in the municipality may exacerbate the impacts of the different climate-related hazards the municipality is exposed to, which is why there is a need to provide climate-adaptive interventions in the different land uses present in Santa Fe.

Infrastructure/Lifeline Utilities

The vulnerability analysis for the lifeline utilities in Santa Fe considers the following indicators: the surface type of the roads and bridges, the existing conditions of the utilities, whether it is in good condition or in need of major or minor repairs, and if these utilities employ hazard-resistant designs.

Generally, all roads in the municipality do not employ hazard resistant design. Out of 11 barangays only 7 barangays have roads made of concrete and gravel. These barangays are Agmanic, Canyayo, Danao Norte, Magsaysay, Mat-I, Pandan and Poblacion. The remaining barangays still have dirt and earth-surfaced roads.

In addition, majority of the barangays need major and minor repairs on road networks, particularly, barangays Agmanic, Canyayo, Danao Norte, Danao Sur, Guinbirayan, Pandan, Poblacion and Tabugon. It was observed that the roads from these barangays need urgent repair for efficient utilization.

Out of all the bridges in the municipality, only the bridges in Magsaysay and Poblacion employ a hazard resistant design. Moreover, the Longa-og Bridge in Poblacion is in poor condition. Only the bridges in Danao Norte, which is the Santol Bridge and Danao Sur, which is the Danao Sur Bridge, are made of concrete that is in good condition, other bridges may either be in fair or poor condition.

Institutional/Critical Point Facilities

As recommended by the HLURB Supplemental Guidelines for Mainstreaming Climate and Disaster Risk in the Comprehensive Land Use Plan, the vulnerability indicators for critical point facilities highlights primarily the structural design and materials of the infrastructures and buildings, the existing condition, and the presence of hazard-resistant design.

From the 80 critical facilities susceptible to the different climate-related hazards, only the Puro Day Care Center and Pandan Foursquare Church are made from light materials and do not employ hazard-resistant design. All the institutional facilities from 11 barangays are in good condition except for the Pandan Foursquare Church, Puro Day Care Center and Santa Fe Central School in Poblacion which are in fair condition. These three also do not have hazard-resistant design. The rest of the institutional facilities in Santa Fe are all made of concrete, in good condition, and employ hazard-resistant design in their structures.

2.6.3. Adaptive Capacity Assessment

According to the definition of the IPCC Working Group II, lifted from the HLURB Supplemental Guidelines for Mainstreaming Climate and Disaster Risks in the Comprehensive Land Use Plan, the adaptive capacity is the ability of an element exposed to adjust to the changing climate, manage the potential damages, cope to the changes, and benefit from the opportunities brought about by the changes in climate and other climate-related hazards.

This assessment will focus on the six dimensions of adaptive capacity including economic wealth, access to information and knowledge and awareness of the impacts of climate-related hazards, presence of infrastructures that can mitigate and control the impacts of climate changes, technology, institution and governance strength, and social/human capital. Each element of adaptive capacity dimension is scored using the scoring matrix (Table _) suggested by the DILG Enhanced LGU Guidebook on the Formulation of Local Climate Change Action Plan.

Social/Population

The social sector has the highest adaptive capacity score for the Municipality of Santa Fe with 4.167, primarily because the LGU prioritizes its people sternly. Majority of the people have enough resources for sustenance and to combat the adverse effects of climate change. However, there is a minimal incidence of poverty in the municipality due to existence of

informal settlers and residents on easements; these people are more vulnerable and sensitive to the impacts of climate change. In terms of information, the municipality conducts information, education campaigns which provide knowledge and awareness to the residents of Santa Fe. Through the Conditional Cash Transfer Program (CCT) by the Department of Social Welfare and Development (DSWD), also known as *Pantawid Pamilyang Pilipino Progam* (4Ps), the residents are endowed with information by means of seminars and educational discussions. Furthermore, the impacts of climate change are taught in institutions as well, particularly in schools as an early edification. With regards to infrastructures, construction of seawalls is on-going for some coastal barangays. In addition, damaged river banks are rehabilitated through ripraps. Conversely, the municipality installed early warning device systems to anticipate and to prepare for the influx of incoming extremes, particularly typhoons.

Table 11 shows the capacities of the social sector of the LGU to adapt to the climate related-hazards and the scores for the adaptive capacity dimensions. The different capacities are also listed for each of the six dimensions provided below.

Table 11. Adaptive Capacity Scores for Social Sector, Sta. Fe, Romblon

ADAPTIVE CAPACITY						AVERAGE SCORE
Wealth	**Information**	**Infrastructure**	**Technology**	**Institution and Governance**	**Social Capital**	
	Information, Education Campaigns such as seminars provided by 4Ps	Seawall construction, riprapping damaged river banks	Installation of early warning devices	PPAs on human security and well-being		4.17
SCORE: 3	SCORE: 5	SCORE: 4	SCORE: 5	SCORE: 4	SCORE: 4	

Economic Production and Natural Resources

The natural resource of Santa Fe is essential for its economy and for its people. Its backbone is agriculture; therefore, it is vital to capacitate the natural resource on the threats of climate change. The natural resource-based production areas of the municipality have the

least adaptive capacity score with only 3.5, relatively, it is categorized as moderate to high. Thus, it is fairly capable to adapt on the adverse effects of climate change. There has been an effort to increase the adaptation of crops to different climates. Through IECs, the LGU tackles these issues to protect crops from the hazards brought by climate change and to continue its production. Furthermore, there is a continuous identification of crops that are compatible with different soil types in the municipality. This is important to increase the probability of crops to survive different climates. Soil suitability and compatibility amplifies the likelihood of crop adaptation and improvement which will benefit the municipality. In terms of infrastructures, there has been an on-going construction of mitigating measures such as sea walls and flood control systems. This is vital to avoid flooding and acidification of the agricultural areas. With regards to social capital, the establishment of Bantay Dagat and Bantay Gubat will be very essential for the conservation and protection of the natural resources.

The adaptive capacities of both the natural resources and natural resource-based production are listed and categorized among the dimensions listed in Table 12. The scores for each adaptive capacity dimension for both sectors are also listed in the table.

Table 12. Adaptive Capacity Scores for Economic Production and Natural Resources, Sta. Fe, Romblon

ADAPTIVE CAPACITY						AVERAGE SCORE
Wealth	**Information**	**Infrastructure**	**Technology**	**Institution and Governance**	**Social Capital**	
	IECs tackling issues which can increase the adaptation of crops to climates Continuous identification of crops that are compatible with the soil type present	Construction of mitigating measures such as sea wall and flood control	Various agricultural technologies are available	Implementation of policies and programs on agriculture	Bantay-dagat and bantay-gubat	3.5
SCORE: 3	SCORE: 4	SCORE: 3	SCORE: 4	SCORE: 4	SCORE: 3	

Infrastructure/Physical Land Use

Settlements are commonly concentrated on urban use areas. Therefore, it is a must to make urban use areas climate adaptive and resilient. In the Municipality of Santa Fe, concerned stakeholders and officials conduct meetings for IECs, regarding climate change, for organization and planning. An inclusive approach on planning is essential because it systematizes all sectors, specifically, the marginalized poor which are the most vulnerable during the occurrence of a hazard. In terms of infrastructure, there are projects of road elevation to make it hazard resistant. In addition, construction of seawalls and flood control systems are also commencing for adaptation measures as well. Likewise, there is an effort to rehabilitate drainage canals to avoid obstruction during an occurrence of flood and heavy rainfall.

In terms of technology, there is the utilization of online sources and social media for adaptation and preparation during an event of hazard. It is an important tool because it spread awareness hastily to every people making it an efficient device to disseminate information. Through the efforts of the LGU, there is a strict implementation of national building code with a regular maintenance check up on structures, specifically, buildings used for social services. In addition, there is a moderate presence and imposition of government regulations and government investments in the municipality, primarily, due to source of fund. For social capital, it has been eminent that the teachers are instruments for the provision of knowledge regarding climate change on schools whether it is on rural or urban area.

Listed in Table 13 are the adaptive capacities per dimension for the physical land uses in the municipality of Santa Fe. The scores for each dimension and the average score are also shown in the table.

Table 13. Adaptive Capacity Scores for Land Uses, Sta. Fe, Romblon

ADAPTIVE CAPACITY						AVERAGE SCORE
Wealth	**Information**	**Infrastructure**	**Technology**	**Institution and Governance**	**Social Capital**	
Majority of the structures are insured	Concerned stakeholders and the LGU conduct meeting for IEC	Elevation of roads Construction of seawalls Construction of flood control system Rehabilitation of drainage canals	Utilization of online sources and social media for adaptation	National Building Code with a regular maintenance check up on structures specially buildings used for social services Presence and imposition of government regulations and government investments are considered as moderate in the municipality primarily due to the source of fund	Teachers provide knowledge on climate change impacts on schools	3.83
SCORE: 4	SCORE: 4	SCORE: 4	SCORE: 4	SCORE: 3	SCORE: 4	

Infrastructure (Lifeline Utilities)

Lifeline utilities are essential in every municipality because it provides the continuous flow of existence. Primarily, the delivery of social services and basic human necessities are possible because of lifeline utilities. The funding for construction of lifeline utilities has been evident for the Municipality of Santa Fe. Many roads and bridges have been rehabilitated and constructed in a short term. With regards to information, there are IECs conducted in the LGU for awareness; it has never been imperative until the threats of climate change. In terms of infrastructure, the lifeline utilities are being rehabilitated through road elevation in resistance to hazard occurrence, specifically, flooding. Likewise, seawall construction is on-going on coastal barangays. Furthermore, there are projects for the rehabilitation of damaged river banks through ripraps. There are also early warning devices in the roads and bridges through signboards and signages. The implementation of road constructions is continuous through the efforts of the government.

Shown in Table 14 are the adaptive capacities of the lifeline utilities in the municipality of Santa Fe. The scores per dimension of adaptive capacity and the average score is also listed in the table.

Table 14. Adaptive Capacity Scores for Lifeline Utilities, Sta. Fe, Romblon

ADAPTIVE CAPACITY						AVERAGE SCORE
Wealth	**Information**	**Infrastructure**	**Technology**	**Institution and Governance**	**Social Capital**	
Funding for construction of roads	Information, Education Campaign	Elevation of roads Seawall construction Riprapping of damaged river banks	Installation of early warning devices	Continuous efforts to implement road constructions		3.83
SCORE: 4	SCORE: 5	SCORE: 4	SCORE: 4	SCORE: 3	SCORE: 3	

Institutional Facilities

The critical point facilities in the municipality have different functions which is very vital in the framework and foundation of Santa Fe. Critical point facilities provide socio-economic support services like schools, hospitals, churches and the like. In the Municipality of Santa Fe, these facilities are subsequent to the social sector with an adaptive capacity score of 4. The LGU prioritizes these facilities, specifically, on funding for its construction and rehabilitation. IECs became a mainstream for climate change adaptation in the municipality. Because of the specific functions of these facilities, it becomes a center for information dissemination and communication as well. In terms of infrastructures, there has been elevation of facilities that are prone to flooding. Likewise, there is seawall construction on facilities that are prone to storm surge. Ripraps are also done on damaged river banks to avoid flooding on nearby facilities. In addition, there is also early warning devices installed in some of the facilities. This will alert these facilities on upcoming hazards, particularly, typhoons.

The local government of Santa Fe sees the importance and significance of critical point facilities in the municipality; therefore, the LGU allocates and prioritizes funding for the construction and rehabilitation of these facilities. There are also intervention and support given by nongovernment organizations like Kalahi.

For the institutional facilities or the critical point facilities in the municipality, the adaptive capacities are listed in Table 15 as well as the scores and the average score of these capacities per dimension.

Table 15. Adaptive Capacity Scores for Institutional Facilities, Sta. Fe, Romblon

ADAPTIVE CAPACITY						AVERAGE SCORE
Wealth	**Information**	**Infrastructure**	**Technology**	**Institution and Governance**	**Social Capital**	
Enough funds for construction and rehabilitation	Information, Education, and Communications Campaign	Elevation of facilities prone to flood Construction of seawall Riprapping of damaged sea banks	Installation of early warning devices	The LGU allocates and prioritizes funding for these facilities	Intervention of NGOs	4
SCORE: 4	SCORE: 5	SCORE: 3	SCORE: 4	SCORE: 4	SCORE: 4	

2.7. Vulnerability and Risk Analysis

In analyzing the relative vulnerability Santa Fe to flood, landslide, and tsunami, the threat level/degree of impact of each barangay in the municipality to the different hazards must be determined first using the exposure and the sensitivity database in the preceding assessment. Aside from this, the adaptive capacity is also necessary in computing for the relative vulnerability.

The threat levels per hazard were scored during a workshop with the LCCAP core team to identify which areas are perceived to receive immense impacts from the hazards

present in the municipality depending on the extent of exposure and sensitivity of these elements.

The risk category, on the other hand, were adopted from the results of the CDRA conducted by the municipality. To compute for the risk score, the likelihood of occurrence of each hazard were identified as well as the severity of consequence for each element, therefore determining the risk category of each barangay. This was conducted for all sectors assessed (social/population, natural resource-based production, urban use areas, lifeline utilities, and institutional facilities).

Social/Population

The relative vulnerability of the social sector was determined through the identification of its threat level and adaptive capacity. The adaptive capacity score of the social sector is 4.16 which indicate that this sector has a high coping mechanism against the adverse effects of climate change and other hazards; the threat level on the other hand, varies from 1 to 4. Corollary to the threat level and adaptive capacity, the relative vulnerability of the social sector ranges from 0.24 to 0.96 due to its high adaptive capacity and low threat level.

This indicates that the social sector, particularly the population, of Santa Fe have low exposure and vulnerability on hazard incidence. Furthermore, the risk category of the social sector for the flood and landslide occurrence is moderate, while low on the event of tsunami according to CDRA (2018) of Santa Fe.

Table 16. Vulnerability and Risk Assessment Matrix for Social Sector, Sta. Fe, Romblon

BARANGAY	ADAPTIVE CAPACITY SCORE	DEGREE OF IMPACT/ THREAT LEVEL			RELATIVE VULNERABILITY (RV=TL/AC)			RISK CATEGORY*		
		F	L	T	F	L	T	F	L	T
AGMANIC	4.16	3	1	4	0.72 (Low)	0.24 (Low)	0.96 (Low)	Moderate	Moderate	Low
CANYAYO		3	3	NS	0.72 (Low)	0.72 (Low)	NS	Moderate	Moderate	Low
DANAO NORTE		2	3	NS	0.48 (Low)	0.72 (Low)	NS	Moderate	Moderate	Low
DANAO SUR		3	2	NS	0.72 (Low)	0.48 (Low)	NS	Moderate	Moderate	Low
GUINBIRAYAN		3	3	2	0.72 (Low)	0.72 (Low)	0.48 (Low)	Moderate	Moderate	Low
GUINTIGBASAN		3	3	NS	0.72 (Low)	0.72 (Low)	NS	Moderate	Moderate	Low
MAGSAYSAY		4	3	1	0.96 (Low)	0.72 (Low)	0.24 (Low)	Moderate	Moderate	Low
MAT-I		3	3	NS	0.72 (Low)	0.72 (Low)	NS	Moderate	Moderate	Low
PANDAN		4	3	3	0.96 (Low)	0.72 (Low)	0.72 (Low)	Moderate	Moderate	Low
POBLACION		4	3	3	0.96 (Low)	0.72 (Low)	0.72 (Low)	Moderate	Moderate	Low
TABUGON		4	2	3	0.96 (Low)	0.48 (Low)	0.72 (Low)	Moderate	Moderate	Low

*From CDRA, Sta. Fe, Romblon (2018)

Natural Resource-Based Production

The economic sector has a rating of 3.5 for adaptive capacity which is in between moderate to high level. The relative vulnerability is inversely proportional with the adaptive capacity which means that a high adaptive capacity will lower the relative vulnerability of an entity. In terms of the relative vulnerability of the economic sector, the rate varies from 0.57 to 1.14 which has a low to medium low relative vulnerability assessment. This indicates that the adaptive capacity is relatively high, and the threat level is barely low.

Therefore, the economic sector, specifically the production areas and natural resources have high resistance to hazard exposure through its adaptive capacity. In addition,

the economic sector is at moderate risk category on flooding while low risk category on landslide and tsunami.

Table 17. Vulnerability and Risk Assessment Matrix for the Natural Resource-Based Production Sector, Sta. Fe, Romblon

BARANGAY	ADAPTIVE CAPACITY SCORE	DEGREE OF IMPACT/ THREAT LEVEL			RELATIVE VULNERABILITY (RV=TL/AC)			RISK CATEGORY*		
		F	L	T	F	L	T	F	L	T
Agmanic	3.5	3	2	4	0.86 (Low)	0.57 (Low)	1.14 (Medium Low)	Moderate	Low	Low
Canyayo		2	3	3	0.57 (Low)	0.86 (Low)	0.86 (Low)	Moderate	Low	Low
Danao Norte		2	4	NS	0.57 (Low)	1.14 (Medium Low)	NS	Moderate	Low	Low
Danao Sur		4	3	NS	1.14 (Medium Low)	0.86 (Low)	NS	Moderate	Low	Low
Guinbirayan		3	2	3	0.86 (Low)	0.57 (Low)	0.86 (Low)	Moderate	Low	Low
Guintigbasan		2	4	NS	0.57 (Low)	1.14 (Medium Low)	NS	Moderate	Low	Low
Magsaysay		4	3	3	1.14 (Medium Low)	0.86 (Low)	0.86 (Low)	Moderate	Low	Low
Mat-i		4	3	NS	1.14 (Medium Low)	0.86 (Low)	NS	Moderate	Low	Low
Pandan		4	4	3	1.14 (Medium Low)	1.14 (Medium Low)	0.86 (Low)	Moderate	Low	Low
Poblacion		4	3	3	1.14 (Medium Low)	0.86 (Low)	0.86 (Low)	Moderate	Low	Low
Tabugon		3	2	4	0.86 (Low)	0.57 (Low)	1.14 (Medium Low)	Moderate	Low	Low

*From CDRA, Sta. Fe, Romblon (2018)

Physical Land Uses

The relative vulnerability consists of threat level and adaptive capacity assessment. Through this, the relative vulnerability will be derived and calculated. For the physical land uses, the adaptive capacity is conversely analogous with the relative vulnerability of the sector. This indicates that high adaptive capacity will lower the rate of relative vulnerability

and vice versa. The adaptive capacity for the physical land use sector is 3.83 which is in between moderate to high level. On the other hand, the relative vulnerabilities of this sector ranges from 0.26 to 1.04. This range signifies low to medium low relative vulnerability evaluation. In addition, this indicates that the adaptive capacity of this sector is considerably high, and the threat level is faintly low.

Thus, the physical land uses and the built-up ecosystem have high coping methods against climate change and its adverse effects. With regards to risk category, the physical land use sector is at moderate risk during flood and landslide incidence while at low risk on the occurrence of tsunami.

Table 18. Vulnerability and Risk Assessment for Physical Land Uses, Sta. Fe, Romblon

BARANGAY	ADAPTIVE CAPACITY SCORE	DEGREE OF IMPACT/ THREAT LEVEL			RELATIVE VULNERABILITY (RV=TL/AC)			RISK CATEGORY*		
		F	L	T	F	L	T	F	L	T
Agmanic	3.83	2	2	4	0.52 (Low)	0.52 (Low)	1.04 (Medium Low)	Moderate	Moderate	Low
Canyayo		3	1	3	0.78 (Low)	0.26 (Low)	0.78 (Low)	Moderate	Moderate	Low
Danao Norte		2	3	NS	0.52 (Low)	0.78 (Low)	NS	Moderate	Moderate	Low
Danao Sur		1	2	NS	0.26 (Low)	0.52 (Low)	NS	Moderate	Moderate	Low
Guinbirayan		2	2	2	0.52 (Low)	0.52 (Low)	0.52 (Low)	Moderate	Moderate	Low
Guintigbasan		3	4	NS	0.78 (Low)	1.04 (Medium Low)	NS	Moderate	Moderate	Low
Magsaysay		4	3	NS	1.04 (Medium Low)	0.78 (Low)	NS	Moderate	Moderate	Low
Mat-i		3	3	NS	0.78 (Low)	0.78 (Low)	NS	Moderate	Moderate	Low
Pandan		4	4	4	1.04 (Medium Low)	1.04 (Medium Low)	1.04 (Medium Low)	Moderate	Moderate	Low
Poblacion		4	3	4	1.04 (Medium Low)	0.78 (Low)	1.04 (Medium Low)	Moderate	Moderate	Low
Tabugon		2	1	2	0.52 (Low)	0.26 (Low)	0.52 (Low)	Moderate	Moderate	Low

*From CDRA, Sta. Fe, Romblon (2018)

Lifeline Utilities

Table 19 shows the vulnerability and risk assessment for the roads, bridges, and all lifeline utilities in the municipality.

It can be observed that the threat level/degree of impact for all lifeline utilities varies among all barangays in the municipality, which ranges from low to high degrees of impact. In terms of flooding, Agmanic, Poblacion, and Tabugon have high threat levels while the rest, except for Canyayo and Danao Norte which have low threat levels, are observed to fall under the moderate threat level. For landslide, Barangay Guintigbasan showed the highest threat level among the barangays, which has a high threat level while the rest ranges from low to moderate. Lastly, for tsunami, areas in proximity to the coasts such as Poblacion, Agmanic, and Tabugon have high threat levels while Danao Norte, Danao Sur, Guintigbasan, and Mat-i are not susceptible to tsunami.

The adaptive capacity of the lifeline utilities in the municipality is somewhat moderate, which is why the computed relative vulnerability of these utilities to the identified hazards are within the low to medium-low category.

In addition, the risk category of the lifeline utilities for flooding are generally moderate, except for Canyayo and Danao Norte, which are at high risk. The risk to landslide of these utilities also fall within the moderate category while low risk for tsunami.

Table 19. Vulnerability and Risk Assessment for Lifeline Utilities, Sta. Fe, Romblon

BARANGAY	ADAPTIVE CAPACITY SCORE	DEGREE OF IMPACT/ THREAT LEVEL			RELATIVE VULNERABILITY (RV=TL/AC)			RISK CATEGORY*		
		F	L	T	F	L	T	F	L	T
Agmanic	3.83	4	2	4	1.04 (Medium Low)	0.52 (Low)	1.04 (Medium Low)	Moderate	Moderate	Low
Canyayo		2	3	2	0.52 (Low)	0.78 (Low)	0.52 (Low)	High	Moderate	Low
Danao Norte		2	3	NS	0.52 (Low)	0.78 (Low)	NS	High	Moderate	Low
Danao Sur		3	2	NS	0.78 (Low)	0.52 (Low)	NS	Moderate	Moderate	Low
Guinbirayan		3	2	3	0.78 (Low)	0.52 (Low)	0.78 (Low)	Moderate	Moderate	Low
Guintigbasan		3	4	NS	0.78 (Low)	1.04 (Medium Low)	NS	Moderate	Moderate	Low
Magsaysay		3	2	2	0.78 (Low)	0.52 (Low)	0.52 (Low)	Moderate	Moderate	Low
Mat-i		3	3	NS	0.78 (Low)	0.78 (Low)	NS	Moderate	Moderate	Low
Pandan		3	3	2	0.78 (Low)	0.78 (Low)	0.52 (Low)	Moderate	Moderate	Low
Poblacion		4	2	4	1.04 (Medium Low)	0.52 (Low)	1.04 (Medium Low)	Moderate	Moderate	Low
Tabugon		4	2	4	1.04 (Medium Low)	0.52 (Low)	1.04 (Medium Low)	Moderate	Moderate	Low

*From CDRA, Sta. Fe, Romblon (2018)

Institutional Facilities

The relative vulnerability and risk assessment for the institutional facilities in the municipality is shown in Table 20.

With regards to the threat level scores, for flooding, the barangay with the highest perceived threat level/ degree of impact is Barangay Pandan, which has a high degree of

impact to flood, while the lowest threat level for flooding are barangays Agmanic and Danao Norte, with a very low threat level. For landslide, the degree of impact of the barangays are generally low, ranging from very low to moderate category. Only barangays Danao Norte and Poblacion are moderate in terms of the threat level to landslide while the rest are very low to low. In terms of tsunami, Danao Norte, Danao Sur, Guintigbasan, and Mat-i have no facilities susceptible. Except for Magsaysay which has a very low threat level, the rest of the barangays were observed to have high threat levels to tsunami, which ranges from moderate to high.

However, it can be observed that the adaptive capacity for this sector is relatively high, showing an average score of 4 out of a total score of 5. Therefore, the relative vulnerability category of all institutional facilities to all hazards are low.

In terms of the risk level of these facilities to hazards, all institutional facilities in the barangays are categorized as low risk to tsunami and moderate risk to flooding and landslide, except for barangay Pandan which has a high risk to flooding.

Table 20. Vulnerability and Risk Assessment for Institutional, Sta. Fe, Romblon

BARANGAY	ADAPTIVE CAPACITY SCORE	DEGREE OF IMPACT/ THREAT LEVEL			RELATIVE VULNERABILITY (RV=TL/AC)			RISK CATEGORY*		
		F	L	T	F	L	T	F	L	T
Agmanic	4	1	1	3	0.25 (Low)	0.25 (Low)	0.75 (Low)	NS	Moderate	Low
Canyayo		3	1	4	0.75 (Low)	0.25 (Low)	1 (Low)	Moderate	Moderate	Low
Danao Norte		1	3	NS	0.25 (Low)	0.75 (Low)	NS	NS	Moderate	Low
Danao Sur		2	1	NS	0.5 (Low)	0.25 (Low)	NS	NS	Moderate	Low
Guinbirayan		2	1	4	0.5 (Low)	0.25 (Low)	1 (Low)	Moderate	Moderate	Low
Guintigbasan		2	1	NS	0.5 (Low)	0.25 (Low)	NS	Moderate	Moderate	Low
Magsaysay		3	1	1	0.75 (Low)	0.25 (Low)	0.25 (Low)	Moderate	Moderate	Low
Mat-i		2	1	NS	0.5 (Low)	0.25 (Low)	NS	Moderate	Moderate	Low
Pandan		4	2	3	1 (Low)	0.5 (Low)	0.75 (Low)	High	Moderate	Low
Poblacion		3	3	3	0.75 (Low)	0.75 (Low)	0.75 (Low)	Moderate	Moderate	Low
Tabugon		3	1	4	0.75 (Low)	0.25 (Low)	1 (Low)	Moderate	Moderate	Low

*From CDRA, Sta. Fe, Romblon (2018)

CHAPTER III. LOCAL CLIMATE CHANGE ACTION PLAN OBJECTIVES

3.1. Vision and Development Goal

The municipal vision, mission, and goals of Santa Fe were revisited in 2018 during the enhancement and updating of the Comprehensive Land Use Plan (CLUP) and incorporated climate and disaster risk considerations.

VISION

"By 2028, the Municipality of Santa Fe as premier agri-tourism destination in the southern part of Tablas Island with secured, self-reliant, healthy, God-fearing, and empowered people living in a resilient and ecologically-balanced community led by competent and service-oriented leaders."

MISSION

"The Local Government Unit of Santa Fe is committed to develop effective, efficient, and pro-active good governance and ensure the general welfare of the citizenry."

EXISTING DEVELOPMENT GOALS

The goals of Santa Fe aim to translate the municipal vision into concrete results, focusing on the following sectors: economic, infrastructure, social services, and environment. These sectoral goals were adopted from the existing CLUP of the municipality:

1. **Economy**- this aims to increase the economic activities within the municipality, primarily, improve agriculture productivity and enhance the potentials of the tourism sector.

GOAL: "A municipality with a socio-economically progressive community."

2. **Infrastructure**- this sector is responsible in ensuring the efficient and effective circulation of goods and services in the municipality through complete and well-developed infrastructures. Mainly, the target of this sector is to improve the quality of life and well-being of the residents in Santa Fe.

   GOAL: "A municipality that has efficient and extensive infrastructure services to support town development."

3. **Social Sector**- refers to the equal distribution of different social services such as housing health and sanitation, education, protective services, and sports and recreation. This sector seeks to provide adequate and accessible basic social services to all.

   GOAL: "A municipality with peaceful, orderly, and morally upright community."

4. **Environment**- this pertains to the preservation, conservation, and protection of the natural ecosystem as well as the resources of Santa Fe. Mainly, it aims to ensure the sustainable management and utilization of resources for the future generations.

   GOAL: "A municipality with sustained ecologically balanced environment."

3.2. Objectives of current CLUP

The following objectives are derived from the CLUP of Santa Fe. Each goal of the sectors (social, economic, environmental, and infrastructure) were provided with a set of objectives which will address the sectoral issues and challenges identified during the situational analysis in the CLUP formulation.

SOCIAL SECTOR:

- To maintain peaceful and orderly environment;
- To reduce the incident of illegal fishing, illegal logging, and other illegal activities;

- To identify areas subject to constant flood and landslide and recommend interventions and;
- To tap potential watershed areas that will serve as a good source of potable water.

ECONOMIC SECTOR:

- To increase the per capita income of farmers to improve their way of life through enhancing agricultural production;
- To develop a favorable commercial-industrial atmosphere in order to maximize the commercial and industrial opportunities in the municipality and;
- To promote small and medium scale industries including those in the cottage industries.

ENVIRONMENTAL SECTOR:

- To identify areas for a sanitary landfill;
- To conduct waste analysis and characterization scheme;
- To increase number of mangroves;
- To ensure conservation and preservation of marine and inland resources;
- To rehabilitate of denuded forests;
- To promote practice of organic farming and;
- To eliminate and minimize the pollution threats of development activities on air, water, and resources of the municipality by designing these developments in a manner that would not destruct the natural and scenic resources.

INFRASTRUCTURE SECTOR:

- To ensure the maintenance of an efficient, reliable, and adequate communication facilities and services;
- To improve and expand the existing communication services;
- To provide adequate, potable, and inexpensive water supply to the growing population;
- To provide adequate, dependable, and inexpensive power to all households;

- To establish an electric cooperative that will provide electricity to the whole municipality;
- To extend irrigation services to all irrigable areas within five years;
- To conserve the optimum utilization of the municipality's land resources and to promote a balance and compatible land use relationship through the allocation/delineation of adequate and settable areas for residential, commercial industrial, agro-industrial, institutional, recreational, agricultural, and other land uses as well as the provision of an efficient circulation system supportive of the aforementioned land uses;
- To provide a resilient road network to connect industrial, commercial, tourism, and residential areas and;
- To maintain the existing jetmatic pumps in all barangays.

3.3. LCCAP Goals and Objectives

In order to address the climate change issues from the Vulnerability and Adaptation Assessment (VAA) of this LCCAP, the existing sectoral goals and objectives of the CLUP of Santa Fe were reformulated and transformed to climate goals and objectives. These are aligned to the thematic areas and goals of the NCCAP.

CLIMATE GOALS

The primary goal of the Santa Fe LCCAP 2018-2023 is to increase the adaptive capacities of humans to various climate-related risks in the community, improve the resilience of the vulnerable sectors and the natural ecosystems to climate change, and optimize mitigation strategies and opportunities for a gender-responsive and rights-based sustainable development.

CLIMATE OBJECTIVES

This set of objectives for the LCCAP 2018-2023 of Santa Fe, Romblon reflects the NCCAP goals which focuses on food security, water sufficiency, environmental and ecological

stability, human security, climate-friendly industries and services, sustainable energy, and knowledge and capacity development. These objectives will guide and define the formulation of adaptation options and PPAs that will address the identified climate-related issues in the municipality.

1. To ensure the availability, affordability, accessibility, and stability of the food supply, as well as its safe and healthy quality amidst the changing climate in the municipality;

2. To improve the resilience of the water resources in Santa Fe, manage the supply and demand for water, ensure the water quality, and lastly, to conserve the various sources of water within the municipality;

3. To maintain the stability of the ecosystems in times of climate change through protection and rehabilitation of the critical ecosystems around Santa Fe, which can in turn, restore and sustain the ecological services and functions;

4. To reduce the risks of humans, both men and women, to climate change;

5. To create green and ecologically-friendly industries and jobs which can contribute to the sustainable production and consumption, as well as the development of a sustainable Santa Fe;

6. To develop more sustainable and renewable energy, transport, and climate-proofing energy sources and infrastructures and ensure the sustainability of energy in the municipality and;

7. To enhance the knowledge on the different climate changes expected in the municipality, the capacity to adapt and mitigate the impacts of climate change and for climate change knowledge to be accessible to all.

CHAPTER IV. ADAPTATION AND MITIGATION OPTIONS

Climate change, exhibited by the increase in rainfall, temperature, number of dry and hot days, extreme events, and sea level rise, have drastic impacts to the natural resources and ecosystems, built infrastructures, physical land uses, social welfare, and economic development of Santa Fe. The location of the municipality further contributes to its vulnerability particularly to flooding, tsunami, and sea level rise since it is surrounded by water bodies, being in the southernmost tip of Tablas Island. With this, it is imperative to formulate local adaptation and mitigation options to combat the effects of climate change to the municipality.

The LCCAP 2018-2023 of Santa Fe identified relevant programs, projects, and activities (PPAs) based on the results of the VAA report. The PPAs formulated and assessed by the TWG of Santa Fe aim to address the climate variables which can pose serious threats and damage to the different assets of the municipality, focusing particularly on temperature increase, flooding due to increased precipitation and typhoons, strong winds brought about by typhoons, drought and dry spells, and storm surge. The mitigation options in this action plan aim to reduce the greenhouse gas (GHG) emissions while the identified adaptation options focus on building the resilience and adaptive capacity of the municipality.

Aside from the climate goals and objectives of Santa Fe, these PPAs are also responsive and anchored to the seven strategic areas of the NCCAP: food security, water sufficiency, ecological and environmental stability, human security, climate-smart industries and services, sustainable energy, and knowledge and capacity development.

Table 21. Climate Change Adaptation and Mitigation PPAs for 2018-2023

GOAL	SPECIFIC OBJECTIVES/ STRATEGIES	PROGRAMS, PROJECTS, ACTIVITIES	EXPECTED OUTPUTS	TIME FRAME		RESPONSIBLE OFFICE/AGENCY	FUNDING SOURCE	AMOUNT	AMOUNT OF CLIMATE CHANGE PPAs		TYPO-LOGY
				START	END				Adaptation	Mitigation	
	Strategic Priority 1-Food Security										
		1-Agriculture and Livestock									
		Encourage farmers to practice organic farming and use of greenhouse to protect high-value crops from harsh climate				MAO	LGU	200,000		200,000	M114-01
		Adjustment of cropping calendar				MAO	LGU				A114-03
		2-Fisheries									
		Removal of illegal fishponds and fish corals				DA, Mayor's Office	LGU	50,000	50,000		A121-02
	Strategic Priority 2-Water Sufficiency										
		1-Water Supply									
		Rainwater Harvesting Project • Retrofitting of barangay facilities to introduce rainwater harvesting technique • IECs on rainwater harvesting				MDRRMO, MPDO, DA	DA, DILG	50M	50M		A212-07
		Regulation of commercial water dealers in the municipality Monitoring the volume of groundwater extracted Proper siting Proper business permit papers				BPLO, MPDO, Mayor's Office, Office of the SB	LGU	50,000	50,000		A211-01
		Municipal-wide advocacy and IEC for household water conservation (w/ DepEd coordination)				MAO, MDRRMO	LGU	20,000	20,000		A213-03
		Impro vement and retrofitting of sustainable water supply facilities at the barangays with emphasis on dengue-proof storage, water conservation, water reuse and recycling, rainwater harvesting, etc				MPDO, MHO, MEO, Mayor's Office	LGU, DILG	20M			A211-03
		2-Flood Protection									
		Formulation of the Comprehensive Municipal Drainage Masterplan				MEO, MPDC	LGU	100,000			A221-02

		Municipal-wide Drainage Improvement Project (w/Provincial Government) • Replacement of old drainage pipes • Rehabilitation of outfalls • Dredging of natural waterways • Unclogging of canals, drainage systems • Construction of additional drainage lines				MEO, MPDC, BLGU	MLGU, PLGU	200M			A224-01
		Use of permeable materials for ground cover for faster water absorption and use of pavers instead of concrete				MEO, MPDC	LGU	1M			A223-02
		Construction and repair of riverbank protection, seawalls, and breakwater along coastal barangays				MDRRMO, MEO, MPDC	BLGU, MLGU, PLGU	500M			A224-02
		Elevation of facilities and infrastructures				MEO, MPDC, BLGU	MLGU				A224-02
		Protection of floodway channels from obstructions and illegal structures to maintain good flow of water				MDRMMO, MEO, MPDC	BLGU, MLGU, PLGU, DILG, DENR	50,000			A224-01
		Retrofitting of ports and wharves with adequate support infrastructure, facilities and emergency protocol for occurrence of hazards and harsh climatic conditions (w/ DPWH & Provincial Government)				MEO, MPDO, Mayor's Office	MLGU, DOTr, DPWH	150M			A222-01
		Automated Rain Gauges (ARG) in monitoring potential hazards such as storm surges				MDRRMO	MLGU	100,00			A222-03
		Coordination with DOST in anticipating typhoons that bring in storm surges by estimating the volume of water in rain clouds with the use of its Doppler Radar and Synoptic Station				MDRRMO	MLGU	50,000			A224-05

		2-Solid Waste									
		Improving solid waste collection and disposal				Mayor's Office, MEO, MPDC, Sanitary Inspector	BLGU, MLGU	10M			M324-04
		Prohibition of burning of solid wastes and promoting composting				MAO, Sanitary Inspector	MLGU	50,000			M323-01
	Strategic Priority 3-Ecological and Environmental Stability										
		1-Forest and Biodiversity									
		Instigate mangrove reforestation along the coastal areas and riversides • Ban mangrove cutting at coastlines, rivers, and other natural waterways (w/ BFAR, DepEd, DENR) • Survey of mangrove areas and study on growth/ decline of species				MAO, Mayor's Office, MDRRMO	MLGU, DENR				M314-07
		Instigating municipal-wide tree planting and growing activities • "Talisay" tree-planting activities to coastal and beach areas • Coordination w/the school heads and supervisors to advocate "School Mini-Forest" propagation (with DepEd School Board and CSOs concerned) • Establish a municipal government plant nursery • Tree-planting and growing activities along rivers and creeks				MDRRMO, MAO, Mayor's Office, BLGU					M314-01
		Building capacities and strict implementation of buffers along riverbanks and creeks				MPDO, MEO, Mayor's Office					FY2016
		Regulating human activities on riverbanks and shorelines (quarrying with the DENR)				MPDO, MEO, Mayor's Office					A311-06
		Establishment of green easements with trees along the coastlines				MAO, MDRRMO					A314-07
	Strategic Priority 4- Human Security										
		1-Health									

		Health Education Behavior and Behavior Change Communication Project to build awareness and capacity in health programs to adjust to climate change				RHU					A414-06
		2-Settlements and Local Land Use									
		Greening Program and Restoration/Rehabilitation of Public Open Spaces • Re-landscaping of Poblacion Children's Park/Rizal Park by adding ornamental plants and shedding trees (w/CSOs) • Landscaping/greening of parking and idle lots within the public establishments including the idle spaces in barangay halls, parks, and plazas • Landscaping and development of Santa Fe shrine and port area • Landscaping, repair, and improvement of Santa Fe Welcome Rotonda structure • Landscaping/Greening of Fish Landing/Port • Promotion of municipal greening, green architecture, road greening, and green development to private sector, contractors, architects, engineers, etc. • Retrofitting of public cemeteries with wider green spaces				Poblacion BLGU, MTO, MEO, MPDO Mayor's Office					A421-03

		Reduction of GHGs • Anti-smoke belching Ordinance and Environment Code Implementation (w/PNP) • Clean Development Mechanism Program (w/DENR) • IEC and advocacy for reduced use of non-renewable resources such as fossil fuels for cooking, transport, etc.				Mayor's Office, Office of the Sangguniang Bayan, MPDO, MDRRMO					A423-01
		Regulating construction of "concretized" areas and advocate the use of pavers and rainwater harvesting ground covers				MEO, MPDO, Mayor's Office					M424-02
		Development and implementation of design/construction guidelines on climate-change friendly structures for public facilities • Use of tropical designs and passive cooling such as natural ventilation • Indirect use of daylight to improve air circulation and lighting (with minimized power consumption) • Advocacy for the use of climate change and green-friendly materials to avoid use of heat conducting materials • Construction and retrofitting of institutional facilities with proper ventilation systems using low-cost designs and technologies				MEO, MPDO, Mayor's Office, LGU Office Heads, and BLGUs, DepEd School Board, RHU, MSWDO,					A423-01
		Strict enforcement of building regulations on buildings, setbacks, buffers, and open spaces				MEO, MPDO, Zoning Administrator					A424-06
		Improvement of existing facilities that can serve as evacuation centers equipped with appropriate facilities				MDRRMO, MEO, MPDO, BLGU					A424-11

		Formulation of Municipal Shelter Plan which includes on-site development options for poor and vulnerable communities and re-blocking designs				MEO, MPDO, Mayor's Office					A424-01
		Relocation of households in safe resettlement areas				MPDO, Mayor's Office, MDRRMO					A424-08
		Setting up of monitoring and IEC projects at the coastal/river barangays				MDRRMO, Mayor's Office					A424-09
		Prioritization of MDRRMC/BDRRMC/s emergency tools and equipment for hazards (e.g. Sea level rise, increase in temperature, typhoons etc.) events in the Municipal Comprehensive Development Plan and Investment Program as well as in the Annual Barangay Development Plan				MPDO, MEO					A424-05
		Preparation/Formulation of the Municipal Coastal Resources Development Plan with provisions for community preparedness for hazards and extreme climatic conditions				DA, MPDO, Mayor's Office, MDRRMO					A424-12
		Preparation of MDRRM Plan with adequate provisions for climate-related hazards				MDRRMO					A423-01
		Establishment of barangay-based emergency response protocol on events of hazards and harsh climates for vulnerable sectors				MDRRMO					A421-05
		Localization of building codes to adjust building design, especially houses, according to local climatic conditions				MPDO, MEO, Mayor's Office					M424-02

		Coordination with concerned national government agencies tasked with the warning system for marine and air navigation and transport (including optimization of meteorological buoys in coordination with ASTI, Automatic Weather Observing System for MIMAROPA Region, OCD, DOST, and PAG-ASA)				MDRRMO					A424-10
		Procurement and installation of upland-to-lowland early warning system				MDRRMO, MBO					A424-08
		Conduct of research on storm surge and establishment of IEC and Advocacy Program for the citizens				MDRRMO					A422-03
		Formulation, Adaptation and Enforcement of Zoning Ordinance on no-build zones				MPDO, MEO, Office of the SB					A424-05
		Integrate climate concerns in development plans, programs, policies • Prioritization of MDRRMC/BDRRMC's emergency tools and equipment for extreme climate changes in the CDP, Investment Programs, and Barangay Development Plans				MDRRMO, MPDO, MBO, BLGU, LGU offices					A424-05
	Strategic Priority 6-Sustainable Energy										
		1-Energy Efficiency									
		Advocate composting of organic wastes and waste-to-energy technologies (w/ DOST)				MAO, Mayor's Office					A614-01
	Strategic Priority 7-Knowledge and Capacity Development										
		1-Education and Climate Science									
		Installation of Information Board Post in strategic areas				MDRRMO, MEO					A713-03 OR A713-01
		Coordination with the concerned agencies for hazard monitoring, forecasting, and early warning systems				MDRRMO					A713-06

CHAPTER V. MONITORING AND EVALUATION

ANNEX

Annex Table 1. Risk and Threat Level Analysis for Social Sector, Sta. Fe, Romblon

Barangay	Summary of Findings		Degree of Impact/ Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk score and category	Summary of Findings
	Exposure	Sensitivity	F	L	T		F	L	T		
Agmanic	519 people affected by flood 482 people affected by tsunami	• 1.52% informal settlers • 53% of houses made from light materials • 26% young & old dependents • 2% are PWDs • 46.06% live below the poverty threshold • 4.17% are malnourished	3	1	4	4.16	0.72 Low	0.24 Low	0.96 Low	F-10.68 L-8.04 T-5.36	
Canyayo	462 people affected by flood 302 people affected by landslide	• 0.58% informal settlers • 59.37% of houses made from light materials • 21% young & old dependents • 0.60% are PWDs • 87.32% live below the poverty threshold • 0.95% are malnourished	3	3	NS	4.16	0.72 Low	0.72 Low	NS	F-9.03 L-8.04 T-NS	
Danao Norte	155 people affected by flood 151 people affected by landslide	• 0.40% informal settlers • 56.52% of houses made from light materials • 29.78% young & old dependents • 1.46% PWDs • 66.01% live below the poverty threshold • 3.37% are malnourished	2	3	NS	4.16	0.48 Low	0.72 Low	NS	F-9.25 L-8.10 T-NS	
Danao Sur	18 people affected by flood 285 people affected by landslide	• 1.16% informal settlers • 35.26% of houses made from light materials • 22.19% young & old dependents • 1.40% PWDs • 50.29% live below the poverty threshold • 2.02% are malnourished	3	2	NS	4.16	0.72 Low	0.48 Low	NS	F-8.53 L-7.85 T-NS	
Guinbirayan	516 people affected by flood 31 people affected by landslide 69 people affected by tsunami	• 3.05% informal settlers • 40.20% of houses made from light materials • 28.38% young & old dependents • 1.78% PWDs • 50.89% live below the poverty threshold • 3.06% are malnourished	3	3	2	4.16	0.72 Low	0.72 Low	0.48	F-8.93 L-7.54 T-4.86	
Guintigbasan	281 people affected by flood 139 people affected by landslide	• 2.84%informal settlers • 53.41% of houses made from light materials • 28.38% young & old dependents • 1.78% PWDs • 50.89% live below the poverty threshold • 3.06% are malnourished	3	3	NS	4.16	0.72 Low	0.72 Low	NS	F-9.18 L-8.07 T-NS	

Barangay	Summary of Findings		Degree of Impact/ Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure	Sensitivity	F	L	T		F	L	T		
Magsaysay	146 people affected by flood 569 people affected by landslide	• 0.33% informal settlers • 40.13% of houses made from light materials • 27.60% young & old dependents • 1.29% PWDs • 55.92% live below the poverty threshold • 3.85% are malnourished	4	3	1	4.16	0.96 Low	0.72 Low	0.24 Low	F-7.43 L-7.82 T-NS	
Mat-i	210 people affected by flood 134 people affected by landslide	• 1.63% informal settlers • 51.43% of houses made from light materials • 24.66% young & old dependents • 1.84% PWDs • 68.16% live below the poverty threshold • 0.78% are malnourished	3	3	NS	4.16	0.72 Low	0.72 Low	NS	F-9.55 L-7.92 T-NS	
Pandan	1,098 people affected by flood 346 people affected by landslide 529 people affected by tsunami	• 4.58% informal settlers • 54.93% of houses made from light materials • 24.94% young & old dependents • 0.70% PWDs • 69.37% live below the poverty threshold • 1.14% are malnourished	4	3	3	4.16	0.96 Low	0.72 Low	0.72 Low	F-10.37 L-7.81 T-5.40	
Poblacion	1,270 people affected by flood 21 people affected by landslide 760 people affected by tsunami	• 5.61% informal settlers • 48.44% of houses made from light materials • 26.19% are young & old dependents • 1.54% PWDs • 57.80% live below the poverty threshold • 0.98% are malnourished	4	3	3	4.16	0.96 Low	0.72 Low	0.72 Low	F-8.85 L-7.43 T-5.18	
Tabugon	1,426 people affected by flood 85 people affected by tsunami	• 2% informal settlers • 49.13% of houses made from light materials • 25.58% are young & old dependents • 1.30% are PWDs • 51.12% live below the poverty threshold • 3.60% are malnourished	4	2	3	4.16	0.96 Low	0.48 Low	0.72 Low	F-9.70 L-7.98 T-4.90	

Source: CDRA, Sta. Fe, Romblon (2018)
*F-flood; L-landslide; T-tsunami
*NS- Not susceptible

Annex Table 2. Risk and Threat Level Analysis for Natural Resources-Based Production, Sta. Fe, Romblon

Barangays	Summary of Findings		Degree of Impact / Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure	Sensitivity	F	L	T		F	L	T		
Agmanic	•57.97 has are exposed to flood; estimated loss of 9,144,388.44 php •86.02 has are susceptible to landslide; estimated loss of 3,016,844.35 php •120.06 has are exposed to tsunami; estimated loss of 12,779,656.43 ph	•24.77% farming families attended climate field school •15% farming families using sustainable production technique •65 farmers have access to hazard info •8 areas have flood infrastructure coverage •No irrigation coverage and water impoundment •56 families have access to EWS	3	2	4	3.5	0.86 Low	0.57 Low	1.14 Low	F-5.5 L-3.67 T-3.67	
Canyayo	•33.88 has are exposed to flood with an estimated loss of 1,693,732.06 php •86.02 has are susceptible to landslide; estimated loss of 2,287,054.00 php •32.54 has exposed to tsunami; estimated loss of 1,626,059.96 php	•16.74% of farming families attended climate field school •12% of farming families using sustainable production technique •43 farmers have access to hazard info •6areas w/ flood infrastructure coverage •No area has irrigation coverage and water impoundment •45 families have access to EWS	2	3	3	3.5	0.57 Low	0.86 Low	0.86 Low	F-6.33 L-4.49 T-3.97	
Danao Norte	•26.62 has are exposed to flood with an estimated loss of 1,600,632.15 php •651.32 has are exposed to landslide; estimated loss of 26,345,014.30 php	•45.16% farming families attended climate field school •10% of farming families using sustainable production technique •45 farmers have access to hazard info •12 areas w/flood infrastructure coverage •No irrigation coverage and water impoundment •75 families have access to EWS	2	4	NS	3.5	0.57 Low	1.14 Medium Low	NS	F-5.19 L-4.25 T-NS	
Danao Sur	•23.21 has are exposed to flood; estimated loss of 1,384,638.86 php •69.09 has are exposed to landslide; estimated loss of 3,461,759.30 php	•19.36% of farming families attended climate field school •15% of farming families using sustainable production technique •62 farmers have access to hazard info •25 production areas w/ flood infrastructure coverage •No area with water impoundment •68 families have access to EWS	4	3	NS	3.5	1.14 Medium Low	0.86 Low	NS	F-6.00 L-4.03 T-NS	

Barangays	Summary of Findings		Degree of Impact / Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure	Sensitivity	F	L	T		F	L	T		
Guinbirayan	•56.70 has are exposed to flood with an estimated loss of 5,621,562.04 php •87.01 has are exposed to landslide with an estimated loss of 4,301,802.20 php •41.27 has are exposed to tsunami with an estimated loss of 2,063,375.75 php	•12.7% of farming families attended climate field school •12% of farming families using sustainable production technique •72 farmers have access to hazard info •16 production areas have flood infrastructure coverage •No area with water impoundment •69 families have access to EWS	3	2	3	3.5	0.86 Low	0.57 Low	0.86 Low	F- 5.20 L-4.27 T-3.33	
Guintigbasan	•18.85 has are exposed to flood with an estimated loss of 1,029,261.25 php •397.62 has are exposed to landslide with an estimated loss of 12,942,694.10 php	•46.75% of farming families attended climate field school •10% of farming families use sustainable production technique •68 farmers have access to hazard info •14 production areas have flood infrastructure coverage •No area has irrigation coverage •No area with water impoundment •58 families have access to EWS	2	4	NS	3.5	0.57 Low	1.14 Medium Low	NS	F-5.19 L-4.29 T-NS	
Magsaysay	•32.29 has are exposed to flood with an estimated loss of 3,756,499.49 php •540.47 has are exposed to landslide with an estimated loss of 24,262,129.30 php •14.95 has are exposed to tsunami with an estimated loss of 1,115,937.71 php	•39.78% of farming families attended climate field school •20% of farming families use sustainable production technique •73 farmers have access to hazard info •10 production areas have flood infrastructure coverage •No area with water impoundment •71 families have access to EWS	4	3	3	3.5	1.14 Medium Low	0.86 Low	0.86 Low	F-6.71 L-4.52 T-3.33	
Mat-i	•47.40 has are exposed to flood with an estimated loss of 3,001,003.16 php •236.25 has are exposed to landslide with an estimated loss of 11,682,546.10 php	•67% of farming families attended climate field school •12% of farming families use sustainable technique •68 farmers have access to hazard info •4 production areas have flood infra coverage •No area has irrigation coverage •No area with water impoundment •69 families have access to EWS	4	3	NS	3.5	1.14 Medium Low	0.86 Low	NS	F-5.94 L-4.23 T-NS	

Barangays	Summary of Findings		Degree of Impact / Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure	Sensitivity	F	L	T		F	L	T		
Pandan	•27.28 has are exposed to flood with an estimated loss of 1,912,747.97 php •510.77 has are exposed to landslide with an estimated loss of 21,688,366.20 php •15.54 (2.26%) has are exposed to tsunami; estimated loss of 1,246,293.28 php	•40% of farming families attended climate field school •10%of farming families use sustainable production technique •53 farmers have access to hazard info •6 production areas have flood infra coverage •No area with water impoundment •71 families have access to EWS	4	4	3	3.5	1.14 Medium Low	1.14 Medium Low	0.86 Low	F-5.62 L-4.03 T-4	
Poblacion	•18.41 has are exposed to flood with an estimated loss of 1,244,999.86 php •142.16 has are exposed to landslide with an estimated loss of 5,896,568.30 php •36.21 has are exposed to tsunami; estimated loss of 2,070,347.98 php	•20.93% farming families attended climate field school •12% of farming families use sustainable production technique •69 farmers have access to hazard info •9 production areas have flood infra coverage •No area has irrigation coverage •No area with water impoundment •89 families have access to EWS	4	3	3	3.5	1.14 Medium Low	0.86 Low	0.86 Low	F-5.32 L-3.67 T-3.44	
Tabugon	•21.42 has are exposed to flood; estimated loss of 1,471,910.79 php • 35.97 has are exposed to landslide with an estimated loss of 1,616,129.40 php •47.42 has are exposed to tsunami with an estimated loss of 2,648,293.81 php	•21.56% of farming families attended climate field school •10% of farming families using sustainable production technique •79 farmers have access to hazard info •25 production areas have flood infra coverage •No area has irrigation coverage •No area with water impoundment •79 families have access to EWS	3	2	4	3.5	0.86 Low	0.57 Low	1.14 Medium Low	F-4.37 L-2.96 T-2.73	

Source: CDRA, Sta. Fe, Romblon (2018)
*F-flood; L-landslide; T-tsunami
*NS- Not susceptible

Table. Risk and Threat Level Analysis for the Urban Uses, Sta. Fe, Romblon

Barangays	Summary of Findings				Degree of Impact / Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure			Sensitivity									
	F	L	T		F	L	T		F	L	T		
Agmanic	**Residential** 3.363 has **Commercial** 0.001 has	**Residential** 0.57 has	**Residential** 6.217 has **Commercial** 0.004 has **Institutional** 0.172 has	•53% of buildings have light to salvageable materials •16% has hazard resistant design •36% have access to infra-related mitigation measures •32% has capacity to retrofit	2	2	4	3.83	0.52 Low	0.52 Low	1.04 Medium Low	F-8.74 L-6.78 T-4.60	
Canyayo	**Residential** 1.072 has **Commercial** 0.019 has **Institutional** 0.026 has	**Residential** 0.412 has	**Residential** 0.421 has **Commercial** 0.019 has **Institutional** 0.501 has	•60% of buildings have light to salvageable materials •18% has hazard resistant design •28% have access to infra-related mitigation measures •21% has capacity to retrofit	3	1	3	3.83	0.78 Low	0.26 Low	0.78 Low	F-8.80 L-7.36 T-2.30	
Danao Norte	**Residential** 0.443 has **Commercial** 0.00002 has	**Residential** 2.65 has **Commercial** 0.002105 has **Institutional** 0.035285 has	NOT EXPOSED	•57% of buildings have light to salvageable materials •13% has hazard resistant design •22% have access to infra-related mitigation measures •17% has capacity to retrofit	2	3	NS	3.83	0.52 Low	0.78 Low	NS	F-8.80 L-8.29 T-NS	
Danao Sur	**Residential** 0.300 has **Institutional** 0.007 has	**Residential** 0.32 has **Commercial** 0.0004 has	NOT EXPOSED	•35% of buildings have light to salvageable materials •8% has hazard resistant design •39% have access to infra-related mitigation measures •12% has capacity to retrofit	1	2	NS	3.83	0.26 Low	0.52 Low	NS	F-8.56 L-6.87 T-NS	
Guinbirayan	**Residential** 0.247 has **Commercial** 0.002 has	**Residential** 1.033 has	**Residential** 0.0341 has	•40% of buildings have light to salvageable materials •11% has hazard resistant design •35% have access to infra- related mitigation measures •35% has capacity to retrofit	2	2	2	3.83	0.52 Low	0.52 Low	0.52 Low	F-7.47 L-7.20 T-4.27	
Guintigbasan	**Residential** 0.963 has **Commercial** 0.006 has **Institutional** 0.008 has	**Residential** 1.44 has	NOT EXPOSED	•53% of buildings have light to salvageable materials •10% has hazard resistant design •43% have access to infra-related mitigation measures •22% has capacity to retrofit	3	4	NS	3.83	0.78 Low	1.04 Medium Low	NS	F-8.32 L-6.82 T-NS	

Barangays	Summary of Findings				Degree of Impact / Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure			Sensitivity									
	F	L	T		F	L	T		F	L	T		
Magsaysay	**Residential** 1.890 has **Commercial** 0.028 has **Institutional** 0.011 has **MRF** 0.035 has	**Residential** 1.72 has **Institutional** 0.087 has	NOT EXPOSED	•40% of buildings have light to salvageable materials •16% has hazard resistant design •46% have access to infrastructure related mitigation measures •26% has capacity to retrofit	4	3	NS	3.83	1.04 Medium Low	0.78 Low	NS	F-8.19 L-6.90 T-NS	
Mat-i	**Residential** 1.820 has **Commercial** 0.049 has **Institutional** 0.058 has	**Residential** 3.91 has **Institutional** 0.020 has	NOT EXPOSED	•51% of buildings have light to salvageable materials •12% has hazard resistant design •37% have access to infra-related mitigation measures •18% has capacity to retrofit	3	3	NS	3.83	0.78 Low	0.78 Low	NS	F-8.95 L-8.20 T-NS	
Pandan	**Residential** 1.913 has **Commercial** 0.016 has **Institutional** 0.003 has	**Residential** 1.83 has **Institutional** 0.000002 has	**Residential** 1.137 has **Commercial** 0.024 has **Institutional** 0.003 has	•54% of buildings have light to salvageable materials •9% has hazard resistant design •31% have access to infra-related mitigation measures •33% has capacity to retrofit	4	4	4	3.83	1.04 Medium Low	1.04 Medium Low	1.04 Medium Low	F-9.29 L-7.55 T-4.49	
Poblacion	**Residential** 3.306 has **Cemetery** 0.070 has **Open Spaces** 0.117 has	**Residential** 1.67 has **Cemetery** 0.18 has	**Residential** 7.803 has **Commercial** 0.515 has **Institutional** 0.633 has **Industrial** 0.008 has **Open Spaces** 0.029 has	•48% of buildings have light to salvageable materials •18% has hazard resistant design •52% have access to infra- related mitigation measures •39% has capacity to retrofit	4	3	4	3.83	1.04 Medium Low	0.78 Low	1.04 Medium Low	F-8.34 L-6.78 T-4.62	
Tabugon	**Residential** 0.180 has	**Residential** 0.020 has	**Residential** 0.227 has	•48% of buildings have light to salvageable materials •18% has hazard resistant design •52% have access to infra-related mitigation measures •39% has capacity to retrofit	2	1	2	3.83	0.52 Low	0.26 Low	0.52 Low	F-8.78 L-7.36 T-5.38	

Source: CDRA, Sta. Fe, Romblon (2018)
*F-flood; L-landslide; T-tsunami
*NS- Not susceptible

Table. Risk and Threat Level Analysis for Lifeline Utilities, Sta. Fe, Romblon

Barangays	Summary of findings				Degree of Impact/ Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure			Sensitivity									
	F	L	T		F	L	T		F	L	T		
Agmanic	**Roads** Barangay-2.58km **Bridges** Agmanic- 3.16m Capdang-5.02m **Post** 222, 223	**Roads** Barangay - 0.103 km	**Roads** Barangay-4.98km Provincial-0.054km **Post** 215-216 218-223	•Roads and bridges are made from concrete and gravel but are not hazard-resistant •Major repair for barangay roads; minor repair for bridges	4	2	4	3.83	1.04 Medium Low	0.52 Low	1.04 Medium Low	F-10.26 L-5.89 T-5.46	
Canyayo	**Roads** Barangay-0.81 km	**Roads** Barangay-0.083 km	**Roads** Barangay-1.12 km	•Barangay roads are concrete and gravel; needs major repair and not hazard-resistant	2	3	2	3.83	0.52 Low	0.78 Low	0.52 Low	F-16.34 L-6.4 T-6.63	
Danao Norte	**Roads** Barangay-0.108 km Provincial-0.004 km **Bridges** Santol-6.46m **Post** 105, 106, 162	**Roads** Barangay-0.82 km Provincial-3.204 km	Not exposed	•All roads are concrete and gravel but needs major repair •Bridges are made from concrete and in good condition but does not employ hazard resistant design	2	3	NS	3.83	0.52 Low	0.78 Low	NS	F-14.97 L-7.76 T-NS	
Danao Sur	**Roads** Barangay-0.33km Provincial-0.30 km **Bridges** D. Sur-4.87m **Post** 107, 108, 111	**Roads** Barangay-0.705 km Provincial-0.151 km	Not exposed	•Only provincial roads and some of barangay roads are made of concrete, some are dirt roads; all need major repair •Bridges are concrete and in good condition but not hazard-resistant	3	2	NS	3.83	0.78 Low	0.52 Low	NS	F-11.00 L-6.17 T-NS	
Guinbirayan	**Roads** Barangay-0.21km Municipal-0.08km Provincial-0.13 km **Bridges** Guinbirayan-5.92m **Post** 134, 135, 136	**Roads** Barangay-0.131km Provincial-0.261 km **Post** 216-219	**Roads** Barangay-0.75km (18.25%) **Bridges** Guba bridge-10.5m	•Some bgy. roads are not concrete but provincial and municipal roads are made of concrete and gravel; all roads need major repair •Atic bridge is concrete but in poor condition; footbridge is made of lumber and need major repair; both bridges are not hazard-resistant	3	2	3	3.83	0.78 Low	0.52 Low	0.78 Low	F-9.33 L-5.58 T-7.00	
Guintigbasan	**Roads** Barangay-0.47km Provincial-0.60 km **Post** 148-153 w/o 150	**Roads** Provincial-2.19km **Post** 225-233	Not exposed	•Some bgy. and provincial roads are still dirt roads; need minor repairs; all do not have hazard-resistant design	3	4	NS	3.83	0.78 Low	1.04 Medium Low	NS	F-10.79 L-6.55 T-NS	

Barangays	Summary of findings				Degree of Impact/ Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure			Sensitivity									
	F	L	T		F	L	T		F	L	T		
Magsaysay	**Roads** Barangay -0.82km Provincial-0.69 km **Bridges** Magsaysay-7.02m Palate P.R.- 1.59 m **Post** 61-63, 68-69	**Roads** Barangay-0.458 km Provincial-1.41 km **Post** 141, 158-160	**Roads** Barangay - 1.19km	• All roads are concrete and gravel but need minor repairs • All bridges are concrete but Magsaysay bridge needs minor repairs; Palate P.R. and Palate B.R bridge have hazard-resistant designs	3	2	2	3.83	0.78 Low	0.52 Low	0.52 Low	F-9.83 L-5.60 T-5.20	
Mat-i	**Roads** Barangay-0.32km Provincial-1.22km **Post** 4, 9, 11-13	**Roads** Provincial-1.73 km **Post** 21-43	Not exposed	•Roads are all concrete and gravel, but some need minor repair and are not hazard-resistant	3	3	NS	3.83	0.78 Low	0.78 Low	NS	F-10.15 L-5.67 T-NS	
Pandan	**Roads** Barangay -0.97km Provincial-0.75km **Bridges** Pandan-5.14m **Post** 31-37	**Roads** Barangay-1.48 km Provincial-1.76 km **Post** 45-63	**Roads** Barangay - 0.66km Provincial-0.98km **Post** 33-38	•All roads are concrete and gravel but not hazard-resistant; some provincial roads need minor repair; some bgy. roads need major repairs •Bridge is concrete but in poor condition and not hazard-resistant	3	3	2	3.83	0.78 Low	0.78 Low	0.52 Low	F-10.53 L-6.75 T-5.53	
Poblacion	**Roads** Barangay-0.95km Provincial-0.58km **Bridges** Bulangan-7.34m Longa-Og -7.78 m **Post** 53, 54, 55, 56, 59, 60	**Roads** Barangay-0.52 km	**Roads** Barangay-1.77km Municipal-2.38km Provincial-0.35 km **Bridges** Bulangan Bridge-7.34m **Post** 41-50, 52	•Roads are concrete but do not employ hazard-resistant designs; bgy. roads need minor and major repairs •Bridges are concrete and hazard-resistant but the Longa-og bridge is in poor condition	4	2	4	3.83	1.04 Medium Low	0.52 Low	1.04 Medium Low	F-10.97 L-5.52 T-5.76	
Tabugon	**Roads** Barangay-0.92km Provincial-1.27km **Post** 192-194, 199-205	**Roads** Provincial-0.18 km **Post** 256-257	**Roads** Barangay-3.55km **Post** 203-206, 199-200, 195-196	•Some bgy. and provincial roads are still dirt roads, all need major repairs and are not hazard-resistant	4	2	4	3.83	1.04 Medium Low	0.52 Low	1.04 Medium Low	F-10.31 L-5.83 T-5.71	

Source: CDRA, Sta. Fe, Romblon (2018)

*F-flood; L-landslide; T-tsunami

*NS- Not susceptible

Table. Risk and Threat Level Analysis for Institutional Facilities, Sta. Fe, Romblon

Barangays	Summary of findings				Degree of Impact/ Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure			Sensitivity									
	F	L	T		F	L	T		F	L	T		
Agmanic	No CPF susceptible		Capdang Catholic Church, Agmanic Catholic Church	All facilities are concrete, in good condition, and with hazard-resistant design but not covered with insurance	1	1	3	4	0.25 Low	0.25 Low	0.75 Low	F-NS L-6.51 T-5.63	
Canyayo	Canyayo Catholic church, barangay hall, child development center, and health center		Catholic Church, Barangay Hall, child development center, Canyayo Elementary School, and Canyayo Health Station	All facilities are concrete, in good condition, and with hazard-resistant design but not covered with insurance	3	1	4	4	0.75 Low	0.25 Low	1 Low	F-13.11 L-6.83 T-5.54	
Danao Norte	No CPF susceptible	Seventh-Day Adventist Church and Baptist Church	Not susceptible	All facilities are concrete, in good condition, and with hazard-resistant design but not covered with insurance	1	3	NS	4	0.25 Low	0.75 Low	NS	F-NS L-8.56 T-NS	
Danao Sur	Child Development Center	No CPF susceptible	Not susceptible	All facilities are concrete, in good condition, and with hazard-resistant design but not covered with insurance	2	1	NS	4	0.5 Low	0.25 Low	NS	F-NS L-7.03 T-NS	
Guinbirayan	Puro Catholic Church, Puro barangay health station, and Puro Child Development Center	Vicente Anselmo Montiel Memorial School	Puro Catholic Church and Puro Barangay Health Station	All facilities are concrete, in good condition, and with hazard-resistant design but not covered with property insurance	2	1	4	4	0.5 Low	0.25 Low	1 Low	F-11.78 L-6.95 T-NS	
Guintigbasan	Guintigbasan Catholic Church, barangay hall, Guintigbasan Elementary School, child development center and barangay health station	No CPF susceptible	No CPF susceptible	All institutional facilities are concrete, in good condition, and with hazard-resistant design but not covered insurance	2	1	NS	4	0.5 Low	0.25 Low	NS	F-10.68 L-6.00 T-NS	
Magsaysay	Barangay hall, child development center, barangay health station and Magsaysay Kingdom of God	No CPF susceptible	No CPF susceptible	All facilities are concrete, in good condition, and with hazard-resistant design but not covered with insurance	3	1	1	4	0.75 Low	0.25 Low	0.25 Low	F-6.55 L-6.74 T-NS	

Barangays	Summary of findings				Degree of Impact/ Threat Level			Adaptive Capacity Score (W, Info, Insti, Infra, T, S)	Relative Vulnerability Score and Category (RV=TL/AC)			Risk level and category	Summary of Findings
	Exposure			Sensitivity									
	F	L	T		F	L	T		F	L	T		
Mat-I	health station, barangay hall, and child development center	Santa Fe National High School (Mat-I Campus) and Mat-I Elementary School	Not susceptible	All facilities are concrete, in good condition, and with hazard-resistant design but not covered with insurance	2	1	NS	4	0.5 Low	0.25 Low	NS	F-11.25 L-6.72 T-NS	
Pandan	Pandan barangay hall, Pandan Saint Joseph Chapel, Pandan Elementary School, Pandan Health station, child development center, and Foursquare Church	Foursquare Church	Saint Joseph Chapel and Barangay Hall	All facilities except for Foursquare Church which is made of light materials, are concrete, in good condition, and with hazard-resistant design but not covered with insurance	4	2	3	4	1 Low	0.5 Low	0.75 Low	F-13.61 L-6.49 T-5.57	
Poblacion	Baptist Church, Santa Fe Central Elementary School, children's park, and senior citizen building	Romblon State University, Santa Fe Senior High School, central evacuation center, Bureau of Fire Protection, and Santa Fe Elementary school	Assembly of God, Baptist Church, Barangay Hall, Catholic Church, Seventh Day Adventist, Rural Health Unit, Santa Fe National High School	All facilities are concrete, in good condition, and with hazard-resistant design but not covered with insurance	3	3	3	4	0.75 Low	0.75 Low	0.75 Low	F-6.95 L-6.65 T-4.94	
Tabugon	Barangay hall, Tabugon Child Development Center, Guinpoingan Child Development Center, Tabugon Baptist Church	Guinpoingan Elementary School and Tranquilino Cawaling, Sr. National High School	Guinpoingan Health Station, Baptist Church, Barangay Hall, Tabugon Health Station, Tabugon child development center and, Tabugon Elementary School	All institutional facilities are concrete, in good condition, and with hazard-resistant design but not covered with insurance	3	1	4	4	0.75 Low	0.25 Low	1 Low	F-11.38 L-6.36 T-4.97	

Source: CDRA, Sta. Fe, Romblon (2018)

*F-flood; L-landslide; T-tsunami

*NS- Not susceptible