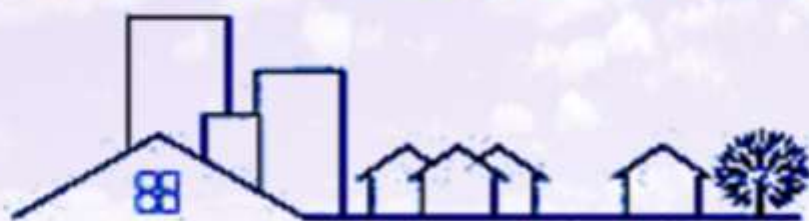


COMPREHENSIVE LAND USE PLAN

LAOAG CITY, ILOCOS NORTE



PLANNING PERIOD 2020-2029



VOLUME 1:

The Comprehensive Land Use Plan

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EXECUTIVE SUMMARY

The City of Laoag Comprehensive Land Use Plan (CLUP) for the period 2020 to 2029 was prepared by the local government of the City of Laoag with technical assistance from North. Planners, Inc. based on the mandate indicated in the Local Government Code of 1991 (RA 7160) for the local government units to “prepare their comprehensive land use plans and enact them through zoning ordinances”.

This plan is meant to guide the city towards its future physical, social and economic development and to hasten the city’s role as the commercial and tourism center of the North. It provides a framework for the objectives and strategies that need to be implemented to achieve its goals and realize its vision of BARO A LAOAG by 2029.

I. VISION

The City of Laoag shall be the “BARO A LAOAG that empowers its people through inclusive governance to sustain economic growth and vibrant culture while preserving the environment.”

II. BRIEF SITUATIONER

A. Demography

The annual growth rate of the City of Laoag had a decreasing trend from 0.18 in 2007 to 0.15 in 2015. This implies that even if the population is increasing, the rate of growth is decreasing.

In 2015, the City of Laoag had a population density of ten (10) persons per hectare. Brgy Sto. Tomas (14), an urban barangay, had the highest population density of 206 persons per hectare. Whereas Brgy. Bacsil North (56-A) and Brgy. Bacsil South (56-B) obtained the lowest population density of two (2) persons per hectare.

Also, in 2015, ages from 15-19 comprise 10.4% of the total population of the City of Laoag. Infants have 2.1% of its total population. About 29.9% of its population belongs to the youth-age group of 0-14; 64% to the working-age group of 15-64; and 6% of its population are age group of 65 and over. The city comprises 51.06% of females (56,742) and 48.94% of males (54,383).

The City of Laoag has the greatest population of young and old dependency in Ilocos Norte, with a population of 26,685 for 0-14 years old (young dependency) and 6,683 for 65-over (old dependency).

The ratio of population in the City of Laoag for both young and old dependency is 49.95%. Specifically, the young dependency ratio (0-14 years old) is 39.95% and the remaining 10% is old dependency ratio (65 and over).

B. Ecosystem Sector

The highest possible future rainfall increase of 32.2% under representative concentration pathway (RCP) 4.5 scenario in the mid-21st century (2036-2065) would be in the season of December-January-February (DJF). The projected impacts during this season are improvements in the growth and yield performance of transplanted rice but an increase in susceptibility of vegetables and fruits to pests and diseases and decrease in quality of harvested vegetables. On the other hand, the highest possible rainfall decrease of 25.9% was projected under RCP 8.5 scenario during the season of March-April-May (MAM). The projected impacts during MAM's season are quicker drying of corn and palay, delay sowing of seeds for rice production, occurrence of ambient pests (poultry and livestock diseases), low level of dissolved oxygen in ponds and increased susceptibility of vegetables to diseases.

The highest projected temperature increase under high emission of greenhouse gas scenario is 2.4°C in the season of June-July-August (JJA). The potential impacts are adjusted working time in the field (rice transplanting) but with no significant impacts on rice production.

The likelihood of occurrence of flooding in the city is every one (1) to three (3) years. The flood hazard map shows that 60.10%, 13.24% and 17.25% of the land area of the City of Laoag is with high, moderate and low susceptibility to flooding. These areas are low-lying and can be found along the Padsan River and creeks.

Landslide in the City of Laoag is a very rare event, occurring once every 200 to 300 years. A small percentage (173.47 ha) of the land area of the city is highly susceptible to rain-induced landslide. This is mostly found in barangays Bacsil North (56-A), Bacsil South (56-B) and Lagui-Sail (54-A).

Storm surge has not occurred yet in the lifetime of key informants. However, based on the model generated by the DOST's Project NOAH, less than one (1) percent (102.45 ha) of the land area of the city is covered by highly susceptible to storm surge and 1.80% (194.57 ha) by moderately susceptible. Highly susceptible areas are mostly found at barangays Gabu Norte West (34-A) and Gabu Sur (35). They can also be found along the shorelines of Madiladig (60-B), Caaocan (60-A) and Cataban (61).

The return period of a tsunami is 200 to 300 years. Based on the DOST's READY Project, all the barangays along the shoreline are affected by tsunami and even extending to Mangato West (38-B), Mangato East (38-A), Cabungaan North (48-A), Cabungaan South (48-B), Zamboanga (44), Navotas North (62-A), Dibua South (59-A) and Dibua North.

The 1983 Laoag earthquake scenario, having a magnitude of 5.3, has a return period of ten (10) to 30 years. The top barangays which will have two (2) to three (3) buildings or structures in complete damage with collapse state would be San Lorenzo (1), San Isidro (12), Santa Joaquina (2), San Matias (23), San Bernabe (28), Buttong (50) and Nra. Sra. De Natividad (7-A).

According to CENRO, the City of Laoag comprise of 71 flora species, 16 species of amphibians, 22 species of reptiles and 34 species of avifauna. Over-all,

there are 69 flora species and 72 fauna species. Nine (9) species of flora are exotic species and 62 species are endemic. Most of fauna species are endemic with a total of 53 species; 12 species are native; 3 species are introduced; and four (4) species of avifauna are migratory.

C. Social Sector

With high literacy rate of 98% and with students from neighboring towns also enrolling in schools in Laoag, the city maintains a high net enrollment participation rate (NEPR) in primary and secondary education. The City of Laoag, being the educational center of Ilocos Norte, offers quality education from elementary, secondary to collegiate level. At present, there are 33 elementary schools, six (6) high school institutions and eight (8) colleges and universities.

To address the medical concerns of Laoagueños, the following healthcare facilities are available: Laoag City General Hospital (LCGH); Governor Roque Ablan, Sr. Memorial Hospital (GRASMH); seven (7) private hospitals, three (3) Rural Health Units (RHUs) located at Brgys. Sta. Joaquina (2), San Tomas (29) and Mangato (38); and 15 Barangay Health Centers located at different barangays. There are also 31 medical clinics/ laboratories offering general medicine, obstetrics, family planning, dermatology, pediatrics, ophthalmology and EENT services, among others, as well as 20 dental clinics in the city. There is however a need to construct more barangay health centers and hire more healthcare professionals to comply with the standards and to ensure adequate delivery of medical services.

Low crude death rate and low malnutrition are indicative of a healthy population. However, the local government of Laoag should focus on addressing the following top causes of mortality and morbidity: pneumonia (mortality); hypertension, animal bite and diabetes mellitus (morbidity).

With regard to housing, the projected total housing requirement in 2029 is 66,383 units and the demand for additional housing units is 43, 154 units.

The City Social Welfare and Development Office (CSWDO) of the City of Laoag has several programs and services for the underprivileged and marginalized sectors. Meanwhile, peace and order in Laoag are primarily maintained by the City of Laoag Police Station (with 95 personnel: that is 86 officers and 9 non-uniformed personnel for administrative and operational works, and with a total of 27 motor vehicles. This is complemented by the following number of barangay security force and volunteers, to wit: 550 traffic enforcers; 1,599 staff for peace and order; 250 personnel for disaster concerns; 250 for auxiliary services; and another 221 persons in charge for other concerns. The Bureau of Fire Protection (BFP) has 30 personnel and five (5) fire trucks while the City Jail has 31 jail personnel. Different sports and recreation facilities are located in different barangays in the city to improve health and wellness of Laoagueños; some however need repair while in some barangays, the construction of such facilities is still recommended.

D. Economic Sector

The City of Laoag, being the capital of its province is a hub of economic activities not only in Ilocos Norte but also of the nearby provinces of Ilocos Sur, Abra and Cagayan. It is in a position to be a preferred investment destination as it pursues its objectives of increased agricultural productivity, more vibrant commercial and light manufacturing activities along with income-generating tourism activities.

These economic objectives supported by adequate infrastructure and communication facilities are expected to launch the city to be an attractive agro-eco/light industrial hub in the region.

The City of Laoag gets its income and revenues from business, special education and real property taxes, regulatory fees, service and user charges, permits, licenses and other income receipts. The city also receives subsidies from the national government in terms of Internal Revenue Allotment (IRA). From the foregoing sources of revenues, the total local income in 2019 amounted to PhP218,623,213.12. This is a 20.3% increase from the previous year. It has been observed that the local income has been increasing by 12.16% annually from 2015-2019.

The IRA is the biggest source of income with PhP 494,092,149.00 or 69.33% of total income in 2019. It has been increasing from 2015 to 2019 with an average annual increase of 9.76%. Meanwhile, business taxes, with 27.5% of the local income in 2019, comprise the biggest source of local income which have been increasing with an annual average of 15.18%, followed by real property taxes with 8.3% of the local income and with average annual increase of 7.59%.

The Local Income Per Capita (LIPC), computed by dividing Laoag's internally generated income by the population, increased by an average of 10.95% from 2016-2019. Subsidy from the government increased by 8.58% annually in the same period. With these increases in local and total income per capita, it can be inferred that the economy is improving and the local government is better able to serve its constituents.

The agriculture subsector is further divided into crop production, livestock and poultry, and fisheries. Agricultural land in the City of Laoag covers 70.63% of the total land area or 9,004 hectares. Rice production occupies the largest area with 3,949 hectares or 43.86%. Important fruits and crops in the area include mango, assorted vegetables, eggplant, tomato, peanut, cassava, watermelon, sweet potato, garlic, squash, okra, upo, string beans, pechay, patola, pepper, cabbage, ampalaya and onion.

There are a lot of small and local commercial businesses in the City of Laoag which have significant community impacts. Because of commercial strips' convenient location, more economic opportunities are arising to meet consumer demands. The economic benefits of commercial strips and complexes are numerous and show how even the smallest shops can have a positive impact to the community. These local businesses provide local jobs, increased tax base, consumer product diversity and local community identity.

In 2019, there were a total of 2,542 business permits issued in the city. No permits were issued from 2015 up to 2019 in the primary category. In general, permits issued in the city are continually increasing. This steady increase in permits issued over the years indicates an improvement in the business environment in the city. Currently, the city has a higher number of permits issued in the tertiary sector which include wholesale and retail trade/repair of motor vehicles and motorcycles, hotels/restaurants, transport, storage and communication, finance, real estate education, and health and social work with a total permit of 2,289. While in the secondary category, the local government issued a total of 253 permits. This category includes manufacturing, electricity, gas and water supply, and construction /contractor.

The City of Laoag is known for the production of basi, suka and the juice drink Golden Coolers - a beverage-like juice which has a capitalization of PhP500,000.00 in the year 2007. Fifty-one (51) manufacturing/industrial establishments are built in the city but most of the establishments are related to hollow blocks-making. Only two (2) manufacturing/industrial establishments have employment with more than five (5) employees, to wit: The Laoag Kambal Corporation, a hollow blocks manufacturing company having 25 employees, and the Golden Coolers, which has 200 employees. The rest of the industrial establishments have less than five (5) employees.

The City of Laoag is the entrance port and central capital in the Province of Ilocos Norte. Tricycle, jeepney, van or private vehicle are the available means of transportation in land, if tourists will visit the tourist attractions in the city. Laoag has an airport, the Laoag International Airport, covered by Brgys. Cavit (43), Araniw (36) and Apaya (42) which will make Laoag a potential international tourist destination.

The city is known for a lot of historical landmarks, scenic natural landscapes and beaches which give tourists a lot of memorable and excitable experiences. Facilities are in place to serve the visitors with their needs. Most of the tourist destinations in the City of Laoag have accommodation facilities including hotels, resorts, cottages, restaurants, fast-food stalls and resto bars. There are also a lot of banks for financial transactions and medical facilities for health emergencies.

E. Infrastructure Sector

The road network pattern of the City of Laoag follows the radial-circumferential network. The transportation map shows roads and bridges connecting all barangays to commercial districts. The city is accessible to and from the other provinces and to the rest of the Luzon Island cluster through the national highway, Manila North Road that is traversing it. The total length of city road is 399.681 kilometers excluding the 34.24 kilometers of national road thereby exceeding the total road requirement by 121.161 kilometers and by 155.401 kilometers if national roads are included. As of census year 2019, road to population ratio is 3.74 kilometers per 1,000 population. Road density is 4.34 kilometers per square kilometer area.

All the barangays of the City of Laoag are already energized as all the households are served by the Ilocos Norte Electric Cooperative (INEC), a cooperative supply system of the province of Ilocos Norte whose main source of

power is the National Power Corporation transmitting electricity through the facilities of the National Transmission Commission (TRANSCO). The major source of electricity is the 69,000 KVA hydro-electric plants in Ambuklao Dam and Binga Dam in Benguet.

A total of seven (7) types of consumers for energy were identified in the City of Laoag. The energy in the city is mostly used for residential purposes. Energy consumed for industrial uses were only ten (10) and only in the recent year (2019).

The Ilocos Norte Water District (INWD) is the water supply agency that extends water service to consumers of the city. It is under the supervision of the Local Water Utilities Administration. Its facilities include two (2) reservoirs with a combined capacity of 1,750 cubic meters, five (5) pumping stations with a total capacity of 295 cubic meters per hour.

The INWD active sources of water are the Pump Station 1 and Pump Station 6 located at Brgy. San Tomas (29), Brgy. Nra. Sra. De Consolacion (27) Pump Station, Suyo Booster Pump Station and the Barit On-Line Booster Pump Station. The two concrete ground reservoirs are located in Ermita Hill and Camp Juan.

The modern modes of communication are mails, emails, fax and telex services, landline telephones and mobile/cellular phones. For news, information and entertainment, the following play important roles: newspapers of national, regional and provincial circulation, radio, television and internet. With these facilities, the population of a locality is informed and updated on the latest development trends in all aspects of living and learning.

The National Irrigation Administration's Provincial Irrigation Office in Ilocos Norte has a concrete dam (Laoag-Vintar RIS) servicing an area of 2, 860 hectares of agricultural lands within the City of Laoag and the municipalities of Vintar, Bacarra and Sarrat. This irrigation system also serves as flood control in the areas mentioned.

Solid waste and domestic sewage continue to be a priority challenge across the city. Fortunately, disease outbreak, rodent infestation and groundwater contamination are currently not exigent issues; nevertheless, these are the potential consequences if the city cannot address the problem on solid waste. This perennial problem of waste management draws attention to the need to rehabilitate/restore non-functioning material recovery facilities (MRF)s to reduce and recycle wastes. Successful operation of MRFs often requires community involvement, which is basically exhibited through the practice of waste segregation at source. To help ease the problem on solid waste, the city through an ordinance (C.O. 2012-045) regulates the use of plastic bags and other materials made of plastic as secondary packing or carryout bags for all forms of merchandise; bans the use of styrofoam and prescribes the penalties for violation thereof.

F. Special Areas Sector

The City of Laoag currently practices conventional ways of making progress in its economic growth. Presently, it has not enacted a local Green

Building Code that would provide for the adoption of sustainable strategies, assure resilient and sustainable infrastructure and serve as technical reference side by side with the National Building Code of the Philippines. The city implements the Solid Waste Management Act, although there are no clear-cut policies on sustainable practices like innovative recycling and managing waste. The use of material recovery facilities (MRF)s is imperative to complement innovative sustainable practices and support waste management. Opportunely, a sanitary landfill is in the plans in an identified site. The City of Laoag is visited regularly by strong typhoons and threatened by earthquakes but it has not established a state-of-the-art hazard monitoring center. It is prone to flooding even under its present network of drainage canals. As yet, there are no best management practices adopted on storm water management and flood mitigation to protect water bodies from pollution, erosion of riverbanks and siltation of both river and productive farmlands.

The Central Business District is characterized by a variety of period architectural styles and of low and medium rise buildings and residential houses. The streetscapes generally do not have physical and visual aesthetics and distinctive character to create a sense of neighborhood identity and beauty, and ownership. Walkable streets are also wanting. Some streets have sidewalks though most have none, and bike lanes are notably absent. This then shows a situation that does not encourage walking and biking in the area. There is also a lack of public parks, public restrooms and street arts/sculptures that would provide shade, comfort, ease of pedestrian movements and visual quality along the streets. The roads surrounding Aurora Park have become dangerous entry and exit roads making the park unsafe and unusable. Aside from Aurora Park, there is no other central urban park that exists except for the Rizal Amusement Park and Mariano Marcos Stadium northeast of the urban area. Laoag can increase its open spaces for urban pocket parks to achieve urban greening for walkability and livability.

The City of Laoag's rich history is being showcased and is the focus of this sector on Special Area. The inhabitants of the city, having been part of an extensive, largely coastal northwestern region of the Ilocano ethnic group, engaged in the barter trade of gold with merchants from Japan, China, Malaysia and Indonesia for ceramics and silk during the pre-colonization period. Captain Juan de Salcedo went to Vigan and sailed along the coast of Laoag enroute to Cagayan in 1572. Salcedo's discovery of this northern region led to the naming of "Ylocos" Province meaning "from" and "lo-oc", translated as "cove or bay", thereby pertaining to "people of the bay" from the present provinces of Ilocos Sur, Ilocos Norte, Abra and La Union.

Laoag was a busy trading port, shining like a night beacon for river travelers, thus the name "light" or "laoag". Even then, it was a closely packed settlement in Ermita Hill, situated along the north bank of the Padsan River, with a population numbering more than a thousand when it was discovered by the Spanish. It was founded in 1850 as one of the early settlements by Augustinian missionaries with a parish dedicated to Saint William the Hermit. By early 19th century, Laoag was a thriving pueblo when the Ilocos Province was split into two provinces of Ilocos Norte and Ilocos Sur by a Spanish Royal Decree on February 2, 1818 with Laoag made as the capital town of Ilocos Norte. On June 19, 1965, the

municipality status of Laoag was changed into a component city of Ilocos Norte, maintained as its capital and proudly called by its residents as “Sunshine City”.

After more than 300 years, Spanish-influenced intangible transformations are still practiced in the city such as cultural festivals and religious traditions intended to preserve the city’s cultural heritage as well. The city celebrates the month-long *Pamulinawen* Festival every February in honor of its patron Saint William the Hermit highlighting its culture and heritage through arts and crafts, cuisine, comedia, parades along Rizal Street that wind up in front of the Provincial Capitol and street dancing showdowns in front of the Laoag City Commercial Complex (Public Market).

III. MISSION, GOALS AND OBJECTIVES

A. Mission

The City of Laoag shall endeavor to develop empowered citizens who value environment and culture, support agro-industrialization and adopt state-of-the-art technologies towards global competitiveness.

B. Goals and Objectives

Goals of the Ecosystem Sector

- Goal 1:** minimize disaster risks by ensuring the safety of the people;
- Goal 2:** improve and sustain good ambient air quality;
- Goal 3:** improve the quality of water bodies of the City of Laoag; and
- Goal 4:** enrich the forest and coastal biodiversity of the City of Laoag.

Objectives of the Ecosystem Sector

- 1.1: reduce risk caused by flooding, earthquake and COVID-19;
- 1.2: decrease the number of families, critical point facilities and lifeline utilities located in disaster prone areas by 20%;
- 1.3: enhance the coping capacity of the economic sector;
- 2.1: decrease the level of PM₁₀ and PM_{2.5} in the air by 10%;
- 3.1: improve and maintain the water quality;
- 4.1: increase the forest biodiversity by 20%; and
- 4.2: increase coastal biodiversity by 20%.

Goals of the Social Sector

- Goal 1:** empower the people by ensuring equitable access to education;
- Goal 2:** empower the people by promoting good health;
- Goal 3:** empower the people by giving them access to affordable and safe housing;
- Goal 4:** empower the people by uplifting their well-being thereby improving social and economic development;
- Goal 5:** empower the people by allowing them to live in a safe, peaceful and orderly community; and
- Goal 6:** empower the people by promoting healthy lifestyle and providing accessible sports and recreation facilities.

Objectives of the Social Sector

- 1.1 increase literacy rate from 98% to 100%;
- 1.2 achieve 100% enrollment participation rate of students from Laoag for kindergarten, primary and secondary education so that Laoag shall retain its status as the educational center of Ilocos Norte;
- 2.1. decrease crude death rate from the average of nine (9) to five (5);
- 2.2. eliminate animal bite in the top five (5) leading causes of mortality;
- 2.3. reduce number of malnourished children to zero;
- 2.4: make more available and less costly burial plots;
- 3.1. accommodate the increase in population and reduce housing backlog by 50%;
- 4.1. increase the participation of the inhabitants, especially women, children and elderlies in programs focused in improving their well-being by 10%;
- 5.1. reduce the incidence of fire and crimes by 50%; and
- 6.1. increase the number of barangays having sports/recreation facilities by 50%.

Goals of the Economic Sector

- Goal 1:** increase agricultural productivity and income;
- Goal 2:** establish a globally competitive agribusiness system;
- Goal 3:** establish a globally competitive agro-industrial hub; and
- Goal 4:** become an internationally recognized tourism destination in South East Asia.

Objectives of the Economic Sector

- 1.1. ensure food security while protecting the environment;
- 2.1. increase agricultural production and income by 20%;
- 3.1. promote sustainable agricultural practices;
- 4.1. increase the number and scale of commercial establishments by 20%;
- 5.1. increase the level of employment generated by the trade and commerce subsector by 20%;
- 6.1. promote sustainable commerce and trade practices;
- 7.1. increase the number and scale of industrial establishments by 10%;
- 8.1. increase the level of employment and income generated by the industrial subsector by 20%;
- 9.1. increase the number of employment and income in the industrial subsector by 20%; and
- 10.1. create a tourism identity.

Goals of the Infrastructure Sector

- Goal 1:** generate sustainable, efficient, comfortable and affordable transportation system in the city;
- Goal 2:** secure the availability of safe and potable water in both the rural and urban barangays of the city;
- Goal 3:** design and construct enough and quality drainage infrastructure, wastewater treatment and disposal;
- Goal 4:** tap and maximize renewable opportunities as power source;
- Goal 5:** establish advance and excellent communication services for the city; and
- Goal 6:** construct environment-friendly infrastructures.

Objectives of the Infrastructure Sector

- 1.1: enhance the walkability in the urban areas of the city;
- 1.2: improve existing mode and situation of public transportation in the city;
- 1.3: improve the traffic situation in the urban areas of the city;
- 2.1: increase the coverage of waterworks system in all barangays by 50%;
- 3.1: extend irrigation system services to unserved barangays by 20%;
- 3.2: reduce flooding incidence in highly susceptible areas by 50%;
- 4.1: prioritize the use of renewable energy sources;
- 4.2: decrease the power outage incidence by 50%;
- 5.1: improve the communication facilities and services for community updates of information by 30%;
- 5.2: increase internet connectivity services to all public and private sectors by 100%;
- 6.2: heighten the implementation of the city's waste management system;
- 6.4: implement no build-zone on high risk areas; and
- 6.5: sustain and maintain a clean and green environment to balance the effect of urbanization on the environment.

Goals of the Special Areas

- Goal 1:** improve the local economy by engaging in environment-friendly agricultural, commercial and industrial activities;
- Goal 2:** maximize physical urban development and aesthetic values; and
- Goal 3:** maximize biodiversity and cultural values.

Objectives of the Special Areas Sector

- 1.1: be the nexus of green technology and innovation;
- 1.2: ensure air, land and water resources are clean;
- 2.1: implement planned and balanced developments in four quadrants of the city;
- 2.2: achieve visual quality, character and overall quality of life in the city;
- 3.1: heighten residents' awareness and appreciation, and pride of place and heritage in all-ages, levels and sectors of the society; and
- 3.2: protect and conserve the tangible and intangible cultural resources and natural resources of the city.

IV. THE CONCEPT PLAN

Growth Center Concept Strategy

Uniform development in all sections of the city shall be assured by assigning growth nodes in the north, west, east and south as well as in the southeast across the river. These growth nodes shall function to spread the economic activities, facilities and services to equalize development in key sections of the city, serving their own areas of influence and capturing their own market in support to the Central Growth Node.

1. Central Growth Node: The Heritage Core, Buffer Zone and Central Business District

The urban core/city proper (*poblacion*) shall continue to be the city's Central Growth Node. Presently, it is serving as the site of the provincial government

center as well the commercial, institutional, educational, recreational and communications center. The Central Business District (CBD), city public market, major sports center, playgrounds, historical landmarks, clinics and hospitals are located in this area.

Its strategic location makes it appropriate as the urban core of the city. It is traversed by the Manila North Road that is being plied by buses going to Metro Manila, Baguio City and the rest of Luzon area in the south; by buses to the north headed to Cagayan Valley and to the neighboring towns towards the east.

a. The Heritage Zone

The Heritage Zone shall encompass the city's major heritage structures that include Plaza Aurora, Saint William's Cathedral and belltower, the Provincial Capitol, Museo Ilocos, present City Hall of Laoag (for adaptive re-use), Heroes Hall, Holy Spirit Academy of Laoag and Laoag Central Elementary School.

b. The Buffer Zone

The Buffer Zone covers the street blocks that immediately surround the Heritage Zone.

c. Central Business District, Mixed Residential-Commercial and Residential Sections

This section of the urban core are all the outer street blocks after the Buffer Zone and constitutes the Central Business District, mixed residential-commercial and residential sections of the city.

2. West Growth Node: The New Government City

The West Growth Node shall be the "new government city" which shall host the new City Hall of Laoag, provincial branches of national agencies and related and support land uses. This proposed growth node shall be nucleated by the intersection of Laoag Bypass Road and extension of GomBurZa Street, enabling the development of the city's western section and influencing the peripheral barangays, particularly Brgy. La Paz with its famed sand dunes at the western end, and immediate barangays northwards of the Laoag By-Pass Road towards the town of Bacarra. The proposed relocation site of the City Public Market which is midway to the new government city shall be well-supported because of its accessibility with the construction of wide, parallel and perpendicular road extensions from the urban center for convenient, fast and increased entry and exit.

a. Influenced Growth Area: The La Paz Sand Dunes

The development of a new government city in the western part of the city will influence the development of La Paz Sand Dunes, and this envisioned development is harmonized with the Metro Ilocos Norte Development Plan that identifies Barangay La Paz Sand Dunes as a priority area for development.

b. Influenced Growth Area: Barangays North of New Government City

Continuing a little farther north of the proposed new government city shall be a commercial development to support the new city.

c. Influenced Growth Area: The New City Public Market Site

The proposed new City Public Market site shall be beside the central terminal. It is midway between the Central Growth Node (City Center) and proposed new government center.

3. East Growth Node: Ermita Hill Traditional Village

The East Growth Node shall be based on the development of the Ermita Hill Traditional Village partly as a reconstructed native settlement to become a cultural tourist attraction, and the rest of the area as reforested hill with tourism amenities.

a. Influenced Growth Area: The Proposed San Nicolas-Laoag By-Pass Road-Solsona-Laoag Road intersection

The construction of the proposed San Nicolas-Laoag By-Pass Road that will intersect with Solsona-Laoag Road will be a catalyst in the development of this node. It is expected that this major access will conveniently bring in more tourists to Ermita Hill taking this alternate road from the south.

b. Influenced Growth Area: The Proposed San Nicolas-Laoag By-Pass Road-Laoag-Vintar Road Intersection

The construction of the proposed San Nicolas-Laoag By-Pass Road that will intersect with Laoag-Vintar Road will stimulate the development of the existing light industrial development of this area. Any additional light industrial activity in this area is seen as a stimulus to the activities in the nearby Ermita Hill Traditional Village.

c. Influenced Growth Area: Redevelopment of Old Dumpsite into a Man-made Forest.

Another potential influenced growth area towards east is the proposed redevelopment of the city's old dumpsite into a man-made forest with low-impact tourism amenities, and the nearby hills and mountains as added natural attractions perfect for nature-based tourism. This strategy would create a demand for tourism which is lacking in Laoag at present and allows this area to grow and develop by itself.

4. Southeast Growth Node: The Mall and Commercial Strip

The Southeast Growth Node shall cover the development of the whole stretch of Laoag Airport Road and the Manila North Road Nangalisan Section up before the Laoag Bridge. The Manila North Road Nangalisan Section shall be allotted for commercial development with a mall before the Laoag Bridge as the central magnet supported by large commercial establishments to serve as seamless spillover of Robinsons Mall complex and commercial establishments in San Nicolas town.

a. Mixed-Use Development along Laoag Airport Road

The Laoag Airport Road shall be characterized by mixed-use development such as commercial, commercial-residential, medium and high-density residential (apartments, hotels, condominium units) and institutional. The urban design for this whole length of mixed-used development shall be formulated so as to create an architecturally impressive and organized built-up development from the airport to the city proper.

5. South Growth Node: PEZA-Registered Eco-Tourism Zone

The South Growth Node shall encompass the proposed PEZA-registered Eco-Tourism Zone, with the Fort Ilocandia, Plaza del Norte Convention Center, the Calay-ab Sand Dunes and Laoag International Airport as support amenities. This zone is accessed from the Laoag Airport Road and Laoag-Paoay Road.

a. Influenced Growth Area: The Calay-ab Sand Dunes, Fort Ilocandia, Plaza del Norte Convention Center, and Laoag International Airport Development Area.

The Calayab Sand Dunes stay protected as a natural heritage resource while nature-based tourism-related activities similar to La Paz Sand Dunes development shall be allowed within the periphery of Fort Ilocandia and Plaza Del Norte Convention Center. The expansion and modernization of the Laoag International Airport will improve the attraction of the city and the province as a tourist-and-business destination and it will spur growth and development of the surrounding communities. The airport will also create a demand for cargo warehousing. Warehouses shall be located in the area zoned as Light Industrial along the Laoag-Paoay Road which is ideal for cargo trucks, thus avoiding traffic along the Manila North Road.

b. Influenced Growth Area: Darayday Road-Paoay-Balacad Road Intersection.

This node located at Brgys. Mangato East (51-A) and Mangato West (51-B) is envisioned to develop as a support growth area to the PEZA-registered Eco-Tourism Zone which shall be largely commercial with a proposed mall development in the area. This area shall provide the shopping needs of guests, visitors and residents in PEZA-registered Eco-Tourism Zone and in the Calay-ab Sand Dunes, Fort Ilocandia, Plaza del Norte Convention Center and shall cater to travelers at Laoag International Airport.

V. THE PROPOSED LAND USE

A. Proposed General Land Use

B.

Proposed General Land Use	Area (ha)	Percent (%)
Industrial	382.38	3.19
Residential	3,811.65	31.82
Agricultural	4,762.81	39.77
Commercial	378.56	3.16
Environment	1,205.90	10.07
Institutional	230.48	1.92
Open Area	52.91	0.44

Comprehensive Land Use Plan of City of Laoag 2020-2029

River	1,152.22	9.62
Total	11,976.90	100.00

A. Proposed Urban Land Use

Proposed Urban Land Use	Area (ha)	Percent (%)
Industrial	40.46	4.85
Residential	271.82	32.59
Agricultural	363.22	43.55
Commercial	59.07	7.08
Environment/Tourism	0.00	0.00
Institutional	99.50	11.93
Open Area	0.00	0.00
Total	834.07	100.00

CHAPTER 1 BRIEF PROFILE OF THE CITY

I. HISTORY AND THE CREATION OF CITY OF LAOAG

Known as the country's *Sunshine City* and the capital of Ilocos Norte, the City of Laoag (*Figure 1. 1*) emits rays of opportunities to the entire province making it the center of education and economic activities.

The city's name was derived from the Ilocano term of *light* or *brightness* because of its clear atmosphere and blue skyline highlighting its beautiful beaches, famous sand dunes, lush green landscape, and picturesque heritage sites.

Focusing on the well-being of its people while embracing its rich and vibrant history and preserving the environment, the city is ready to embark into the future towards a sustainable and more progressive BARO A LAOAG (a New Laoag).



Figure 1. 1. The City of Laoag

Prior to Spanish conquest, trade in Ilocos was already flourishing with merchants from Japan and China visiting the area to trade beads, ceramics and silk with Ilocos' gold. During that time, the inhabitants called their place *samttoy*, from *sao mi itoy*, which literally meant "this is our language."

In 1572, Juan de Salcedo, in one of his expeditions, headed north of the Philippines and landed in Vigan until he proceeded towards Laoag, Currimao and Badoc. As he and his men sailed along the coast, they were surprised to see numerous sheltered coves (*looc*) where the locals lived. From then on, they named the region "Ylocos" and its people "Ylocanos".

Slowly, colonization and Christianization of Ilocos was carried out as churches, plazas, convents, towers, tribunals and settlements were built forming a gridiron pattern inspired by the early Romans. It was sometime in the year 1584 or 1585 when Laoag was first organized as a parish while on June 19, 1965, Laoag became a city through a plebiscite.

Revolution took place and freed the Filipinos from the abusive practices of the Spaniards. Eventually, Ilocos was divided into two provinces due to the surge of the population in the 1700s. It was on February 2, 1818 when the Province of Ilocos Norte was formally separated from the Province of Ilocos Sur. Laoag, having the most numerous inhabitants, was made the capital of Ilocos Norte (*Figure 1. 2*).



Figure 1. 2. City of Laoag, Capital of Ilocos Norte

With the creation of Laoag as a city, Hon. Eulalio F. Siazon became the first city mayor. He was followed by Hon. Jose P. Santos who assumed office in the year 1976. He was succeeded by Hon. Atty. Rodolfo C. Fariñas in 1980 then by Hon. Ernesto L. Tamayo in 1988. The fifth city mayor was Hon. Cesar A. Ventura who started his office in 1992 while the sixth was Hon. Roger C. Fariñas commencing in the year 1995. Hon. Michael V. Fariñas was the seventh city mayor in 2004; and his wife, Chevylle V. Fariñas, became the eighth city mayor when he ended his term in 2013. The present administration is led by Hon. Michael Marcos Keon who dreams of a more prosperous yet environment-friendly and people-centered BARO A LAOAG.

ALCALDES MAYORES

- 1815 – Francisco Bringas, Chief of Province of Ilocos Norte (with residence in Vigan)
- 1818 – Jacinto Piato, Primero Alcalde Mayor
- 1823 – Juan Padredo, Juez Receptor (Casa Nacional)
- 1839 – Francisco Godinez
- 1858 – Manuel Valderico Morquecho
- 1860 – Estanislao de Vivas
- 1871 – Antonio Davila
- 1878 – Miguel de la Guardia
- 1884 – Mariano Isquerdo



CHIEF EXECUTIVE OF LAOAG MUNICIPAL RESIDENTS

- 1902 – Elias Villanueva
- 1902 – 1903 – Mauricio Castro
- 1904 – 1906 – David Flors
- 1906 – 1907 – Pedro Acosta
- 1908 – 1909 – Severo Hernando
- 1910 – 1912 – Mauricio Castro
- 1912 – 1916 – Florencio Castro
- 1916 – 1919 – Eleuterio Ruiz
- 1919 – 1924 – Francisco Julian
- 1924 – 1925 – Leoncio Ablan
- 1925 – 1931 – Apolonio Castro
- 1931 – 1937 – Tomas Pasion



MUNICIPAL/CITY MAYORS

- 1938 – 1941 – Agripino Santos
- 1941 – 1943 – Galiciano Rafales (Japanese Occupation)
- 1943 – 1944 – Celestino Peralta (Japanese Occupation)
- 1944 – 1945 – Agripino Santos (Japanese Occupation)
- February – August 1945 – Vicente Erieta (Military)
- August – January 1946 – Felix Donungo
- April – June 1946 – Marcelino Francisco (Commonwealth)
- June 1946 – 1947 – Eulalio F. Siazon (Republic)
- 1948 – 1951 – Mamerto Remigio
- 1952 – 1955 – Andres Domingo
- 1956 – 1960 – Jose P. Santos
- 1960 – March 1976 – Eulalio F. Siazon
- April 1976 – 1980 – Jose P. Santos
- 1980 – 1986 – Rodolfo C. Fariñas
- 1988 – 1992 – Ernesto L. Tamayo
- 1992 – 1995 – Cesar A. Ventura
- 1995 – 2004 – Roger C. Fariñas
- 2004 – 2013 – Michael V. Fariñas
- 2013 – 2019 – Chevylle V. Fariñas
- 2019 – Present – Michael Marcos Keon



II. PHYSICAL PROFILE

Geography

Located at the west-central part of the Province of Ilocos Norte bordering the West Philippine Sea, City of Laoag is bounded on the east by the Municipality of Sarrat, in the southeast by the Municipality of San Nicolas, in the southwest by the Municipality of Paoay, in the northeast by the Municipality of Vintar, in the northwest by the Municipality of Bacarra, and in the west by the South China Sea (*Figure 1. 3*). It is 488 km away from Manila, 274 km from Baguio, and 78 km from Vigan. With Laoag International Airport and the international seaport of Currimao, the City of Laoag helps the country in maintaining strong external linkages.

With total land area of 11,976.90 hectares (ha), City of Laoag has residential area of 3,311.65 ha, commercial area of 127.10 ha, industrial area of 494.47 ha, agricultural area of 4,123.16 ha, forest and tourism area of 1,054.93 ha, open area of 1,527.36 ha and river covering 1,152.22 ha.

Topography

Figure 1. 4 shows the transect line which traverses across the City of Laoag. The city has an elevation of one (1) meter above sea level (msl) extending from its shoreline at Brgy. Apaya (42) to 12.5 km at Brgy. Lagui-Sail (54-A). Starting from Brgy. Bacsil South (56-B), the elevation rises to 72 msl traversing toward Brgy. Bacsil North (56-A) which has the highest elevation of 225 msl in the transect.

The City of Laoag has generally low elevation of -2 to 8 msl covering an area of 4,689.31 ha or 39.15% of the total land area (*Table 1. 1* and *Figure 1. 5*). This favors agricultural, residential and commercial activities. However, the lowest elevation can be found at Brgy. Rioeng (53), Brgy. Camanggaan (54-B) and Brgy. Nangalisan (51- A & B), making these areas prone to flooding. The northeastern portion of the city, specifically Brgy. Dibua North (59-B), Brgy. Dibua South (59-A), Brgy. Salet-Bulangon (55-B), Brgy. Lagui-Sail (54-A), Brgy. Bacsil North (56-A) and Brgy. Bacsil South (56-B), composed the area with elevation ranging from 44 to 309 msl. Brgy. Bacsil North (56-A) has the highest elevation of 309 msl. These barangays are predominantly covered by forest. A small portion of Brgy. La Paz Proper (33-A) is also slightly elevated because of the sand dune. Brgy. Balatong (50) is also elevated with 61 msl as its highest point.

Figure 1. 6 shows the topographic contours of the City of Laoag.

Table 1. 1. Elevation of City of Laoag

Elevation (msl)	Area (ha)	Percentage (%)
-2 to 8	4,689.31	39.15
8 to 11	1,847.89	15.43
11 to 18	2,226.48	18.59
18 to 44	1,672.34	13.96
44 to 309	1,540.87	12.87
Total	11,976.90	100.00

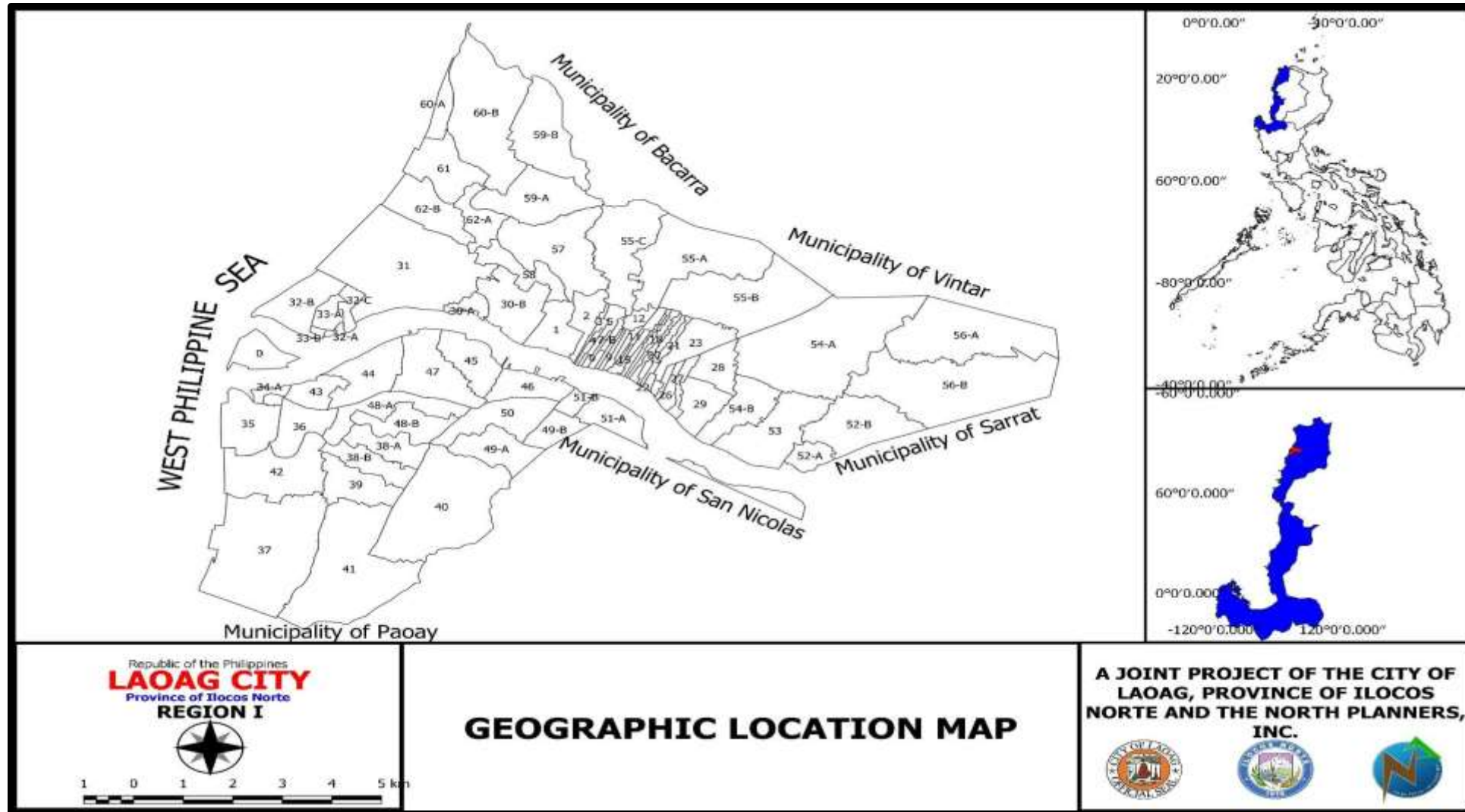


Figure 1. 3. Geographical Location of City of Laoag

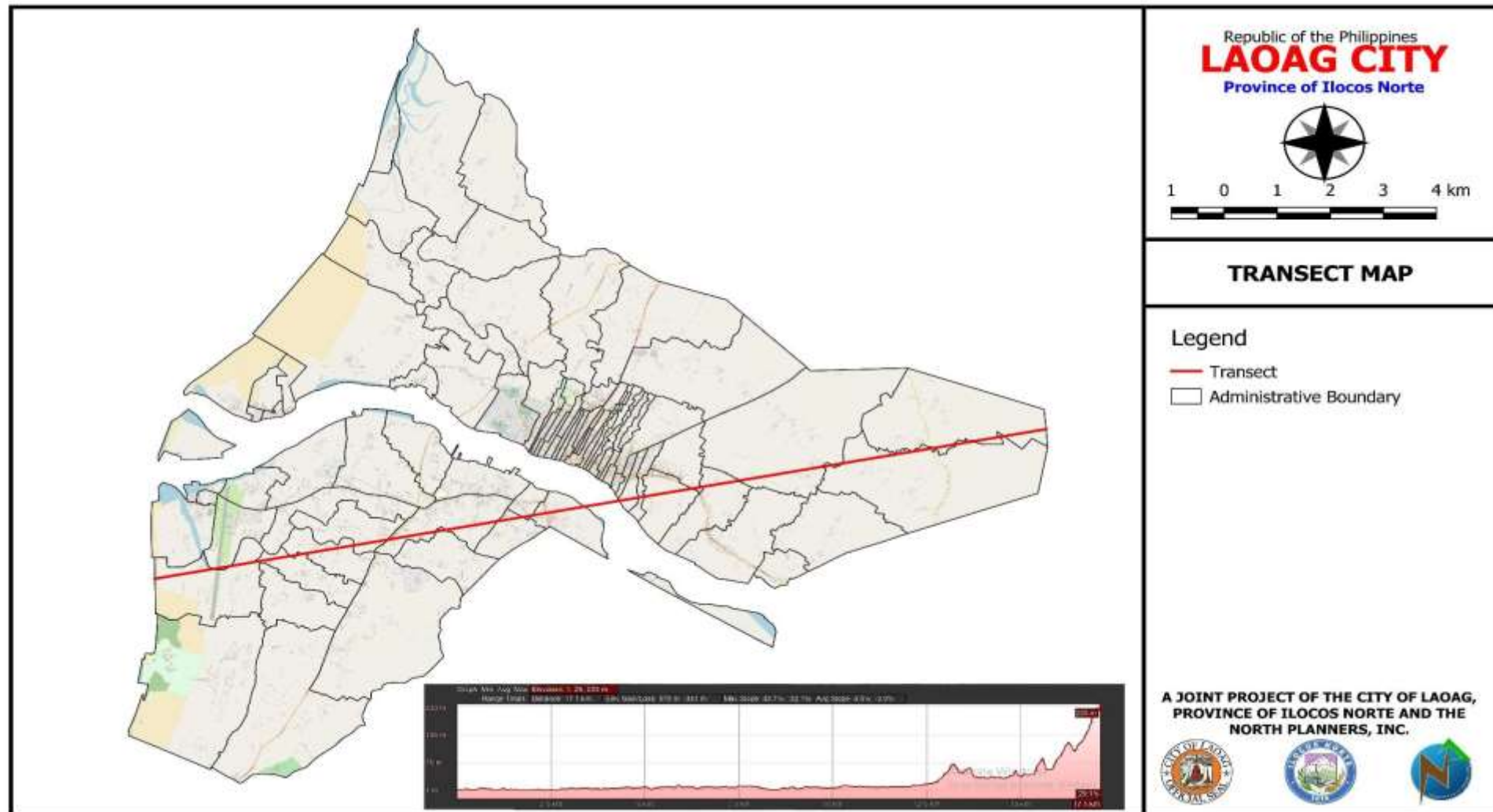


Figure 1. 4. Transect Map of City of Laoag

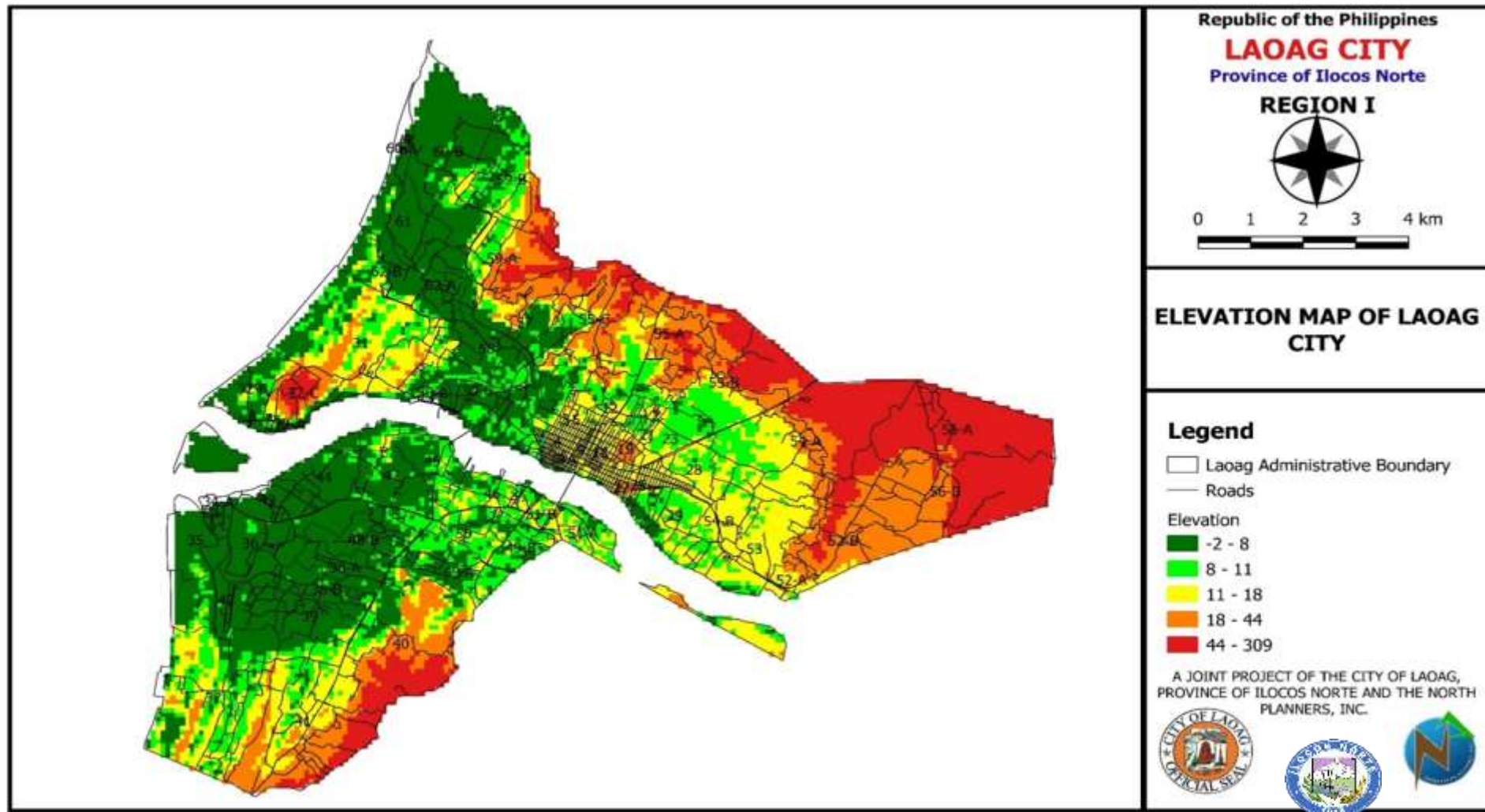


Figure 1. 5. Elevation of City of Laoag

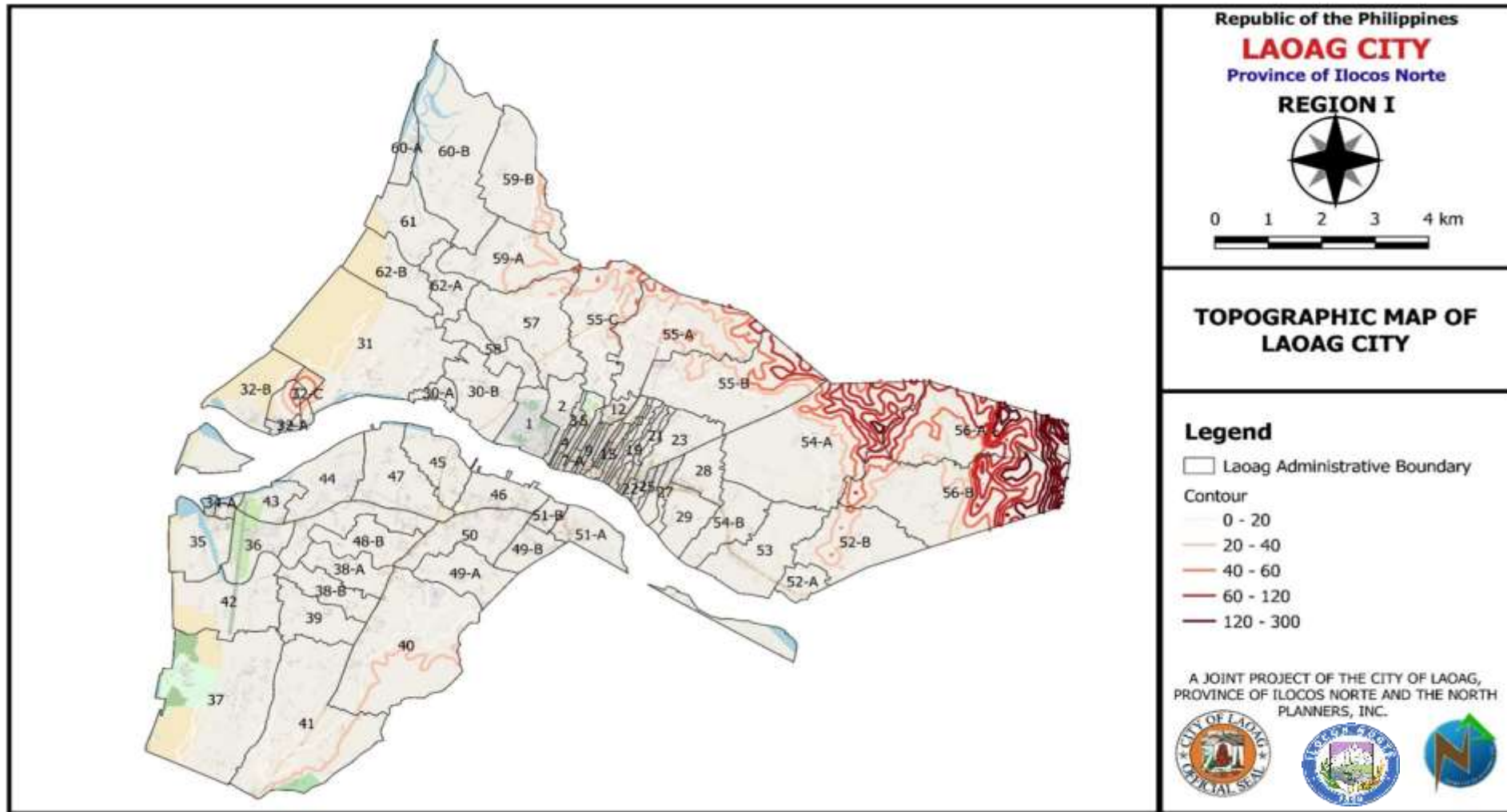


Figure 1. 6. Topographic Map of City of Laoag

Slope

Land within the poblacion and all adjacent barangays and the rural barangays south of the river except Brgy. Balatong (40), parts of Brgy. Balacad (41) and part of Bacsil (56 A& B) and Lagui-Sail (54-A), coastal barangays of barangays Calayab (37), Gabu (35), La Paz (32-C), Cataban (61) and Caaocan (60-A) are level to very gently sloping, having a slope of 0-8% with a total land area of 8,924.33 or 74.5% (**Table 1. 2**). Brgy. Pila (57), Brgy. Dibua (49) and part of Brgy. Balatong (40), Brgy. Balacad (41), Brgy. Lagui-Sail (54-A) and Brgy. Barit (55-A) have a slope of 8-18% with a land area of 1,827 ha. Barangays Vira (55-C) and Bacsil (56 A &B) have a slope of 18-30% characterized as sloping to moderately steep. The forest land has a total land area of 74.71 ha with a slope of 30% and over. The highest peak is in Bacsil North (56-A) with a slope of over 50% (**Figure 1. 7**).

Table 1. 2. Slope of City of Laoag

Slope	Area (ha)	Percentage (%)
0-3	7,953.71	66.409
3-8	970.63	8.104
8-18	1,827.00	15.254
18-30	1,150.38	9.605
30-50	74.71	0.624
50 and above	0.48	0.004
Total	11,976.90	100.00

Soil Type

The different soil types found in the City of Laoag are presented in **Table 1. 3** and **Figure 1. 8**.

Bantog Sandy Loam. The surface soil is brown sandy loam; friable; 25 centimeters thick. The subsoil is dark sandy clay loam to clay loam. The texture of this layer becomes finer as its depth increases. The substratum is yellowish brown silty clay loam. This type is found east of Brgy. Balacad (41). Bantog soil series is suitable for lowland and upland rice, corn, sugarcane, vegetables, root crops, coconut and perennial trees (Carating, et al, 2012). Bantog sandy loam lies in 57.86 hectares in the City of Laoag.

San Manuel Loam. The surface soil is very pale brown to pale brown loam; loose and friable; 30 to 35 centimeters deep. Other profile characteristics are similar to those of the San Manuel Silt Loam. San Manuel soil series is generally suitable to lowland and upland rice, corn, coconut, vegetables, sugarcane, root crops and perennial trees (Carating, et al, 2012). City of Laoag is covered with 21.28% or 2,548.99 hectares of San Manuel Loam.

San Manuel Silt Loam. The surface soil is coarse granular; and mellow when moist. The boundary with the lower layer is diffuse. The subsoil is pale brown silt loam to fine sandy loam with yellowish brown streaks; slightly compact. The lower limit of this layer is 90 to 100 centimeters from the surface. It is underlain by yellowish brown fine sandy loam to fine sand, which is slightly compact. The boundary with the lower layer is gradual. San Manuel silt loam occupies 153.45 hectares or 1.28% of the total land area of the City of Laoag.

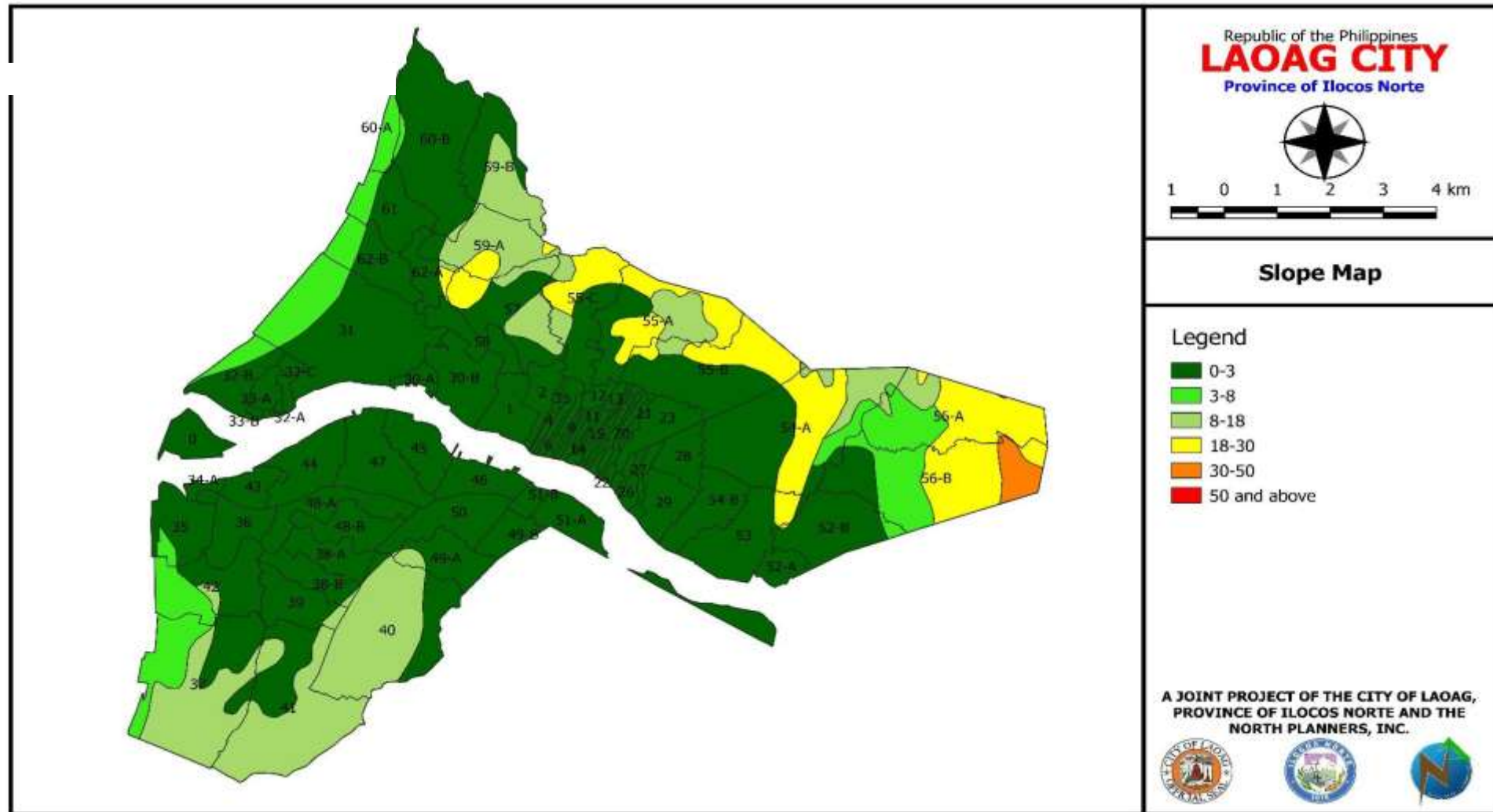


Figure 1. 7. Slope of City of Laoag

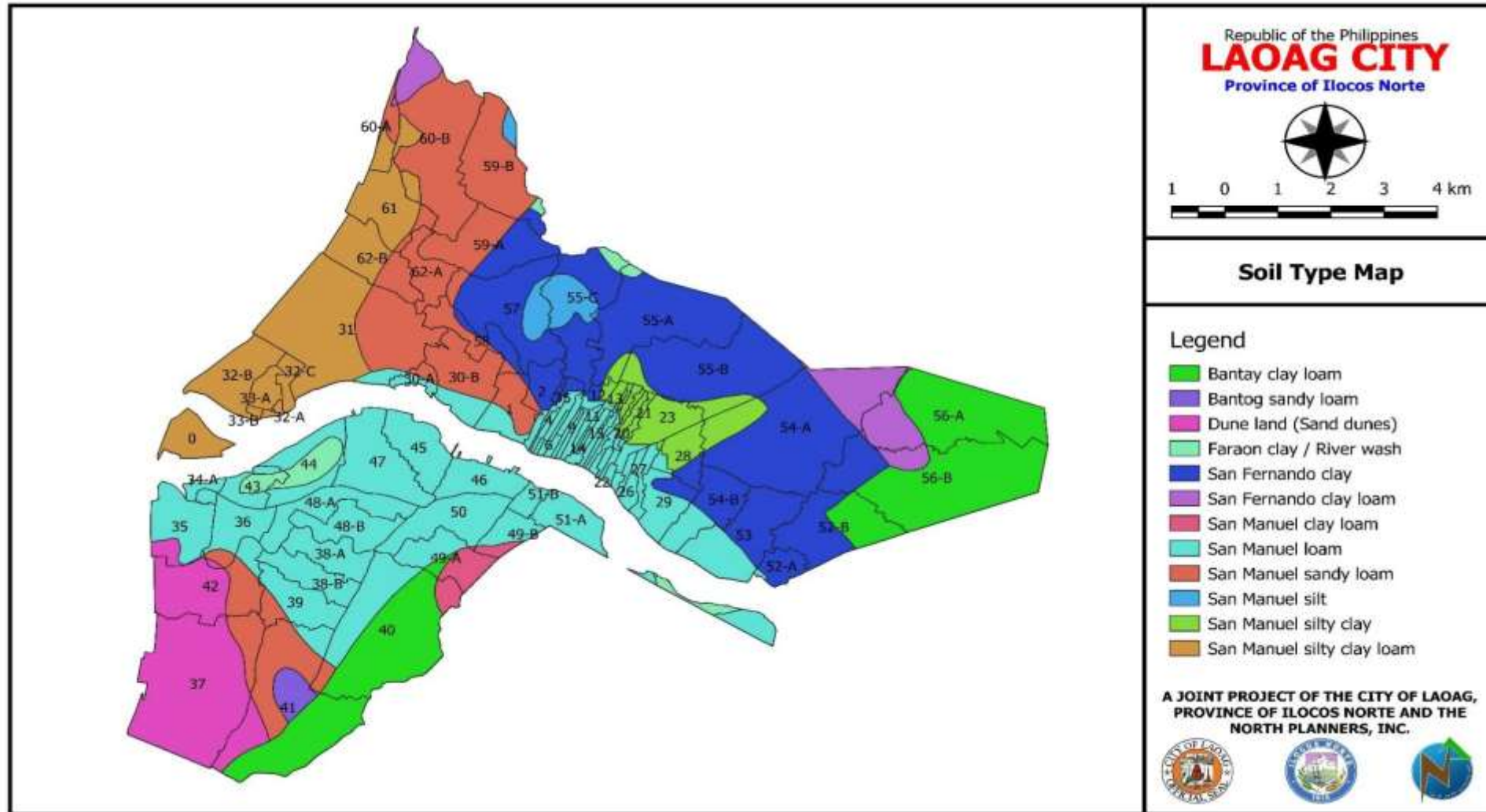


Figure 1. 8. Soils of City of Laoag

San Manuel Sandy Loam. The surface soil is very pale brown to brown sandy loam; loose and very friable; 25 to 30 centimeters deep. The boundary with the lower layer is diffuse. The subsoil is pale brown fine sandy loam, very friable. Its lower boundary is about 110 centimeters from the surface. This layer is undertaken by yellowish brown sandy loam to fine sand; loose and friable. The boundary with the upper layer is diffuse. The city is covered with 1,627.82 hectares or 13.59% of this type of soil.

San Manuel Silt Clay. The surface soil is silty clay; slightly sticky; 30 to 35 centimeters thick. It easily puddles and becomes hard when dry. The subsoil and stratum are more or less similar to those of other San Manuel Soils. San Manuel silt clay lies on 378.17 hectares or 3.16% of the total land area of the city.

Bantay Clay Loam. The surface soil is brown to dark brown loam; friable; granular; and 15 to 20 centimeters deep. The boundary with the lower layer is granular. The upper subsoil is yellowish brown clay loam; friable; and coarse granular in structure. Beneath is a layer of highly weathered shale, which breaks into cube-like fragments under slight pressure. Lime precipitates are present. The substratum consists of highly weathered shale. This is good for grassland and second growth forest with bamboo and boho. This can be cultivated with sugarcane, rice, corn, cassava and vegetables (Costelo, n.d.). Bantay clay loam covers 1,567.60 hectares in the city.

Dune land. This is composed of coarse to medium, light gray to gray sand. It is characterized by an undulating to rolling topography. The greater portion of the land is unstabilized which means that strong winds induce sand movement. This is characterized with the absence of vegetation. Sand dunes made up 767.62 ha or 6.41% of the city.

San Fernando Clay. The surface soil is gray, dark gray to black massive clay; firm; sticky and plastic when wet, hard and compact when dry. The average depth is about 30 centimeters. San Fernando series is generally covered with cultivated crops, such as rice, sugarcane, corn, vegetables and fruit trees. It covers 2,305.13 ha or 19.25% of the total land area of City of Laoag.

San Fernando Clay Loam. This type has the same profile characteristics as those of San Fernando Clay. They differ in the nature of their surface soil. San Fernando Clay loam consists of gray to very dark gray clay loam. It is slightly sticky when wet and slightly friable when moist. City of Laoag is covered with 260.73 ha of San Fernando clay loam.

Faraon Clay. Faraon series are classified as black limestone soils. The soils are very shallow, good drainage, and fairly friable clay soils. They are fairly productive and good for crops that require plenty of calcium, such as corn, sugarcane, coconut, vegetables and root crops (Carating, et al, 2012; Costelo, n.d.). City of Laoag has 121.04 ha of Faraon clay.

Table 1. 3. Different Soil Types in the City of Laoag

Soil Type	Location	Area (ha)	Crops Cultivated
Bantog Sandy Loam	Balacad (41), Balatong (40)	57.86 (0.48%)	lowland and upland rice, corn, sugarcane, vegetables, root crops, coconut and perennial trees
San Manuel Loam	San Tomas (29), Rioeng (53), Camanggaan (54-B), Suyo (30-A), Sta. Maria (30-B), Talingaan (31), Gabu Norte West (34-A), San Guillermo (4), San Jacinto (16), San Guillermo (15), Sto. Tomas (14), San Quirino (18), Sta. Marcela (19), San Isidro (12), Sta. Angela (9), San Jose (10), Sta. Balbina (11), Nra. Sra. de Visitacion (13), San Pedro (5), San Agustin (6), Nra. Sra. de Natividad (7-A), San Vicente (8), Nra. Sra. de Natividad (7-B), San Lorenzo (1), Sta. Joaquina (2), Nra. Sra. del Rosario (3), Balatong (40), Sta. Rosa (39), San Francisco (17), Balacad (41), San Andres (22), Nra. Sra. de Consolacion (24), Sta. Cayetana (25), San Marcelino (26), Nra. Sra. de Soledad (27), San Bernabe (28), San Miguel (20), San Pedro (21), San Matias (23), Raraburan (49-B), Nangalisan West (51-B), Nangalisan East (51-A), San Mateo (52-A), Zamboanga (44), Bengcag (47), Tangid (45), Nalbo (46), Buttong (50), Darayday (49-A), Araniw (36), Gabu Sur (35), Gabu Norte East (34-B), Cavit (43), Apaya (42), Mangato West (38-B), Mangato East (38-A), Cabungaan South (48-B), Cabungaan North (48-A)	2,548.99 (21.28%)	lowland and upland rice, corn, coconut, vegetables, sugarcane, root crops and perennial trees

Table 1.3. Cont...

Soil Type	Location	Area (ha)	Crops Cultivated
San Manuel Silt Loam	Pila (57), Barit Pandan (55-A), Dibua North (59-B), Vira (55-C)	153.45 (1.28%)	lowland and upland rice, corn, coconut, vegetables, sugarcane, root crops and perennial trees
San Manuel Sandy Loam	Pila (57), Dibua North (59-B), Madiladig (60-B), Caaocan (60-A), Navotas North (62-A), Navotas South (62-B), Cataban (61), Dibua South (59-A), Talingaan (31), Casili (58), Suyo (30-A), Sta. Maria (30-B), San Lorenzo (1), Sta. Joaquina (2), Balatong (40), Calayab (37), Balacad (41), Araniw (36), Sta. Rosa (39), Apaya (42)	1,627.82 (13.59%)	lowland and upland rice, corn, coconut, vegetables, sugarcane, root crops and perennial trees
San Manuel Silt Clay	Lagui Sail (54-A), Salet Bulangon (55-B), San Jacinto (16), San Quirino (18), San Isidro (12), Nra. Sra. de Visitacion (13), San Bernabe (28), San Francisco (17), Nra. Sra. de Soledad (27), Sta. Marcela (19), San Miguel (20), San Pedro (21), San Matias (23), Barit Pandan (55-A)	378.17 (3.16%)	lowland and upland rice, corn, coconut, vegetables, sugarcane, root crops and perennial trees
San Manuel Silty Clay Loam	Madiladig (60-B), Caaocan (60-A), Navotas South (62-B), Cataban (61), Talingaan (31), La Paz (32-C), La Paz Proper (33-A), La Paz Proper (33-B), La Paz West (32-B), La Paz East (32-A), Monroe Island	884.91 (7.39%)	lowland and upland rice, corn, coconut, vegetables, sugarcane, root crops and perennial trees
Bantay Clay Loam	Bacsil South (56-B), Bacsil North (56-A), Lagui Sail (54-A), Lataag (52-B), Balacad (41), Balatong (40), Darayday (49-A)	1,567.60 (13.09%)	sugarcane, rice, corn, cassava and vegetables
Dune Land	Calayab (37), Balacad (41), Araniw (36), Gabu Sur (35), Apaya (42)	767.62 (6.41%)	no vegetation
San Fernando Clay Loam	Salet Bulangon (55-B), Bacsil South (56-B), Bacsil North (56-A), Lagui Sail, Madiladig (60-B), Caaocan(60-A)	260.73 (2.18%)	rice, sugarcane, corn, vegetables and fruit trees

Table 1.3. Cont...

Soil Type	Location	Area (ha)	Crops Cultivated
San Fernando Clay	Pila (57), San Tomas (29), Salet Bulangon (55-B), Barit Pandan(55-A), Bacsil North (56-A), Lagui Sail (54-A), San Mateo (52-A), Lataag (52-B), Rioeng (53), Camanggaan (54-B), Bacsil South (56-B), Dibua South (59-A), Dibua North (59-B), Casili (58), Sta. Maria (30-B), San Isidro (12), Nra. Sra. del Rosario (3), San Pedro (5), Nra. Sra. de Natividad (7-A), San Lorenzo (1), Sta. Joaquina (2), San Bernabe (28), San Matias (23), Vira (55-C)	2,305.13 (19.25%)	rice, sugarcane, corn, vegetables and fruit trees
Faraon Clay / River Wash	Dibua North (59-B), Nangalisan East (51-A), Zamboanga (44), Cavit (43), Barit Pandan (55-A), Vira (55-C)	121.04 (1.01%)	corn, sugarcane, coconut, vegetables and root crops

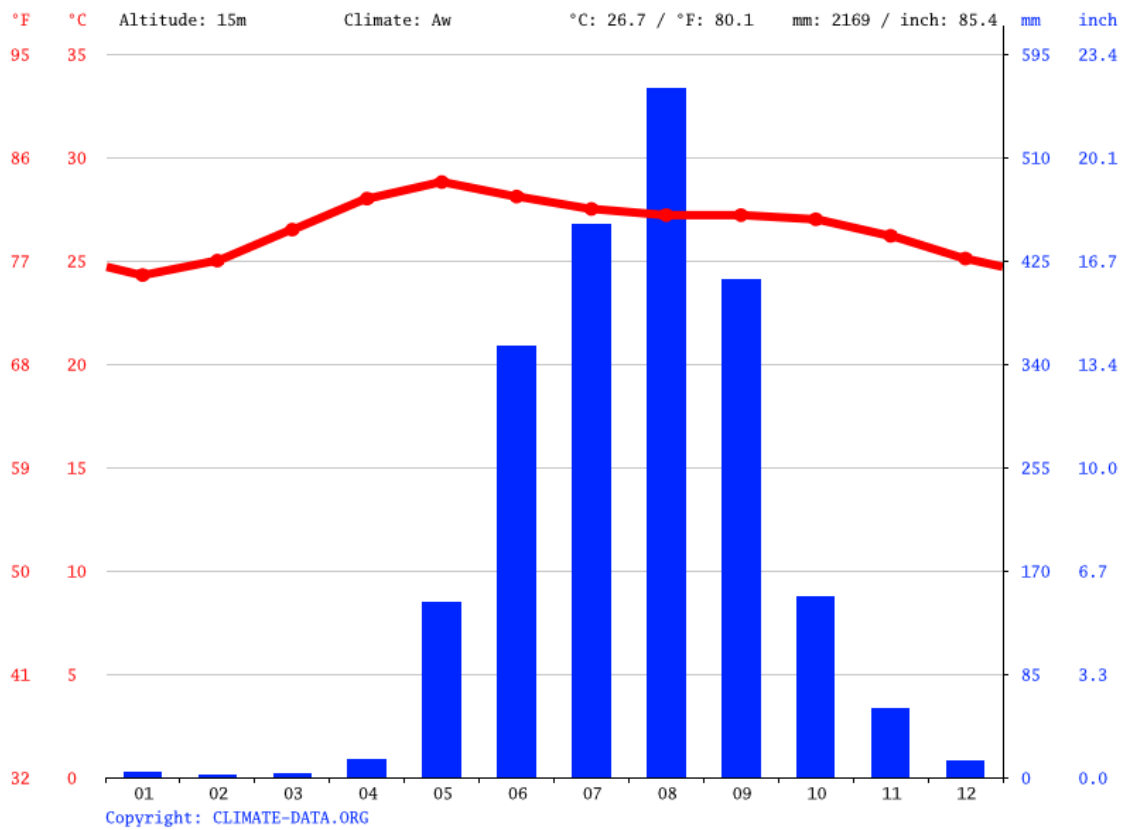
Climate

The City of Laoag belongs to Type I climate, characterized as having two (2) pronounced seasons, i.e., dry from November to April and wet throughout the rest of the year. The southwest monsoon or “habagat” causes frequent heavy rainfall and humid weather during the wet seasons.

The City of Laoag’s driest month is February which recorded a two (2) mm or 0.1 inch of precipitation (*Figure 1. 9*). From the month of May to August, the precipitation is continuously increasing, where August has the highest recorded precipitation with an average 566 mm or 22.3 inches. The transition of precipitation level from September to October was an abrupt decrease and continually decreasing up to December, signifying the dry season.

May is recorded as the warmest month with an average of 28.8 °C or 83.8 °F. While the coldest temperature is recorded in the month of January with temperature averaging 24.3 °C or 75.7 °F (*Figure 1. 9*).

The average lowest minimum temperature in the City of Laoag is 19.4°C or 66.0 °F which was recorded in the month of January, while the average highest maximum temperature is 33.3°C or 91.9°F recorded in the month of May (*Figure 1. 10*).



Source: <https://en.climate-data.org/>

Figure 1. 9. Normal Monthly Rainfall in the City of Laoag

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	24.3	25	26.5	28	28.8	28.1	27.5	27.2	27.2	27	26.2	25.1
Min. Temperature (°C)	19.4	19.8	21.5	23.4	24.3	24.1	23.8	23.7	23.6	22.9	21.9	20.5
Max. Temperature (°C)	29.3	30.2	31.5	32.7	33.3	32.1	31.3	30.7	30.9	31.2	30.6	29.8
Avg. Temperature (°F)	75.7	77.0	79.7	82.4	83.8	82.6	81.5	81.0	81.0	80.6	79.2	77.2
Min. Temperature (°F)	66.9	67.6	70.7	74.1	75.7	75.4	74.8	74.7	74.5	73.2	71.4	68.9
Max. Temperature (°F)	84.7	86.4	88.7	90.9	91.9	89.8	88.3	87.3	87.6	88.2	87.1	85.6
Precipitation / Rainfall (mm)	4	2	3	15	144	354	455	568	409	148	56	13

Source: <https://en.climate-data.org/>

Figure 1. 10. Monthly Weather Averages in the City of Laoag

Barangays

There are a total of 80 barangays, 30 are considered urban/población while 50 are rural. Listed below are the said barangays with their land areas (**Table 1. 4**). *Figure 1. 11* shows the base map of the City of Laoag. *Figure 1. 12* presents the 30 urban barangays.

Table 1. 4. Barangays of City of Laoag and their Land Area

Barangay Number	Barangay Name	Land Area (ha)	Percentage (%)
<i>Urban</i>			
1	San Lorenzo	103.52	0.96
2	Sta. Joaquina	68.87	0.64
3	Nra. Sra. del Rosario	14.08	0.13
4	San Guillermo	9.93	0.09
5	San Pedro	29.46	0.27
6	San Agustin	9.26	0.09
7-A	Nra. Sra. de Natividad	6.49	0.06
7-B	Nra. Sra. de Natividad	11.57	0.11
8	San Vicente	7.86	0.07
9	Sta. Angela	8.73	0.08
10	San Jose	11.82	0.11
11	Sta. Balbina	11.20	0.10
12	San Isidro	23.87	0.22
13	Nra. Sra. de Visitacion	19.15	0.18
14	Sto. Tomas	3.52	0.03
15	San Guillermo	17.79	0.16
16	San Jacinto	13.53	0.13
17	San Francisco	14.74	0.14
18	San Quirino	19.46	0.18
19	Sta. Marcela	19.93	0.18
20	San Miguel	23.36	0.22
21	San Pedro	21.63	0.20
22	San Andres	6.65	0.06
23	San Matias	100.40	0.93
24	Nra. Sra. de Consolacion	6.25	0.06
25	Sta. Cayetana	11.00	0.10
26	San Marcelino	26.03	0.24
27	Nra. Sra. de Soledad	27.65	0.26
28	San Bernabe	85.16	0.79
29	San Tomas	101.16	0.94

Table 1.4. Cont...

Barangay Number	Barangay Name	Land Area (ha)	Percentage (%)
<i>Rural</i>			
	Monroe Island	83.43	0.77
30-A	Suyo	31.51	0.29
30-B	Sta. Maria	172.46	1.59
31	Talingaan	596.75	5.52
32-A	La Paz East	8.34	0.08
32-B	La Paz West	143.76	1.33
32-C	La Paz	33.12	0.31
33-A	La Paz Proper	40.67	0.38
33-B	La Paz Proper	6.68	0.06
34-A	Gabu Norte West	18.29	0.17
34-B	Gabu Norte East	10.33	0.10
35	Gabu Sur	154.60	1.43
36	Araniw	110.01	1.02
37	Calayab	574.65	5.31
38-A	Mangato East	97.88	0.91
38-B	Mangato West	94.68	0.88
39	Sta. Rosa	131.17	1.21
40	Balatong	508.83	4.70
41	Balacad	518.23	4.79
42	Apaya	246.45	2.28
43	Cavit	69.58	0.64
44	Zamboanga	160.43	1.48
45	Tangid	124.61	1.15
46	Nalbo	100.75	0.93
47	Bengcag	198.72	1.84
48-A	Cabungaan North	132.01	1.22
48-B	Cabungaan South	115.54	1.07
49-A	Darayday	128.44	1.19
49-B	Raraburan	68.77	0.64
50	Buttong	160.95	1.49
51-A	Nangalisan East	167.85	1.55
51-B	Nangalisan West	29.95	0.28
52-A	San Mateo	53.23	0.49
52-B	Lataag	228.90	2.12
53	Rioeng	230.43	2.13
54-A	Lagui Sail	605.21	5.60

Table 1.4. Cont...

Barangay Number	Barangay Name	Land Area (ha)	Percentage (%)
54-B	Camanggaan	136.41	1.26
55-A	Barit Pandan	352.87	3.26
55-B	Salet Bulangon	393.44	3.64
55-C	Vira	261.28	2.42
56-A	Bacsil North	394.41	3.65
56-B	Bacsil South	548.26	5.07
57	Pila	290.72	2.69
58	Casili	96.54	0.89
59-A	Dibua South	219.11	2.03
59-B	Dibua North	247.90	2.29
60-A	Caoacan	52.44	0.48
60-B	Madiladig	431.58	3.99
61	Cataban	159.42	1.47
62-A	Navotas North	84.17	0.78
62-B	Navotas South	155.62	1.44

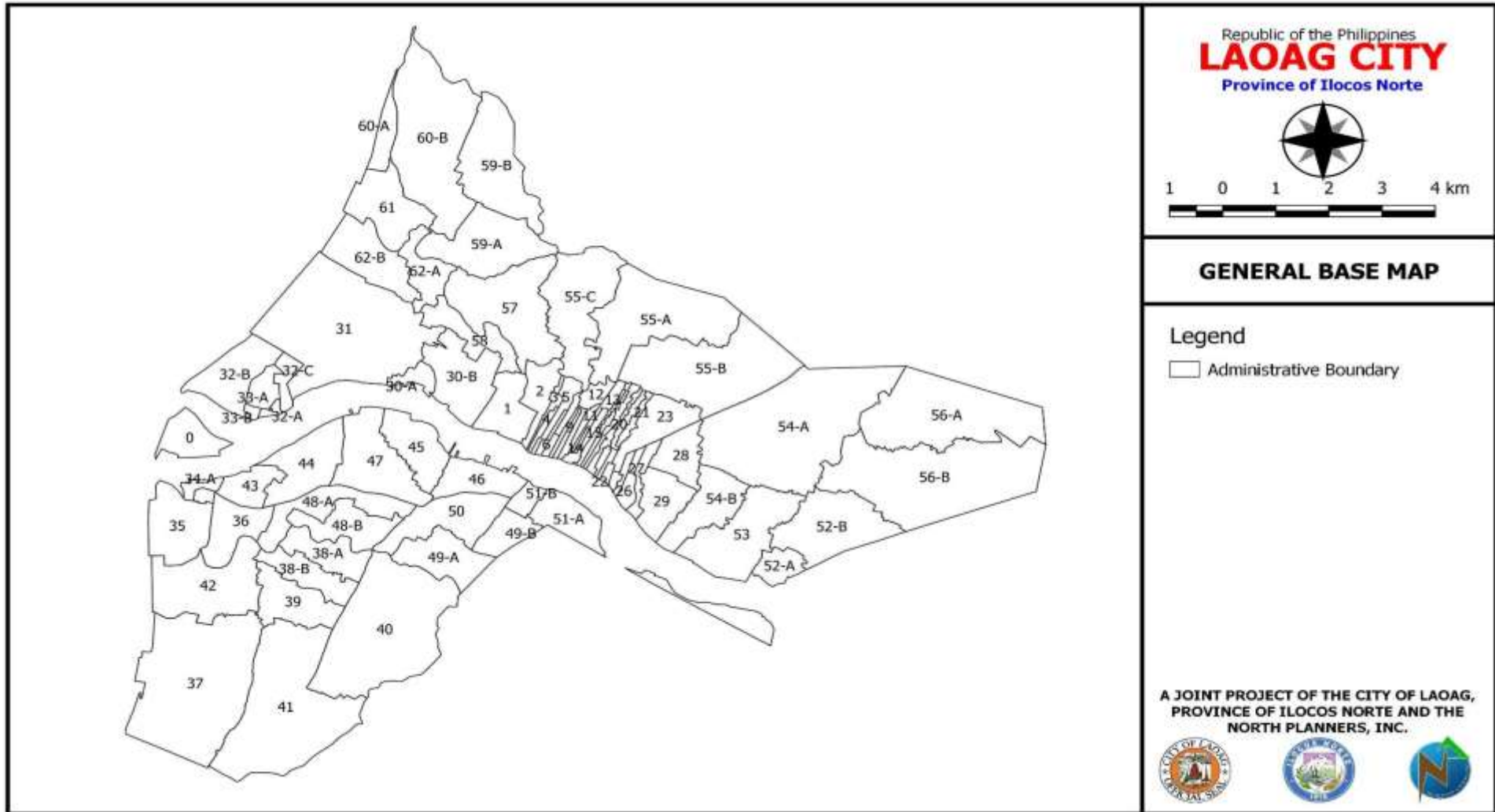


Figure 1. 11. Base Map of City of Laoag

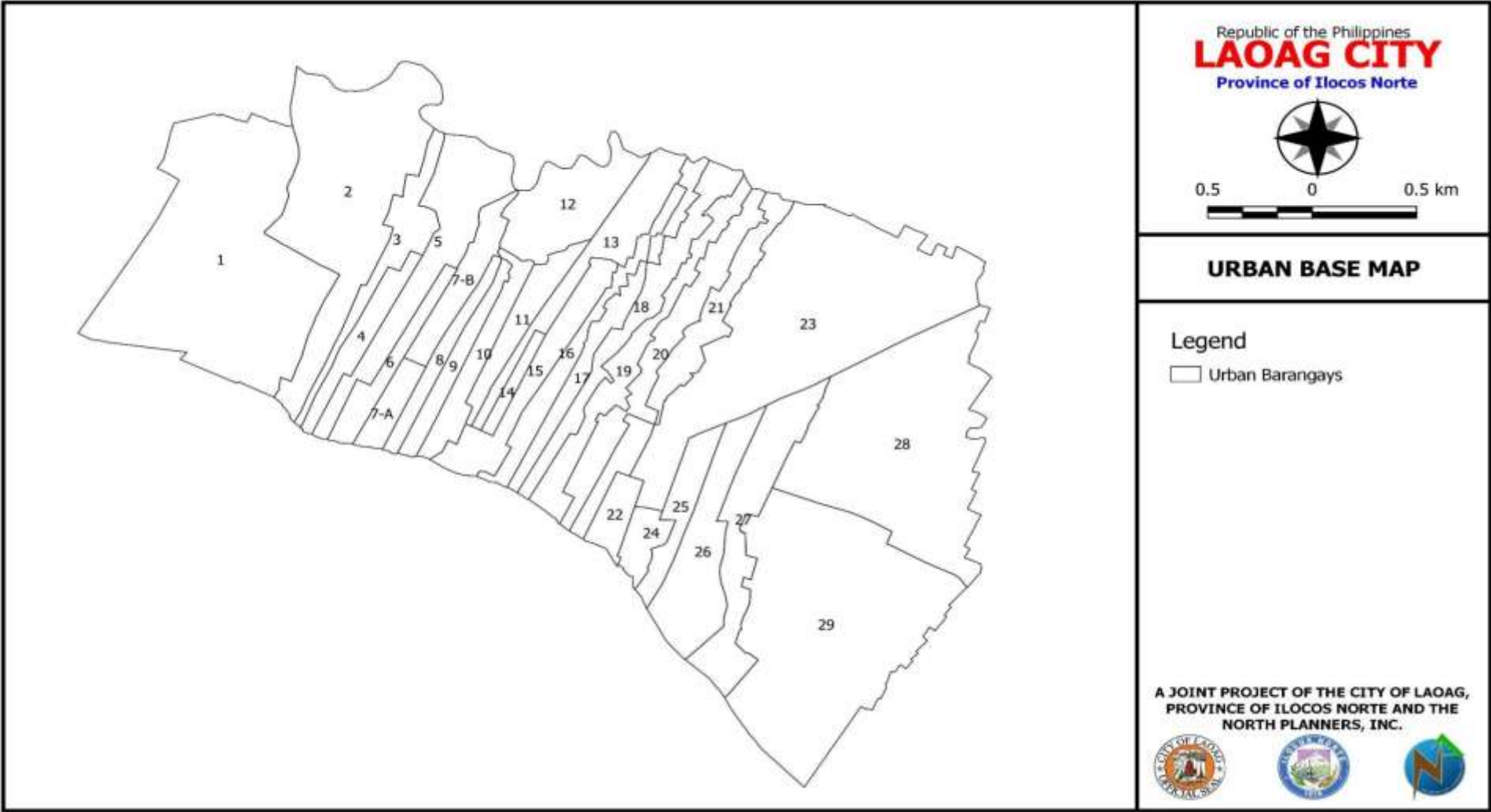


Figure 1. 12. Urban Base Map of City of Laoag

III. DEMOGRAPHY

Annual Growth Rate

The annual growth rate of the City of Laoag had a decreasing trend from 0.18 in 2007 to 0.15 in 2015 (*Table 1. 5*). This implies that even if the population is increasing, the rate of growth is decreasing.

Table 1. 5. Annual Growth Rate of City of Laoag

Year	Population			Increase/Decrease			Annual Growth Rate
	Male	Female	Total	Male	Female	Total	
2000	46,230	48,236	94,466				
2007	50,141	52,316	102,457	3,911	4,080	7,991	0.18
2010	51,338	53,566	104,904	1,197	1,250	2,447	0.12
2015	54,383	56,742	111,125	3,045	3,176	6,221	0.15

Population Density

In 2015, the City of Laoag had a population density of ten (10) persons per hectare. Brgy. Sto. Tomas (14), an urban barangay, had the highest population density of 326 persons per hectare. Brgy. Bacsil North (56-A) and Brgy. Bacsil South (56-B) obtained the lowest population density of two (2) persons per hectare (*Table 1. 6* and *Figure 1. 13*).

Table 1. 6. Population Density of City of Laoag, Year 2015

Barangay		Population	Land Area (ha)	Population Density (persons/ha)
<i>Urban</i>				
1	San Lorenzo	4,733	107.03	44
2	Sta. Joaquina	2,568	74.07	35
3	Nra. Sra. Del Rosario	1,189	15.28	78
4	San Guillermo	1,256	10.34	121
5	San Pedro	1,723	32.78	53
6	San Agustin	1,371	10.96	125
7-A	Nra. Sra. De Natividad	1,131	8.40	135
7-B	Nra. Sra. De Natividad	968	11.49	84
8	San Vicente	1,042	8.97	116
9	Sta. Angela	802	8.08	99
10	San Jose	1,005	11.49	87
11	Sta. Balbina	1,365	14.46	94
12	San Isidro	1,607	27.66	58
13	Nra. Sra. De Visitacion	1,443	19.25	75

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Barangay		Population	Land Area (ha)	Popn Density (persons/ha)
<i>Urban</i>				
14	Sto. Tomas	1,147	5.58	206
15	San Guillermo	1,098	22.41	49
16	San Jacinto	1,060	14.80	72
17	San Francisco	708	15.98	44
18	San Quirino	723	74.96	10
19	Sta. Marcela	1,144	23.82	48
20	San Miguel	1,029	24.15	43
21	San Pedro	1,349	28.29	48
22	San Andres	1,065	8.03	133
23	San Matias	2,857	100.31	28
24	Nra. Sra. De Consolacion	1,054	8.28	127
25	Sta. Cayetana	1,201	10.61	113
26	San Marcelino	963	21.29	45
27	Nra. Sra. De Soledad	1,618	24.85	65
28	San Bernabe	1,758	100.65	17
29	San Tomas	1,330	103.45	13
	Subtotal	42,307	947.72	45
<i>Rural</i>				
30-A	Suyo	762	31.51	24
30-B	Sta. Maria	1,516	172.47	9
31	Talingaan	1,616	596.77	3
32-A	La Paz East	1,433	8.34	172
32-B	La Paz West	1,065	143.76	7
32-C	La Paz East	1,693	33.12	51
33-A	La Paz Proper	1,113	40.67	27
33-B	La Paz Proper	1,052	6.68	157
34-A	Gabu Norte West	777	18.29	42
34-B	Gabu Norte East	1,230	10.33	119
35	Gabu Sur	1,778	154.61	11
36	Araniw	873	110.02	8
37	Calayab	2,081	574.67	4
38-A	Mangato East	1,040	97.89	11
38-B	Mangato West	1,188	94.68	13
39	Sta. Rosa	789	131.18	6
40	Balatong	2,659	508.85	5
41	Balacad	1,422	518.25	3
42	Apaya	916	246.46	4
43	Cavit	1,086	69.58	16
44	Zamboanga	1,331	160.44	8
45	Tangid	997	124.61	8
46	Nalbo	2,401	100.76	24

Comprehensive Land Use Plan of City of Laoag 2020-2029

	Barangay	Population	Land Area (ha)	Population Density (persons/ha)
47	Bengcag	1,874	198.72	9
48-A	Cabungaan North	1,788	132.01	14
48-B	Cabungaan South	1,239	115.54	11
49-A	Darayday	976	128.44	8
49-B	Raraburan	1,658	68.78	24
50	Buttong	3,044	160.95	19
51-A	Nangalisan East	1,510	167.86	9
51-B	Nangalisan West	814	29.95	27
52-A	San Mateo	629	53.23	12
52-B	Lataag	876	228.91	4
53	Rioeng	1,616	230.44	7
54-A	Lagui-Sail	2,372	605.23	4
54-B	Camanggaan	1,005	136.41	7
55-A	Barit	2,233	352.88	6
55-B	Salet-Bulangon	2,521	393.46	6
55-C	Vira	1,377	261.29	5
56-A	Bacsil North	951	394.42	2
56-B	Bacsil South	1,349	548.28	2
57	Pila	1,866	290.74	6
58	Casili	964	96.54	10
59-A	Dibua South	1,100	219.11	5
59-B	Dibua North	865	247.91	3
60-A	Caoacan	1,430	52.44	27
60-B	Madiladig	1,469	431.60	3
61	Cataban	766	159.42	5
62-A	Navotas North	796	84.17	9
62-B	Navotas South	912	155.63	6
	Sub-total	68,818	9,898.28	7
	Total	111,125	10,568.00	11

Source: Community-Based Monitoring System

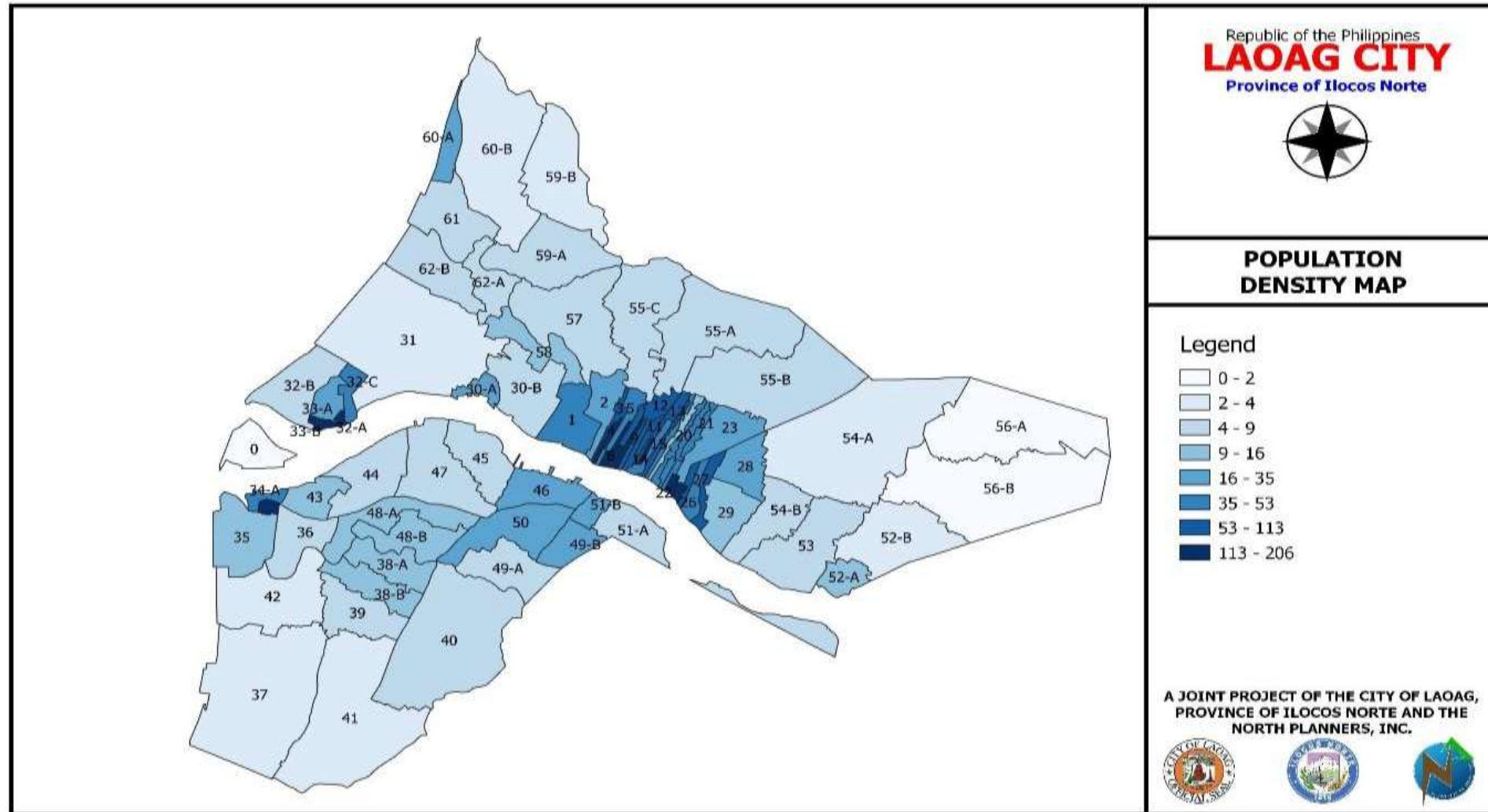


Figure1. 13. Population Density of City of Laoag

Population Distribution

In 2015, ages from 15-19 comprised 10.4% of the total population of City of Laoag City. Infants have 2.1% of its total population. About 29.9% of its population belongs to the youth-age group of 0-14; 64% to the working-age group of 15-64; and 6% of its population are age group of 65 and over. The city's population comprises 51.06% females (56,742) and 48.94% males (54,383) (*Table 1.7*).

Figure 1. 14 shows that there were more males than females for age groups 0-4 until 10-14. However, from age group 15-19 and onwards, the female population was greater than the male group. This can be attributed to lifestyle and occupation of the latter which makes lifespan shorter. It can also be observed that the age pyramid is tapering which implies that the population still has an increasing trend. The pyramid has a broad tip because the population of the elders were clumped to age group 65 and over.

Age Dependency Ratio

The City of Laoag has the greatest population of young and old dependency in Ilocos Norte, with a population of 26,685 for 0-14 years old (young dependency) and 6,683 for 65-over (old dependency).

The ratio of population in the City of Laoag for young and old dependency is 49.95%. The young dependency ratio (0-14 years old) is 39.95% and the remaining 10% is old dependency ratio (65 and over).

Urbanization Level

The urbanization level of the City of Laoag is computed to have 38.07% in 2015, a slight decrease of 0.59 from 2010. This means that 38% of the population of the city reside in the urban areas, implying that there is a need to enrich the economic activities in the urban area.

Table 1. 7. Population by Age and Sex, City of Laoag, Year 2010 and 2015

Age Group	2010 Population			2015 Population		
	Male	Female	Total	Male	Female	Total
Under 1	1,199	1,012	2,211	1,270	1,072	2,342
1-4	4,464	4,102	8,565	4,729	4,345	9,074
5-9	5,238	5,081	10,320	5,549	5,382	10,931
10-14	5,248	5,071	10,320	5,559	5,371	10,930
15-19	5,350	5,561	10,912	5,668	5,891	11,559
20-24	4,943	5,223	10,155	5,236	5,532	10,768
25-29	4,355	4,794	9,149	4,614	5,078	9,692
30-34	4,122	4,021	8,142	4,367	4,260	8,627
35-39	3,548	3,647	7,196	3,758	3,863	7,621
40-44	2,933	3,114	6,047	3,107	3,298	6,405
45-49	2,438	2,681	5,118	2,582	2,840	5,422
50-54	1,993	2,265	4,260	2,112	2,400	4,512
55-59	1,659	1,770	3,429	1,757	1,875	3,632
60-64	1,240	1,501	2,742	1,314	1,590	2,904
65 and over	2,603	3,724	6,327	2,761	3,944	6,705
Total	51,337	53,567	104,904	54,383	56,742	111,125

Source: Community-Based Monitoring System

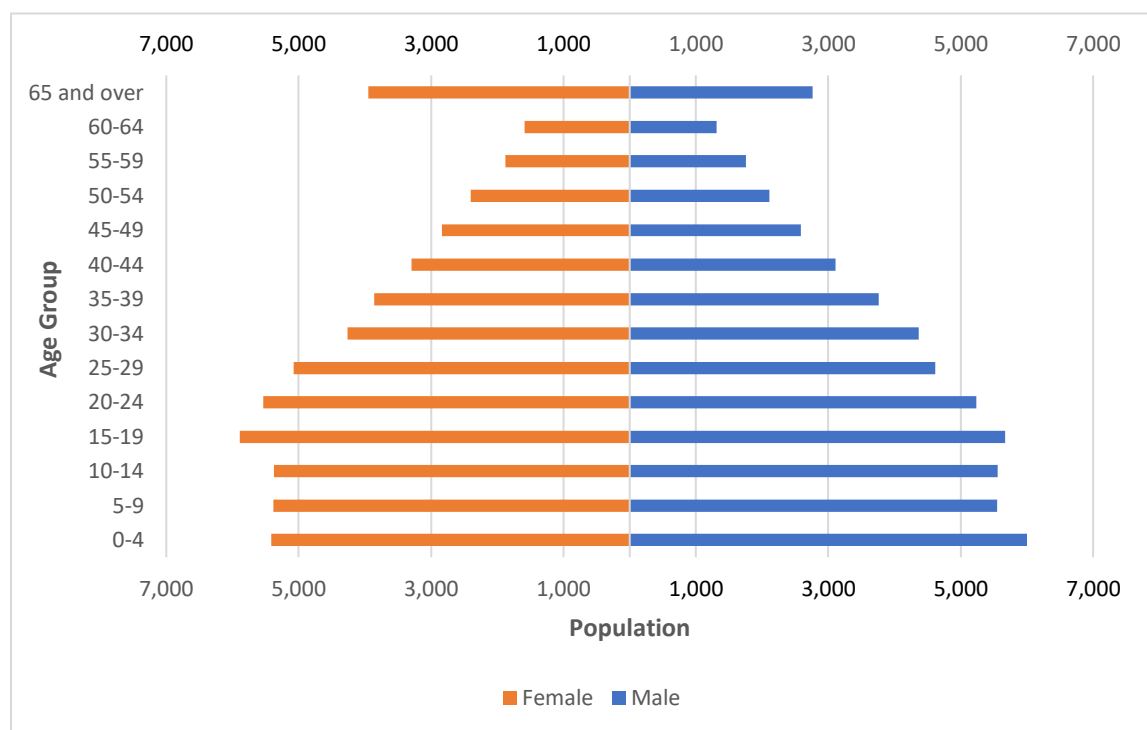


Figure 1. 14. Age-Sex Distribution of City of Laoag

Household Population

In 2015 Philippine Statistics Authority (PSA) census results, the total number of households in the City of Laoag was 27,874 wherein 10,612 were urban households while 17,262 were rural households (*Table 1. 8*). Among urban barangays, Brgy. San Lorenzo (1) had the largest number of households with a total of 1,420, while Brgy. San Francisco (17) had the lowest household population of 185. Meanwhile among rural barangays, Brgy. Buttong (50) had the highest number of households with a total number of 764, while Brgy. San Mateo (52-A) had the least number of households of 158.

Table 1. 8. Household Population in the City of Laoag, Year 2015

No.	Barangay	Population	Number of Households
<i>Urban</i>			
1	San Lorenzo	4,733	1,240
2	Sta. Joaquina	2,568	673
3	Nra. Sra. Del Rosario	1,189	311
4	San Guillermo	1,256	329
5	San Pedro	1,723	451
6	San Agustin	1,371	359
7-A	Nra. Sra. De Natividad	1,131	296
7-B	Nra. Sra. De Natividad	968	254
8	San Vicente	1,042	273
9	Sta. Angela	802	210
10	San Jose	1,005	263
11	Sta. Balbina	1,365	358
12	San Isidro	1,607	421
13	Nra. Sra. De Visitacion	1,443	378
14	Sto. Tomas	1,147	300

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15	San Guillermo	1,098	288
16	San Jacinto	1,060	278
17	San Francisco	708	185
18	San Quirino	723	189
19	Sta. Marcela	1,144	300
20	San Miguel	1,029	270
21	San Pedro	1,349	353
22	San Andres	1,065	279
23	San Matias	2,857	748
24	Nra. Sra. De Consolacion	1,054	276
25	Sta. Cayetana	1,201	315
26	San Marcelino	963	252
27	Nra. Sra. De Soledad	1,618	424
28	San Bernabe	1,758	461
29	San Tomas	1,330	348
	Sub-Total	42,307	10,612
Rural			
30-A	Suyo	762	191
30-B	Sta. Maria	1,516	380
31	Talingaan	1,616	405
32-A	La Paz East	1,433	359
32-B	La Paz West	1,065	267
32-C	La Paz East	1,693	425
33-A	La Paz Proper	1,113	279
33-B	La Paz Proper	1,052	264
34-A	Gabu Norte West	777	195
34-B	Gabu Norte East	1,230	309
35	Gabu Sur	1,778	446
36	Araniw	873	219
37	Calayab	2,081	522
38-A	Mangato East	1,040	261
38-B	Mangato West	1,188	298
39	Sta. Rosa	789	198
40	Balatong	2,659	667
41	Balacad	1,422	357
42	Apaya	916	230
43	Cavit	1,086	272
44	Zamboanga	1,331	334
45	Tangid	997	250
46	Nalbo	2,401	602
47	Bengcag	1,874	470
48-A	Cabungaan North	1,788	448
48-B	Cabungaan South	1,239	311
49-A	Darayday	976	245
49B	Raraburan	1,658	416
50	Buttong	3,044	764
51-A	Nangalisan East	1,510	379
51-B	Nangalisan West	814	204
52-A	San Mateo	629	158
52-B	Lataag	876	220
53	Rioeng	1,616	405

54-A	Lagui-Sail	2,372	595
54-B	Camanggaan	1,005	252
55-A	Barit	2,233	560
55-B	Salet-Bulangon	2,521	632
55-C	Vira	1,377	345
56-A	Bacsil North	951	239
56-B	Bacsil South	1,349	338
57	Pila	1,866	468
58	Casili	964	242
59-A	Dibua South	1,100	276
59-B	Dibua North	865	217
60-A	Caoacan	1,430	359
60-B	Madiladig	1,469	368
61	Cataban	766	192
62-A	Navotas North	796	200
62-B	Navotas South	912	229
	Sub-Total	68,818	17,262
	Total	111,125	27,874

Source: Community-Based Monitoring System

IV. ECOSYSTEM SECTOR

Climate Change Adaptation and Disaster Risk Reduction

The highest possible future rainfall increase of 32.2% under representative concentration pathway (RCP) 4.5 scenario in the mid-21st century (2036-2065) would be in the season of December-January-February (DJF). The projected impacts during this season are improvements in the growth and yield performance of transplanted rice, and adversely, an increase in susceptibility of vegetables and fruits to pests and diseases and decrease in quality of harvested vegetables. On the other hand, the highest possible rainfall decrease of 25.9% was projected under RCP 8.5 scenario during the season of March-April-May (MAM). The projected impacts during MAM's season are quicker drying of corn and palay, delay sowing of seeds for rice production, occurrence of ambient pests (poultry and livestock diseases), low level of dissolved oxygen in ponds and increased susceptibility of vegetables to diseases.

The highest projected temperature increase under high emission of greenhouse gas scenario is 2.4°C in the season of June-July-August (JJA). The potential impacts are adjusted working time in the field (rice transplanting) but with no significant impacts on rice production.

The likelihood of occurrence of flooding in the city is every one (1) to three (3) years. *Figure 1. 15* shows that 60.10%, 13.24% and 17.25% of the land area of the City of Laoag is with high, moderate and low susceptibility to flooding. These areas are low-lying and can be found along the Padsan River and creeks.

Landslide in the City of Laoag is a very rare event, occurring once every 200 to 300 years. *Figure 1. 22* shows that a small percentage (173.47 ha) of the land area of the city is highly susceptible to rain-induced landslide. This is mostly found in barangays Bacsil North (56-A), Bacsil South (56-B) and Lagui-Sail (54-A).

Storm surge has not occurred yet in the lifetime of key informants. However, based on the model generated by the DOST's Project NOAH, less than one (1) percent (102.45 ha) of the land area of the city is covered by highly susceptible to storm surge and 1.80% (194.57 ha) by moderately susceptible (*Figure 1. 17*). Highly susceptible areas are mostly found at barangays Gabu Norte West (34-A) and Gabu Sur (35). They can also be found along the shorelines of Madiladig (60-B), Cacaoacan (60-A) and Cataban (61).

The return period of tsunami is 200 to 300 years. Based on the DOST's READY Project, all the barangays along the shoreline may be affected by tsunami and even extending to Mangato West (38-B), Mangato East (38-A), Cabungaan North (48-A), Cabungaan South (48-B), Zamboanga (44), Navotas North (62-A), Dibua South (59-A) and Dibua North (59-B) (*Figure 1. 18*).

The 1983 Laoag earthquake scenario, having a magnitude of 5.3 has a return period of ten (10) to 30 years. The top barangays which will have two (2) to three (3) buildings or structures in complete damage with collapse state would be San Lorenzo (1), San Isidro (12), Santa Joaquina (2), San Matias (23), San Bernabe (28), Buttong (50) and Nra. Sra. De Natividad (7-A) (*Figure 1. 19*).

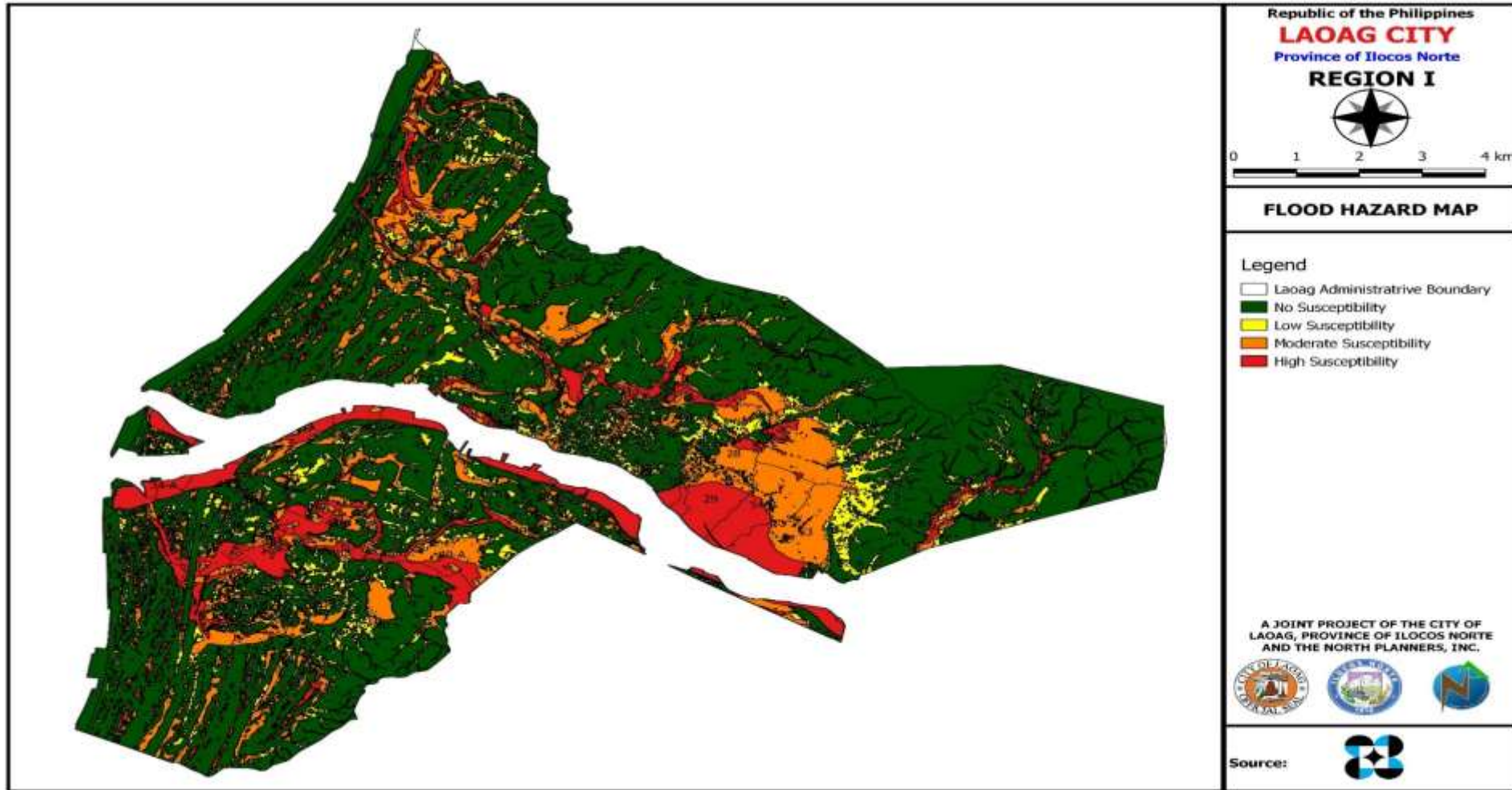


Figure 1. 15. Flood Hazard Susceptibility in the City of Laoag

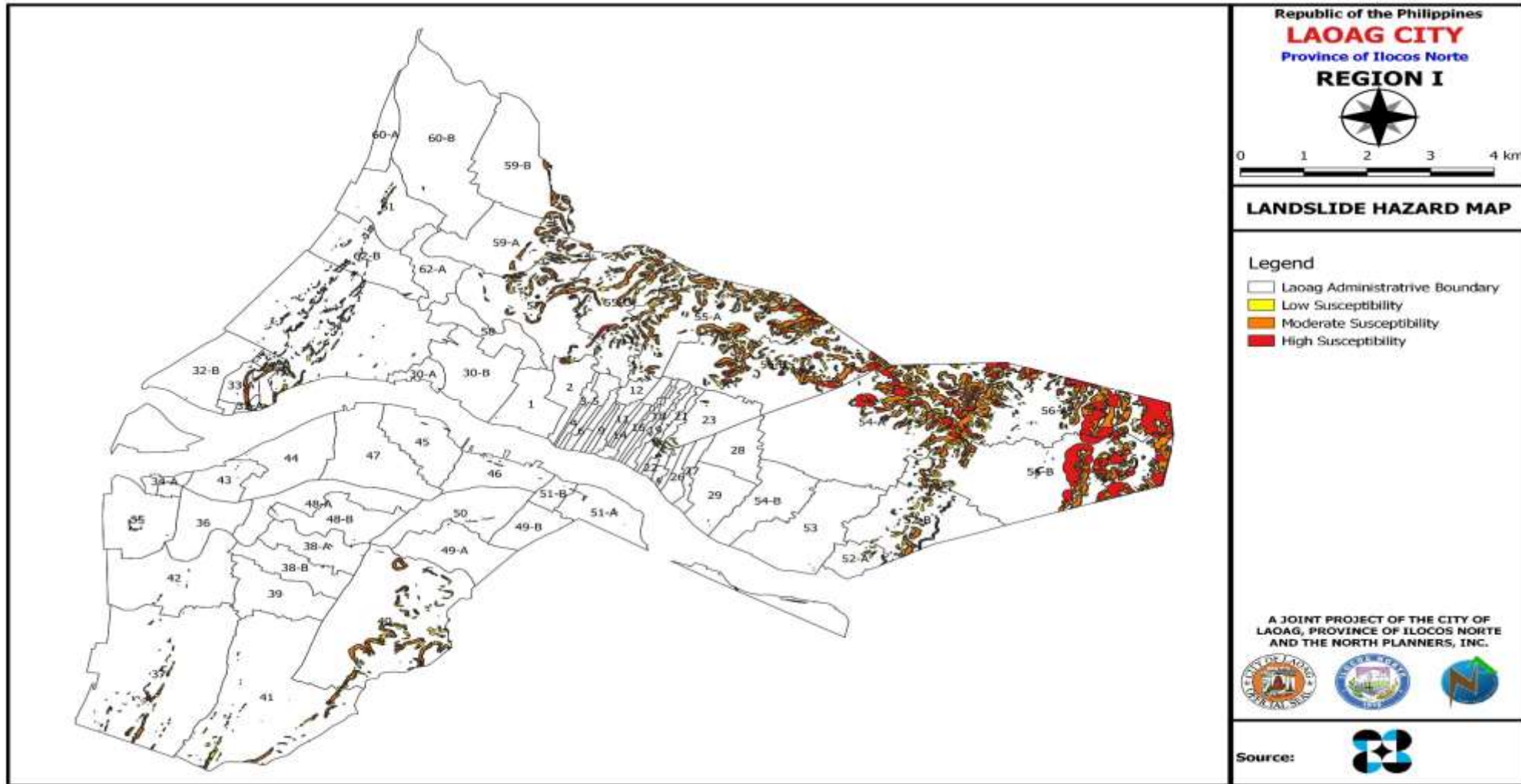


Figure 1. 16. Landslide Hazard Susceptibility in the City of Laoag

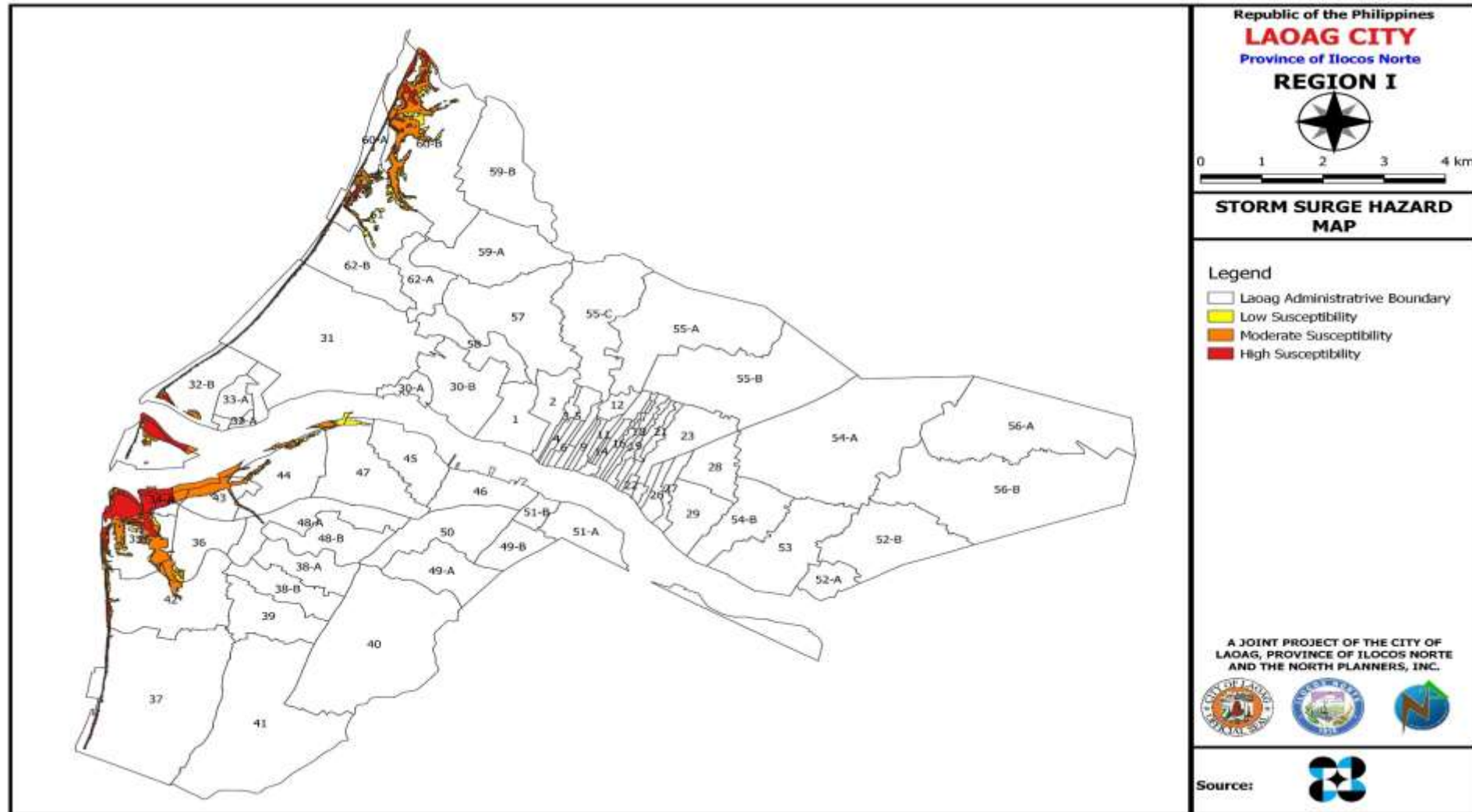


Figure 1. 17. Storm Surge Hazard Susceptibility in the City of Laoag

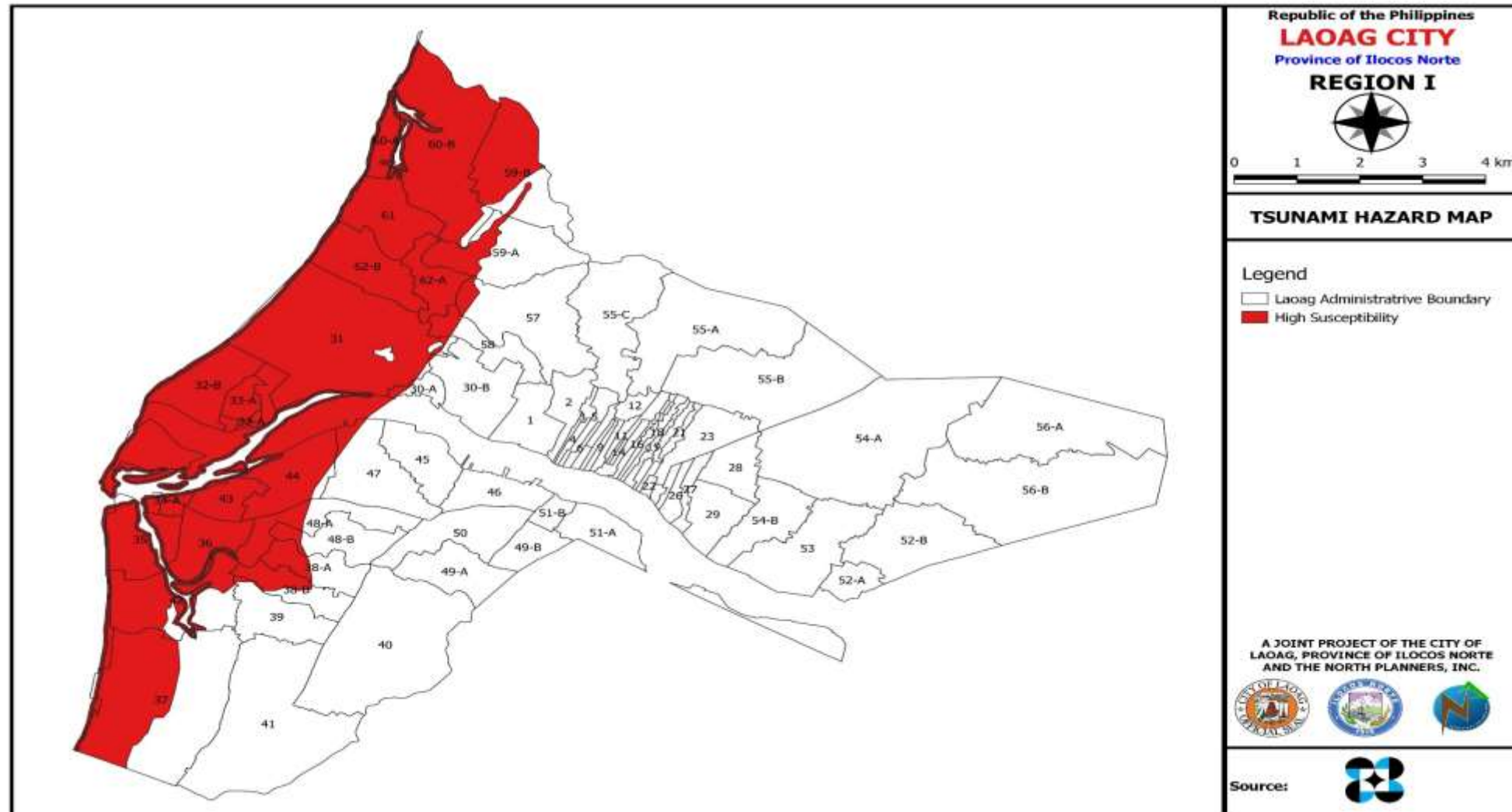


Figure 1. 18. Tsunami Hazard Susceptibility in the City of Laoag

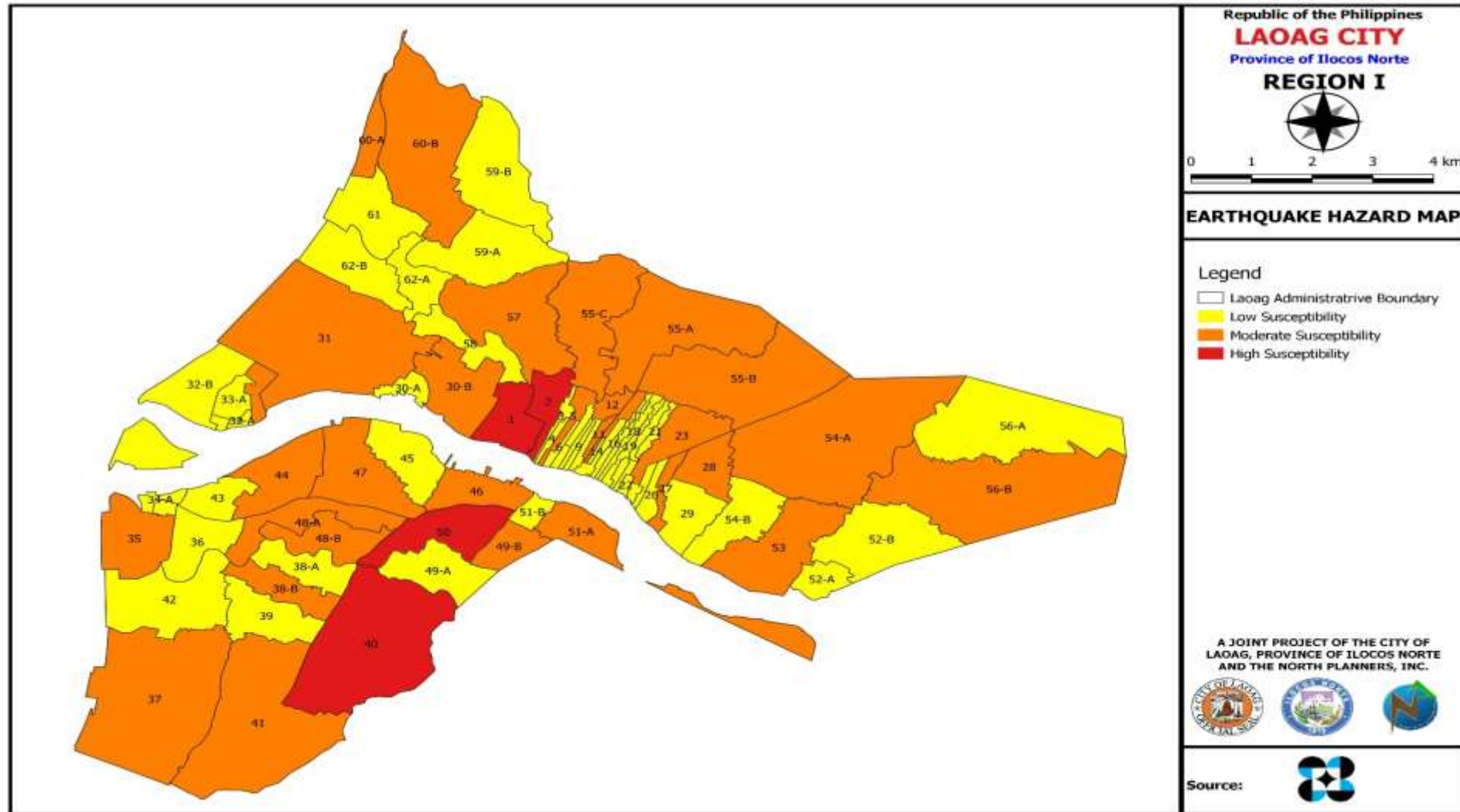


Figure 1. 19. Earthquake Impact in the City of Laoag

Biodiversity

According to CENRO, City of Laoag has 71 flora species; 16 species of amphibians; 22 species of reptiles; and 34 species of avifauna. Over-all, there are 69 flora species and 72 fauna species. Nine (9) species of flora are exotic species and 62 species are endemic. Most of fauna species are endemic with a total of 53 species; 12 species are native; three (3) species are introduced; and four (4) species of avifauna are migratory.

A total of 13 species of avifauna were found in the mangroves of Brgy. Gabu Sur (35) and Brgy. Apaya (42). At Brgy. Gabu Sur (35), the number of individual Philippine Duck (*Anas luzonica*) is uncountable because they fly as flocks. The pond behind the mangroves is classified as their breeding area because it's inaccessible for the community living in the area. As observed, Crested Myna (*Acridotheres cristatellus*) has the largest number of individuals with a total of 659 individuals, making it the most abundant in the area together with *A. luzonica*.

There is also one species of eagle observed at Brgy. Gabu Sur (35) and Brgy. Apaya (42) named Brahminy Kite (*Haliastur indus*) (**Figure 1. 20**). Five (5) individuals were observed roaming in the area.



PHOTO CREDIT: OCPDC

Figure 1. 20. *Haliastur indus* (Brahminy Kite) located at Brgy Gabu Sur (35)

Based on the assessment conducted (**Table 1. 9**), the biodiversity index of the terrestrial fauna in the City of Laoag is computed as 1.28 which implies very low biodiversity (Fernando Scale, 1998).

Table 1. 9. Computed Diversity Index of Terrestrial Fauna in City of Laoag

Species	Number of individual	Pi	log(Pi)	Pi[log(Pi)]
<i>Artramus leucoryn</i>	46	0.048	-1.323	-0.063
<i>Lanis schach</i>	37	0.038	-1.418	-0.054
<i>Passer montanus</i>	24	0.025	-1.606	-0.040
<i>Arderia cineria</i>	22	0.023	-1.643	-0.037
<i>Rhipidura nigriteguis</i>	19	0.020	-1.707	-0.034
<i>Haliastur indus</i>	5	0.005	-2.287	-0.012
<i>Geopelia striata</i>	3	0.003	-2.509	-0.008
<i>Egretta alba</i>	79	0.082	-1.088	-0.089
<i>Ixobrychus sinensis</i>	17	0.018	-1.755	-0.031
<i>Anas luzonica</i>	32	0.033	-1.481	-0.049
<i>Acridotheres cristatellus</i>	659	0.681	-0.167	-0.114
<i>Anthus cervinus</i>	4	0.004	-2.384	-0.010
<i>Alcedinidae</i>	2	0.002	-2.685	-0.006
<i>Dendrocopos maculatus</i>	2	0.002	-2.685	-0.006
<i>Turnix ocellatus</i>	1	0.001	-2.986	-0.003
<i>Phapitreron leucotis</i>	1	0.001	-2.986	-0.003
<i>Cynopterus brachyotis</i>	2	0.002	-2.685	-0.006
<i>Rhinella Marina</i>	12	0.012	-1.907	-0.024
<i>Gecko gecko</i>	1	0.001	-2.986	-0.003
Total	968	0.9845		-0.557
Biodiversity Index	1.282			

Air Quality

The air quality of Laoag is compared to its neighbor, Batac City. The month with the highest recorded average for PM₁₀ is October with 40.19 ug/Ncm in Batac City. While the lowest average for PM₁₀ was recorded in the month of June (14.85 ug/Ncm). The quality of air in Batac City is considered good and has no adverse effect on health. The same is true therefore in the case of Laoag.

During the first half of 2018 in Batac City, the month with the highest recorded average for PM_{2.5} was March with 20.643 ug/Ncm while the lowest average for PM_{2.5} was recorded in the month of February (14.398 ug/Ncm). Highest and lowest recorded average was considered fair and has no adverse effect on health. It is likewise assumed for Laoag.

Water Quality

In 2019, Laoag creek, having a dissolved oxygen (DO) of 0.6 mg/L, did not meet the Class C standard of 5 mg/L; whereas, Tupec creek passed the standard having a DO level of 5.3 mg/L. The biochemical oxygen demand (BOD) of 47 mg/L of Laoag Creek exceeded the water quality standard of 7 mg/L; while, Tupec creek has 3 mg/L BOD. Results of DO and BOD of Laoag Creek imply that it is polluted.

Average total suspended solid (TSS) in Laoag creek was 9 mg/L while Tupec creek has 21 mg/L TSS. Both bodies of water passed the standard by not exceeding 80 mg/L. This is an indicative that the bodies of water had no siltation.

V. SOCIAL SECTOR

Education

With high literacy rate of 98% and with students from neighboring towns also enrolling in schools in Laoag, the city maintains a high net enrollment participation rate (NEPR) in primary and secondary education (*Figure 1. 21*). The City of Laoag, being the educational center of Ilocos Norte, offers quality education from elementary, secondary to collegiate level. At present, there are 33 elementary schools, six (6) high school institutions and eight (8) colleges and universities (*Figure 1. 22*).

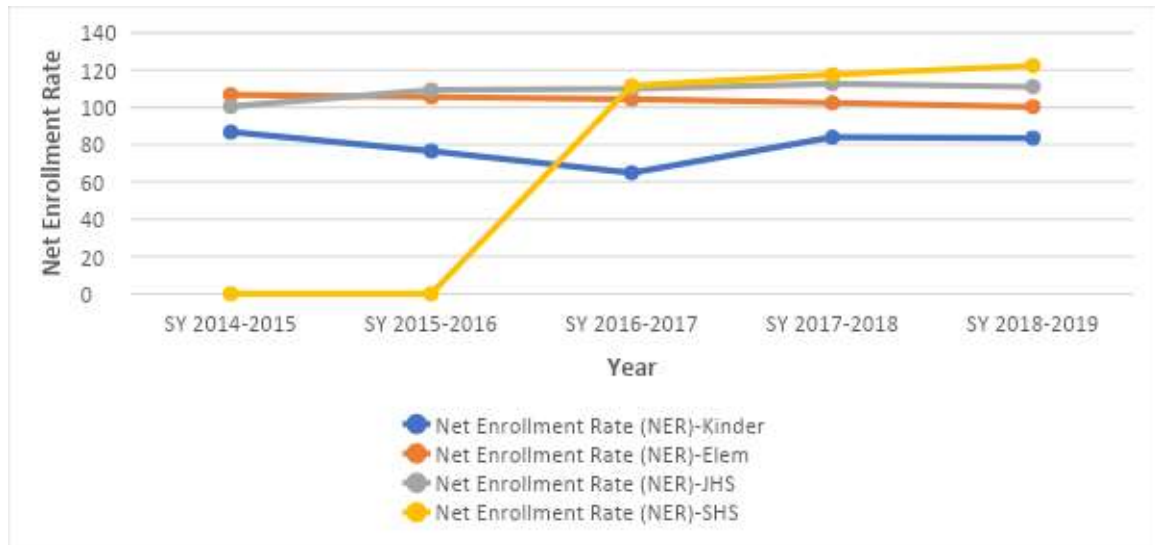


Figure 1. 21. Historical Net Enrollment Participation Rate, City of Laoag

Health and Sanitation

To address the medical concerns of Laoageños, the following healthcare facilities are available: City of Laoag General Hospital (LCGH); Governor Roque Ablan, Sr. Memorial Hospital (GRASMH); seven (7) private hospitals (*Figure 1. 23*), three (3) Rural Health Units located in Brgy. Sta. Joaquina (2), Brgy. San Tomas (29) and Brgy. Mangato (38); and 15 barangay health centers located in different barangays. There are also 31 medical clinics/ laboratories offering general medicine, obstetrics, family planning, dermatology, pediatrics, ophthalmology and EENT services, among others, as well as 20 dental clinics in the city. There is however a need to construct more barangay health centers and hire more healthcare professionals to comply with the standards and to ensure adequate delivery of medical services.

Low crude death rate and low malnutrition are indicative of a healthy population. However, the local government of Laoag should focus on addressing the following top causes of mortality and morbidity: pneumonia (mortality); hypertension, animal bite and diabetes mellitus (morbidity). Location of burial grounds are presented in *Figure 1. 24*.

Housing

The housing situation from 2000 to 2015 obtained from the Philippine Statistics Authority (PSA) is shown in *Table 1. 10*.

Based on the foregoing and the projected total housing requirement in 2029 which is 66,383 units, the demand for additional housing units is 43, 154 units.

Table 1. 10. Housing Situation for the Past Years, City of Laoag

	2000	2007		2010		2015	
	No.	No.	% Inc/Dec	No.	% Inc/Dec	No.	% Inc/Dec
Households (HH)	19,751	21,895	10.86	23,892	9.12	25,285	5.83
Household Population	93,837	101,872	8.56	104,337	2.42	110,413	5.82
Housing Units (HU)	18,123	20,410	12.62	22,027	7.92	23,229	5.46
Vacant HU	836						
Ratio of HH to Occupied HU	1.09	1.07	-1.83	1.1	2.80	1.09	1.04
Ratio of HH Population to Occupied HU	5.18	4.99	-3.67	4.7	-5.81	4.75	1.13

Source: Philippine Statistic Authority

Social Welfare

The City Social Welfare and Development Office (CSWDO) of the City of Laoag has several programs and services for the underprivileged and marginalized sectors.

At present, there are 91-day care centers; one (1) Care Home for the Elderly (Retirement Home) for the elderly; one (1) Bahay Pag-asa Youth Rehabilitation Center for youth ages 15-17 years old considered children in conflict with the law; Gender and Development (GAD) Center for women and children who are victims of violence and other forms of abuse; Stimulation and Therapeutic Activity Center (STAC) for people with special needs; and Senior Citizens Center. Some of the programs provided by the City of Laoag are: Livelihood Development Program, Practical Skills Development, Emergency Relief Assistance, and Special Social Services.

Peace and Order

Peace and order in Laoag are primarily maintained by the City of Laoag Police Station (*Figure 1. 25*) with 95 personnel: that is 86 officers and 9 non-uniformed personnel for administrative and operational works, and with a total of 27 motor vehicles. This is complemented by the following number of barangay security force and volunteers, to wit: 550 traffic enforcers; 1,599 staff for peace and order; 250 personnel for disaster concerns; 250 for auxiliary services; and another 221 persons in charge for other concerns. The Bureau of Fire Protection (BFP) has

30 personnel and five (5) fire trucks while the City Jail (*Figure 1. 26*) has 31 jail personnel.

Sports and Recreation

Laoageños enjoy various sports and recreation facilities available in the City of Laoag including City of Laoag Sports Stadium, Marcos Stadium, Rizal Amusement Park and the Centennial Arena. Laoag's delicious food and rich culture are likewise showcased in the following activities: Palarong Pamasko, Pamulinawen Street Pageantry, Dulang Food Festival and Calesa Festival. For tourists who intend to stay longer, the famous five-star Fort Ilocandia Resort Hotel and Casino can be their home while in Laoag. It offers sports adventures such as parasailing, jet skiing, water skiing and cruising on motorized boat.

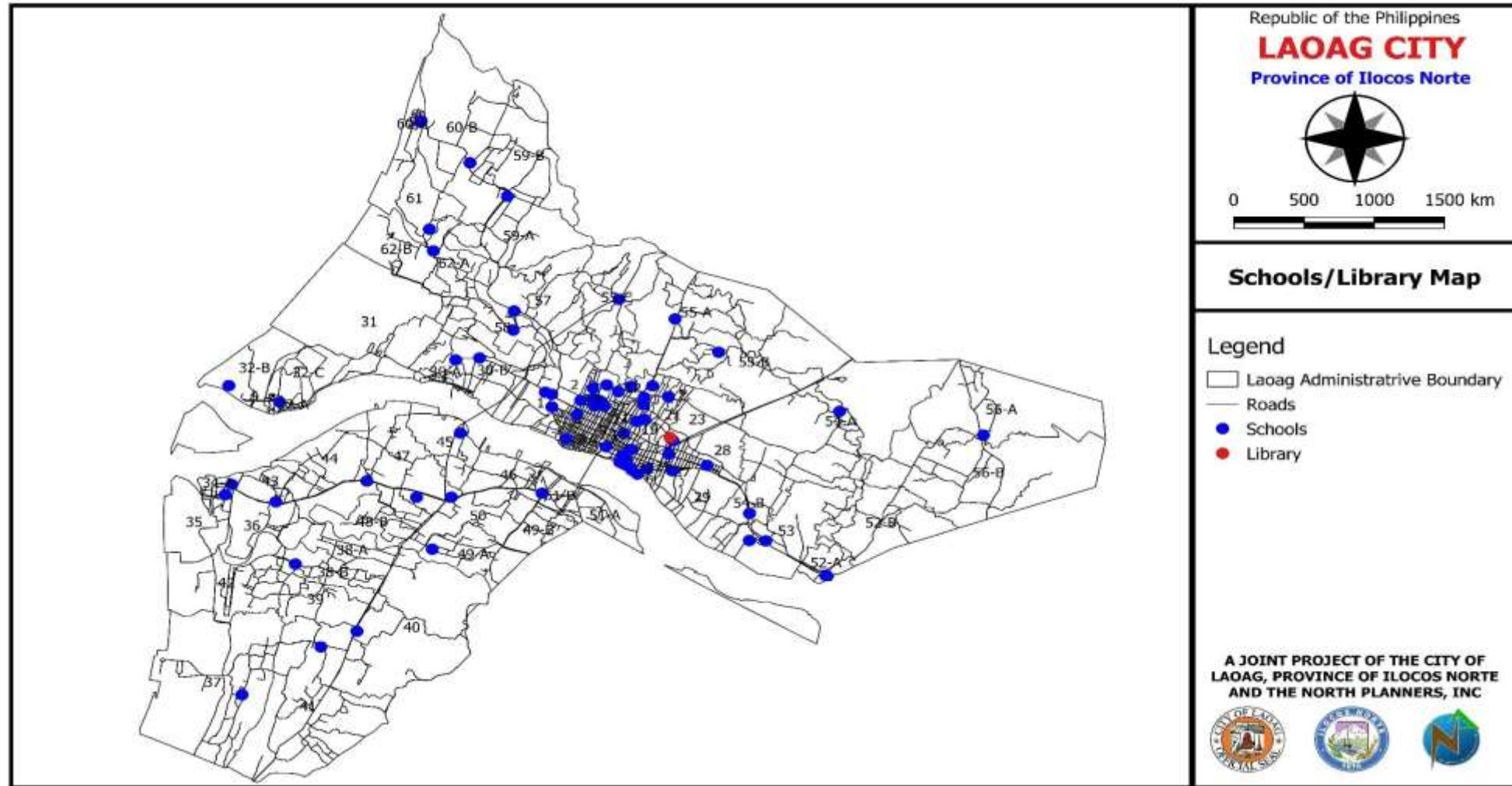


Figure 1. 22. Locator Map: Schools and Library in the City of Laoag

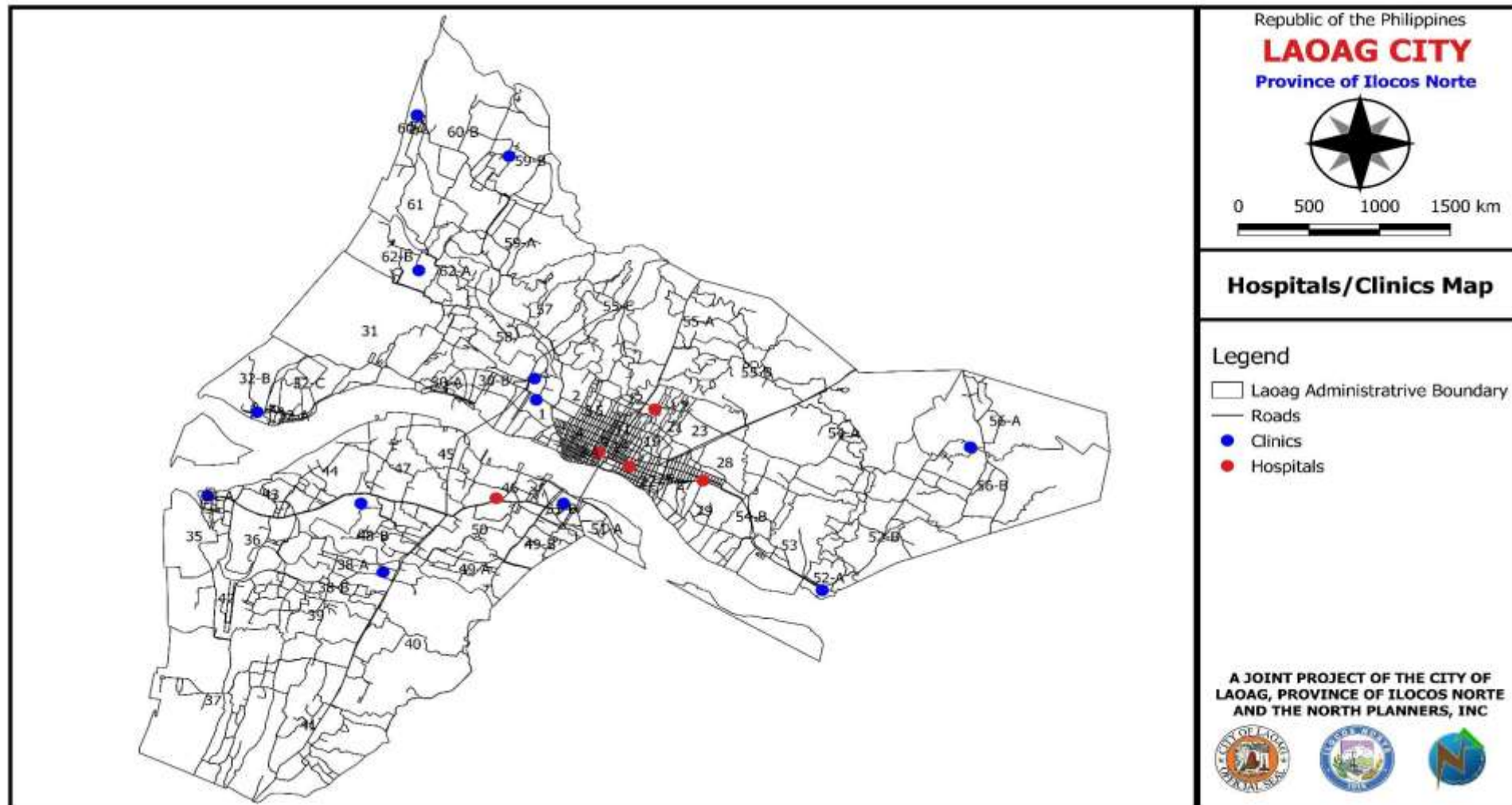


Figure 1. 23. Locator Map: Hospitals/Clinics in the City of Laoag

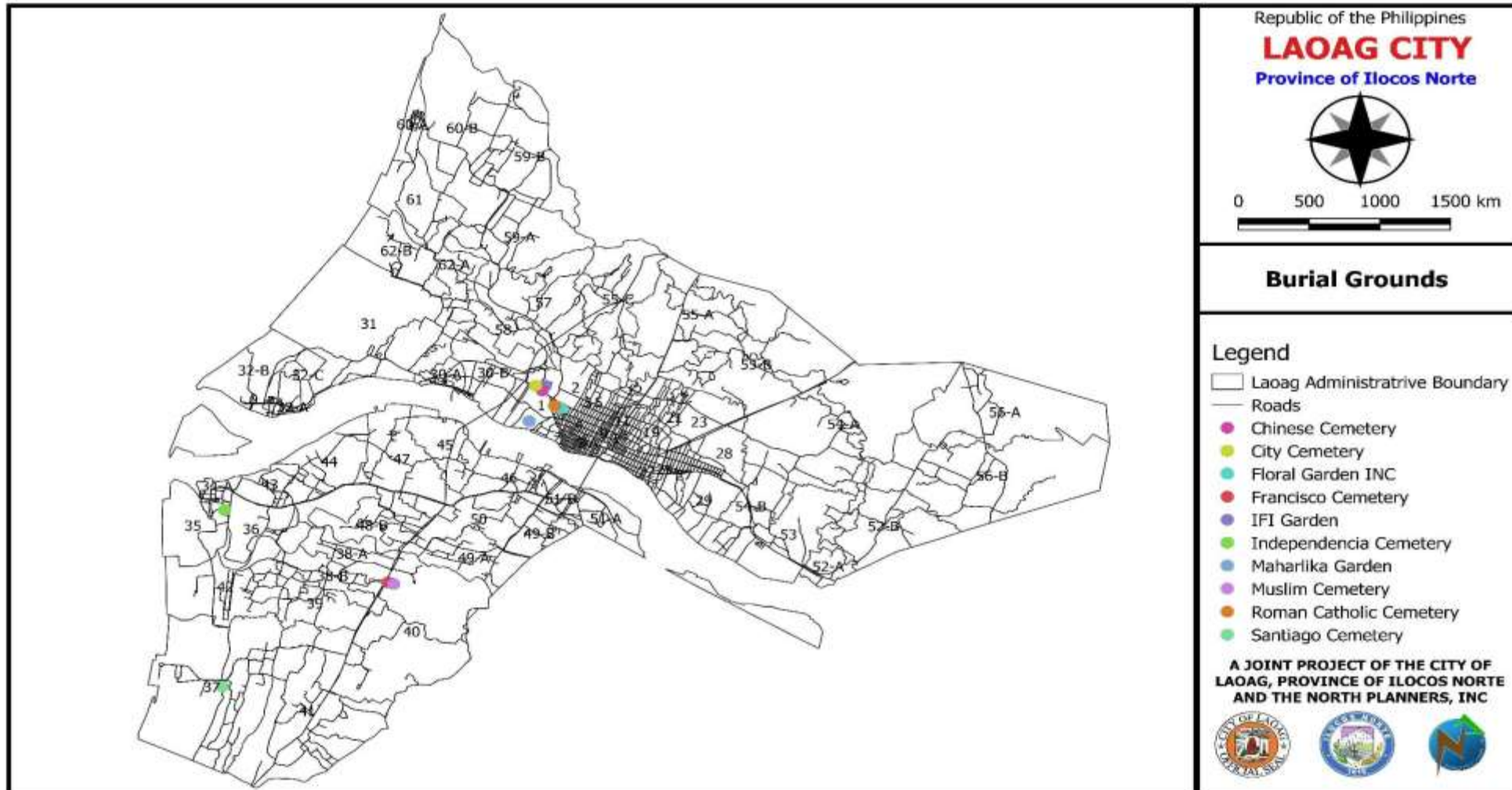


Figure 1. 24. Locator Map: Burial Grounds in the City of Laoag

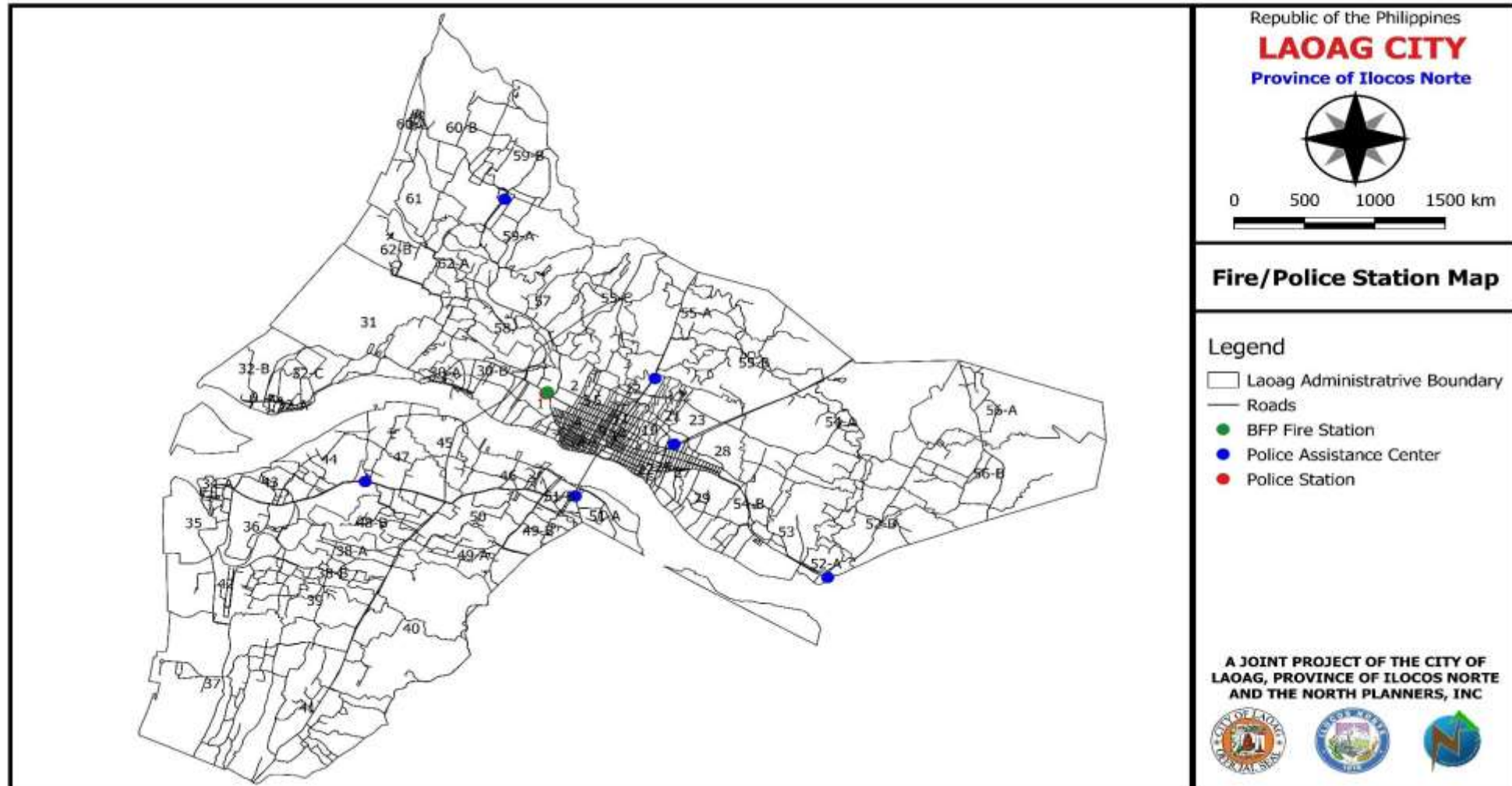


Figure 1. 25. Locator Map: Fire/Police Stations in the City of Laoag



Figure 1. 26. Locator Map: City Jails in the City of Laoag

VI. ECONOMIC SECTOR

The Economic Structure

City of Laoag, being the capital of its province is a hub of economic activities not only in Ilocos Norte but also of the nearby provinces of Ilocos Sur, Abra and Cagayan. It is in a position to be a preferred investment destination as it pursues its objectives of increased agricultural productivity, more vibrant commercial and light manufacturing activities along with income-generating tourism activities.

These economic objectives supported by adequate infrastructure and communication facilities are expected to launch the city to be an attractive agro-eco/light industrial hub in the region.

Revenue Sources

City of Laoag gets its income and revenues from business and real property taxes, regulatory fees, service and user charges, permits, licenses and other income receipts. The city also receives subsidies from the national government in terms of Internal Revenue Allotment (IRA). *Table 1. 11* shows the city’s sources of revenues along with its local and total income per capita. The total local income in 2019 amounted to PhP 218,623,213.12. This is a 20.3% increase from the previous year. The local income has been increasing by 12.16% annually from 2015-2019.

The biggest source of local income is the business taxes with 27.5% of the local income in 2019 and it has been increasing with an annual average of 15.18%, followed by real property taxes with 8.3% with an average annual increase of 7.59%. The IRA is the biggest source of income with PhP 494,092,149.00 or 69.33% of total income in 2019. It has been increasing from 2015 to 2019 with an average annual increase of 9.76% (*Figure 1. 27*).

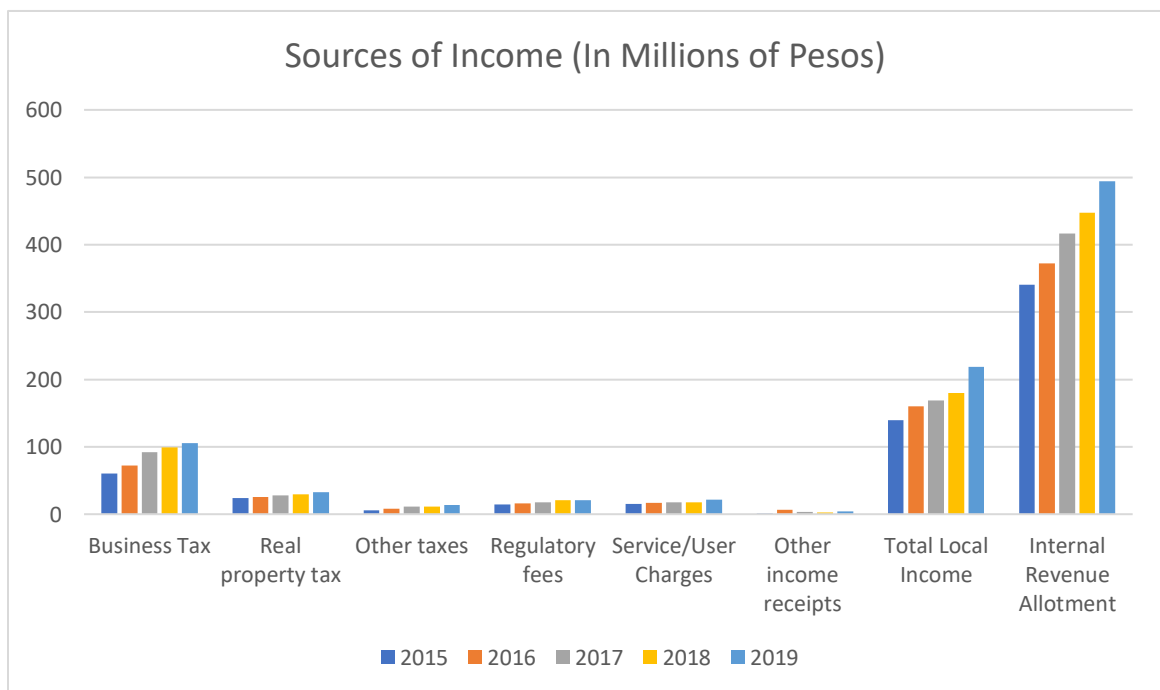


Figure 1. 27. Sources of Income (In Millions of Pesos), City of Laoag

Table 1. 11. Sources of Revenues and Income Per Capita, City of Laoag

Income and Income Per Capita (PhP)	2015	2016	2017	2018	2019
Total Local Income	139,126,650.70	160,300,229.74	169,114,536.68	179,769,191.01	218,623,213.12
Internal Revenue Allotment	340,525,560.18	372,026,905.00	416,848,199.00	447,637,204.00	494,092,149.00
Total Income	479,652,210.88	532,327,134.74	585,962,735.68	627,406,395.01	712,715,362.12
Population	111,125	112,336	113,561	114,799	116,050
Local Income Per Capita	1,251.983358	1,426.971138	1,489.195557	1565.94736	1883.870858
Total Income Per Capita	4,316.330357	4,738.704732	5,159.894116	5465.260107	6141.450772
% of TLI to total Income	29.01	30.11	28.86	28.65	30.67
% of IRA to total Income	70.99	69.89	71.14	71.35	69.33

The local income per capita (LIPC), which is City of Laoag’s internally generated income divided by the population, increased by an average of 10.95% from 2016-2019 (Figure 1. 28). Subsidy from the government increased by 8.58% annually in the same period. With these increases in local and total income per capita, it can be inferred that the economy is improving and the local government is better able to serve its constituents.

According to 2018 PSA, City of Laoag, as part of Ilocos Norte, was classified as having the least poor population.

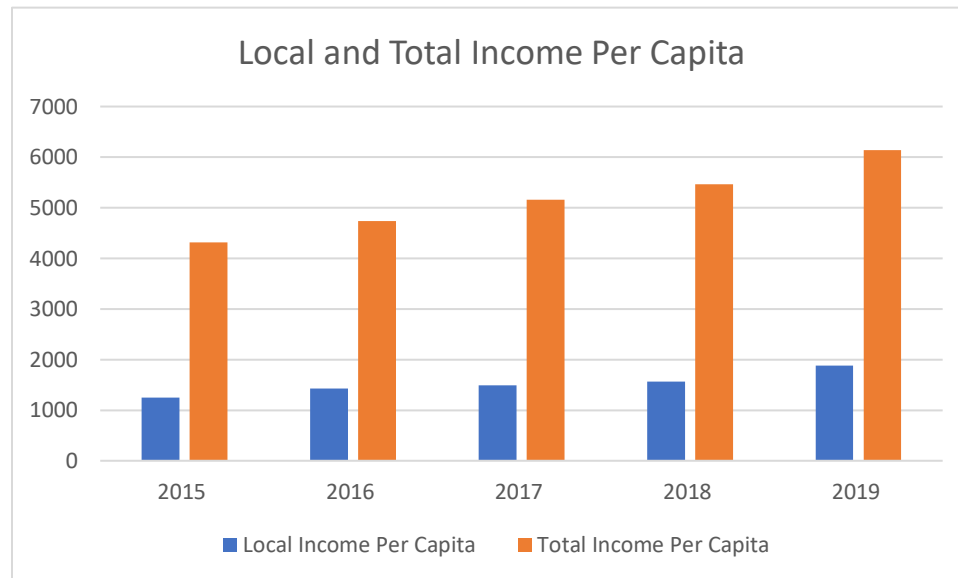


Figure 1. 28. Local and Total Income Per Capita, City of Laoag

Agriculture

The local economy is composed of the primary, secondary and tertiary sectors. The Agriculture subsector is further divided into crop production, livestock and poultry, and fisheries. Agricultural land in the City of Laoag covers 70.63% of the total land area or 9,004 hectares. Rice occupies the largest area with 3,949 hectares or 43.86%. Important fruits and crops in the area include mango, assorted vegetables, eggplant, tomato, peanut, cassava, watermelon, sweet potato, garlic, squash, okra, upo, string beans, pechay, patola, pepper, cabbage, ampalaya and onion.

Commerce and Trade

There are a lot of small and local commercial businesses in the City of Laoag which have significant community impacts. Because of commercial strips’ convenient location, more economic opportunities are arising to meet consumer demands. The economic benefits of commercial strips and complexes are numerous and show how even the smallest shops can have a positive impact to the community. These local businesses provide local jobs, increased tax base, consumer product diversity and local community identity.

In 2019, there were a total of 2,542 business permits issued in the city. No permits were issued from 2015 up to 2019 in the primary category. In general, permits issued in the city are continually increasing. This steady increase in

permits issued over the years indicates an improvement in the business environment of the city. Currently, the city has a higher number of permits issued in the tertiary sector which include wholesale and retail trade/repair of motor vehicles and motorcycles, hotels/restaurants, transport, storage and communication, finance, real estate education, and health and social work with a total permit of 2,289. While in the secondary category, the local government issued a total of 253 permits. This category includes manufacturing, electricity, gas and water supply, and construction / contractor.

Industry

The City of Laoag is known for the production of basi, suka and the juice drink Golden Coolers - a beverage-like juice which has a capitalization of PhP 500,000 in the year 2007. Fifty-one (51) manufacturing/industrial establishments are built in the city but most of the establishments are related to hollow blocks making. Only two (2) manufacturing/industrial establishments have employment with more than five (5) employees, to wit: The Laoag Kambal Corporation, a hollow blocks manufacturing company which has 25 employees; and the Golden Coolers, which has 200 employees. The rest of the industrial establishments have less than five (5) employees.

Tourism

The City of Laoag is the entrance port and central capital in the Province of Ilocos Norte. Tricycle, jeepney, van or private vehicle are the available means of transportation in land if tourists will visit the tourist attractions in the city. Laoag has an airport, the City of Laoag International Airport, located in Brgy. Gabu Sur (35) which makes it a potential international tourist destination.

The city is known for a lot of historical landmarks, scenic natural landscapes and beaches which give tourists a lot of memorable and excitable experiences. Facilities are in place to serve the visitors with their needs. Most of the tourist destinations in the City of Laoag have accommodation facilities including hotels, resorts, cottages, restaurants, and fast-food stalls and resto bars. There are a lot of banks for financial transactions and medical facilities for health emergencies.

VII. INFRASTRUCTURE SECTOR

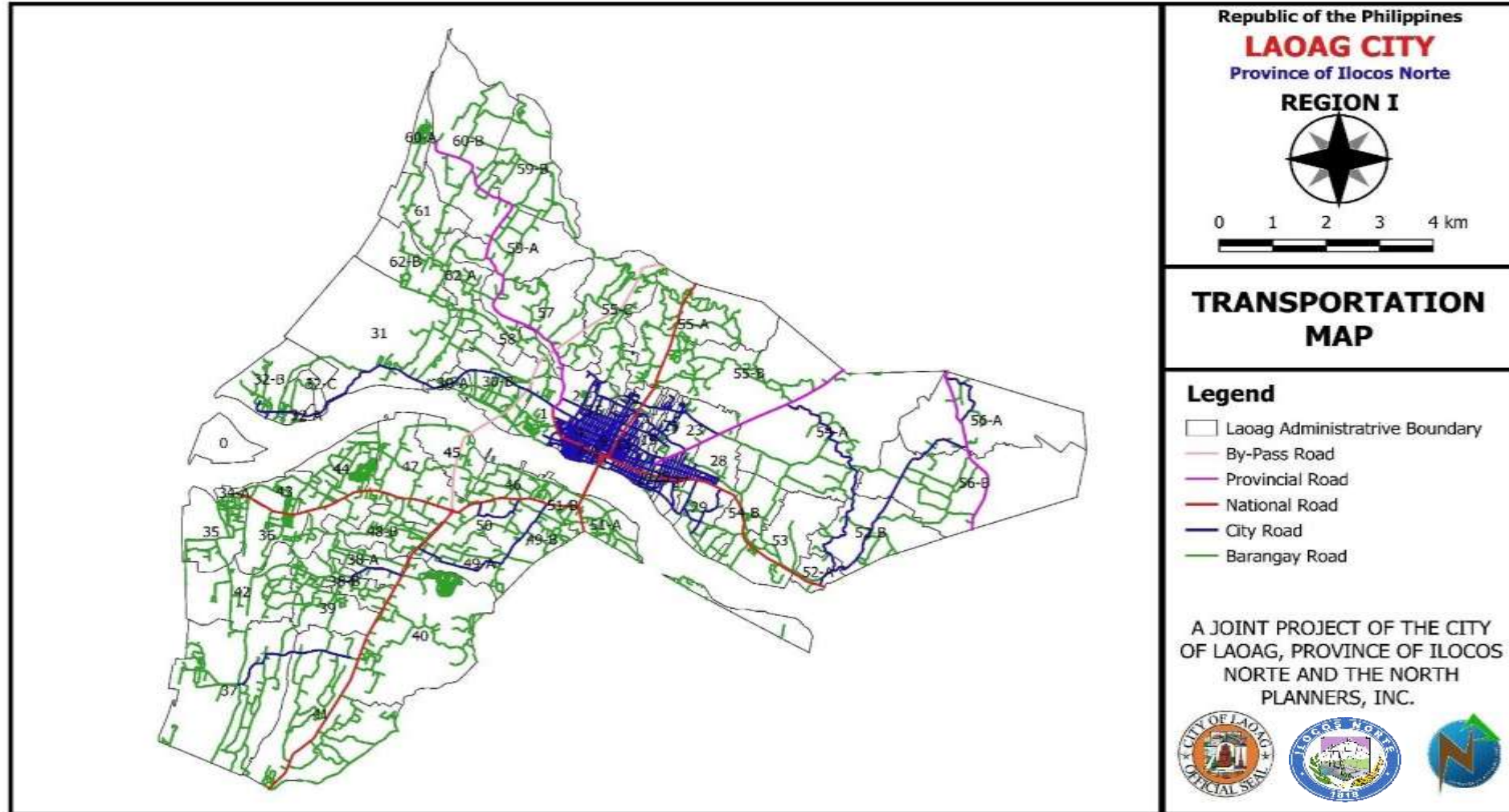
Transportation

The road network pattern of the City of Laoag follows the radial-circumferential network (*Figure 1.29*). The transportation map shows roads and bridges connecting all barangays to commercial districts. The city is accessible to and from the other provinces and to the rest of the Luzon Island cluster through the national highway, Manila North Road that is traversing it. The total length of city road is 399.681 kilometers excluding the 34.24 kilometers of national road thereby exceeding the total road requirement by 121.161 kilometers and by 155.401 kilometers if national roads are included. As of 2019, road to population ratio is 3.74 kilometers per 1000 population. Road density is 4.34 kilometers per square kilometer area.

City of Laoag roads, regardless of classification, are mostly concrete. The urban city road has a total of 178.00 km. Complementing the road network system of the City of Laoag are 24 bridges with a total length of 1,353.50 linear meters including the 750 linear meter Gilbert Bridge connecting the city to the southern part of Ilocos Norte through the Manila North Road. These bridges are mostly concrete or permanent structures except for a 90 linear meter bridge made of timber.

The modes of land transportation within the city and to/from the city are buses, jeepneys, taxi/FX, public utility van, tricycles, privately-owned vehicles and government-owned vehicles. A total of 2,800 registered tricycles can serve from different barangays to the city center while 245 tricycles can serve only within barangays. There are eight (8) bus companies operating in the city plying the routes from Laoag to Manila, Baguio City and Cagayan. Public utility van also covers the route from Laoag to Claveria, Cagayan. Mini buses and jeepneys also ply the routes to/from other municipalities of Ilocos Norte, Ilocos Sur, Kalinga and Cagayan.

The presence of the Laoag International Airport complements the mode of transportation. The airport is located in Brgy. Araniw (36), Brgy. Cavit (43) and Brgy. Apaya (42) and has nine (9) commercial air carriers that serve domestic and international flights. Cebu Pacific is the only carrier that operates both domestic and international flights. Air travel is the fastest mode of transport and it takes 55 minutes to Manila.



Source: City Engineering Office, Laoag City

Figure 1. 29. Transportation Map of City of Laoag

Power

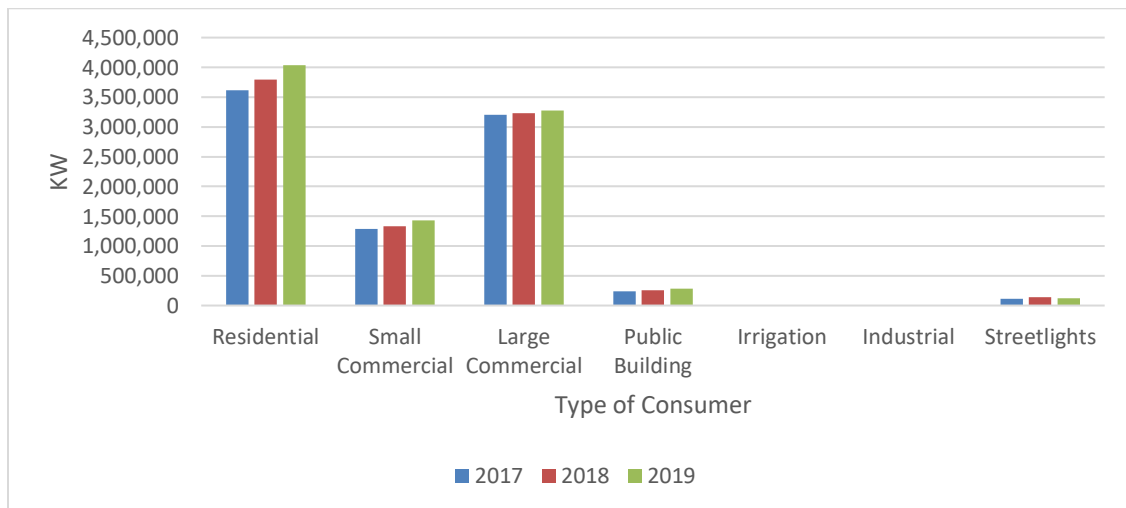
All barangays of Laoag City are already energized with 100% of the total numbers of households are served by the Ilocos Norte Electric Cooperative (INEC), a cooperative supply system of the province of Ilocos Norte whose main source of power is the National Power Corporation (NPC) transmitting electricity through the facilities of the National Transmission Commission (TRANSCO) (Table 1.12). The major source of electricity is the 69,000 KVA hydro-electric plants in Ambuklao Dam and Binga Dam in Benguet.

Table 1. 12. Average Energy Consumption (kwh) by Type of Consumer, City of Laoag

Type of Consumer	Energy Consumption (Kwh)		
	2017	2018	2019
Residential	3,611,240.00	3,798,799.00	4,032,048.00
Small Commercial	1,282,388.00	1,330,478.00	1,433,067.00
Large Commercial	3,201,858.00	3,233,238.00	3,276,336.00
Public Building	238,627.00	253,659.00	284,569.00
Irrigation	1,666.00	3,954.00	2,557.00
Industrial			10.00
Streetlights	116,983.00	137,237.00	124,168.00
Total	8,452,762.00	8,757,365.00	9,152,755.00

Source: Ilocos Norte Electric Cooperative, Inc.

A total of seven (7) types of consumers for energy (Table IS-10) were identified in Laoag. The energy in the city is mostly used for residential purposes (Figure 1. 30) and energy consumed for industrial uses were only 10.00 and only in the recent year (2019).



Source: Ilocos Norte Electric Cooperative, Inc.

Figure 1. 30. Average Energy Consumption by Type of Consumers, City of Laoag

There are three (3) lines distributing power within the city with equal amount of kilovolt capacity. Beside the main source of energy, the city has three

(3) alternative power sources: Solar Power Plant, Windmill Bangui Bay Power Plant and the Mini-hydro Power Plant. It supplied a capacity of 5,051.40 megawatt/hour in 2019. The wind farm in Bangui uses 20 units of 70-meter high Vestas V82 1.65 MW wind turbines. These turbines are arranged facing the West Philippine Sea in a single row of nine-kilometer on the shoreline of Bangui Bay.

Water

The Ilocos Norte Water District (INWD) is the water supply agency that extends water service to consumers of Laoag (Table 1. 13). It is under the supervision of the Local Water Utilities Administration. Its facilities include two (2) reservoirs with a combined capacity of 1,750 cubic meters, five (5) pumping stations with a total capacity of 295 cubic meters per hour.

The INWD active sources of water are the Pump Station 1 and Pump Station 6 located at Brgy. San Tomas (29), the Brgy. Nra. Sra. De Soledad (27) Pump Station, the Brgy. Suyo (30-A) Booster Pump Station and the Barit On-Line Booster Pump Station. The two (2) concrete ground reservoirs are located at Ermita Hill and Camp Juan.

Table 1. 13. Water Service Connections by Type of Consumer, City of Laoag, 2019

Type of Consumer	Number of Connections	Average Water Consumption (Unit)
Domestic	10,828	19
Commercial	1,107	20
Industrial	456	59
Others	186	77
Total	12, 577	

Source: Ilocos Norte Water District

Information and Communication Technology

The modern modes of communication are in the forms of mails, emails, fax and telex services, landline telephones and mobile/cellular phones. For news, information and entertainment, newspapers of national, regional and provincial circulation, radio, television and internet play important roles (Table 1.14). With these facilities, the population of a locality are informed and updated on the latest development trends in all aspects of living and learning.

Table 1. 14. Inventory of Communication Facilities in the City of Laoag

Type	Number	Location	Ownership
Postal Services	2	Brgy. San Jose (10)	Public
		Brgy. Nra. Sra. De Soledad (27)	Public
Cell site Network Providers			
Public Calling Station (PLDT)	1	Brgy. Sta Balbina (11)	Private
Digitel/Sun Cellular	1	Brgy. Nra. Sra Del Rosario (3)	Private
Smart	1	Brgy. San Jacinto (16)	Private

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Globe	2	Brgy. San Guillermo (15)	Private
		Brgy. Sta Balbina (11)	Private
Bayan Telecom, Inc.	1	Brgy. Sto. Tomas (14)	Private
Radio Station			
AM	3	Brgy. Cabungaan (48)	Private
		Brgy. Sto. Tomas (14)	Private
		Brgy. Sta Angela (9)	Private
FM	3	Brgy. Sta Angela (9)	Private
		Brgy. Sta. Marcela (19)	Private
		Brgy. San Matias (23)	Private
Government	1	Brgy. Sto. Tomas (14)	Public
Broadcasting & Television Network			
GMA	1	Brgy. Talingaan (31)	Private
ABS-CBN	1	Brgy. Sta Angela (9)	Private
Planet Cable	1	Brgy. Nra. Sra. De Consolacion (24)	Private
Sky Cable	1	Brgy. San Quirino (18)	Private
Private Couriers			
Ilocandia North Delivery Express	1	Brgy. Sta. Marcela (19)	Private
Airfreight 21 Co., Inc.	1	Brgy. Sta Angela (9)	Private
JRS Business Corporation	1	Brgy. Sta. Marcela (19)	Private
Kwiikee Courier Services	1	Brgy. San Quirino (18)	Private
LBC Express	2	Brgy. San Quirino (18)	Private
		Brgy. San Vicente (8)	Private
Wide Wide World Express, Corp.	1	Brgy. Sta. Balbina (11)	Private
WCC Aviation Co.	1	Laoag Intl. Airport	Private
J&T Express	1	Brgy. San Quirino (18)	
Publications			
Ilocos Times (Area Covered: Ilocos Norte)	1	Brgy. San Matias (23)	Private
Sunshine news (Area Covered: City Government)	1	Brgy. Sto. Tomas (14)	Public

Source: Office of City Planning and Development Coordinator

Irrigation and Drainage

The National Irrigation Administration's Provincial Irrigation Office in Ilocos Norte has a concrete dam (Laoag-Vintar RIS) servicing an area of 2, 860 hectares of agricultural lands within the City of Laoag and the Municipalities of Vintar, Bacarra and Sarrat (*Table 1. 15*). This irrigation system also serves as flood control in the areas mentioned.

Table 1. 15. Irrigation System by Areas Served and Beneficiaries, City of Laoag

Name of System	2015 Area Served (Ha)	No. of Farmer Beneficiaries
National Irrigation System		
1. Laoag-Vintar RIS	1,303	1,834
2. Bonga Pump # 3 PIS	98	228
NIA-Assisted Communal Irrigation System (CIS)		
1. Mabisbis CIS	30	55
2. Matoc CIS	30	50
Other Government Agencies Assisted (CIS)		
1. Balatong SWIS	37.5	74
2 Pandan DD	10.13	63
3. Zanjera Ganagan	292.5	574
Total	1,801	2,878

Source: National Irrigation Administration

Solid Waste Management and Pollution

Solid waste and domestic sewage continue to be a priority challenge across the city. Disease outbreak, rodent infestation and ground water contamination are potential consequences associated with solid waste and its management, thus the need to address this concern. This perennial problem of waste management draws attention to the need to rehabilitate/restore non-functioning materials recovery facilities (MRFs) to reduce and recycle wastes. Successful operation of MRFs often requires community involvement, which is basically exhibited through the practice of waste segregation at source. Presented in Table IS-25 are the semi-functional 74 MRFs in the city. The City has an ordinance (C.O. 2012-045) which regulates the use of plastic bags and other materials made of plastic as secondary packing or carryout bags for all forms of merchandise; bans the use of Styrofoam in the City of Laoag; and prescribes the penalties in violation thereof.

In pursuance to the provisions of City Ordinance No. 97-143 (Environmental Protection and Management Code) and all other existing laws on solid waste disposal and pollution, a five-hectare sanitary landfill facility was established in Brgy. Lagui-Sail near the boundary of Laoag and Vintar town. Brgy. San Lorenzo (1) was also identified as a zero-waste pilot area for the zero-waste management program of the city.

The sanitary landfill was officially operational in 1988 and has an estimated life of 20 years. There are two (2) big chambers where garbage is dumped, one for the biodegradable and the other for the non -biodegradable.

VIII. SPECIAL AREAS SECTOR

Green Growth

The City of Laoag currently practices conventional ways of making progress in its economic growth. Presently, it has not enacted a local Green Building Code that would provide for the adoption of sustainable strategies, assure resilient and sustainable infrastructure and serve as technical reference side by side with the National Building Code of the Philippines. The city implements

the Solid Waste Management Act, although there are no clear-cut policies on sustainable practices like innovative recycling and managing waste. It lacks materials recovery facilities (MRF) to complement innovative sustainable practices and support waste management. However, a sanitary landfill is in the plans in an identified site. City of Laoag is visited regularly by strong typhoons and threatened by earthquakes but it has not established a state-of-the-art hazard monitoring center. It is prone to flooding even under its present network of drainage canals. As yet, there are no best management practices adopted on storm water management and flood mitigation to protect water bodies from pollution, erosion of riverbanks and siltation of both river and productive farmlands.

The City of Laoag has innovative programs and activities for the social sector but these are not yet well-defined and clearly established- all aimed to raise the level of, and benefit the family, women and children, the poor and marginalized, unemployed, older persons and ageing, youth, physically-challenged and disadvantaged due to natural and man-made-disasters. Presently, there is no dedicated Training Center for women (cooking, baking, weaving, sewing, hair and make-up), children (arts classes, cooking classes, SPED classes), youth (Alternative Learning System, games, arts, cooking, beauty courses), physically challenged (skills training); LGBTQI (training center, counselling), unemployed, disadvantaged, poor (skills training) to accommodate and secure inclusive social development programs. There is a lack of demonstration, experiment, or model farms for organic and sustainable farming systems for farmers. There is not a well-demonstrated clear-cut program for the protection, conservation and judicious utilization of the city's water resources and watershed for water needs and health of Laoageños. A sewerage and septage treatment facility for the incorporation of water recycling is absent. Sustainable tourism practices have not been fully trained on the residents particularly in the coastal areas aimed at building awareness on natural heritage resources as sources of sustainable income.

Ilocos Norte has the biggest wind farms and large areas of solar farms for renewable energy. The City of Laoag has started to explore this potential like benchmarking on solar-generated irrigation pumps but has not yet explored the institutionalization of solar-generated electricity in public/government buildings, public plazas, open spaces and streets. The city continues to be vigilant about the state of the environment aimed at maintaining and achieving healthy air for Laoagenos by implementing the Clean Air Act of 1999 which covers all potential sources of air pollution. However, public transportation vehicles using conventional gas is the present system that contributes to air pollution. Laoag tourism and industries are mostly anchored in the La Paz (32-C) and Calayab (37) sand dunes being its foremost natural heritage resource, and the rest of the coastline. Other than this resource, tourism activities in the city is minimal. Its forested hills, mountain peaks and rivers have not been explored for eco-tourism. The city has a cultural heritage core with potential for cultural tourism but remains undefined officially including a buffer zone to protect this core. Ermita Hill has a significant role in the history of the city with great potential for cultural tourism. Presently, it is occupied by the Ilocos Norte Water District office. The city's traditional industries and crafts have not been documented including possible features of best practices in environmental management (or green) practice that could support livelihood and employment of residents.

Green Growth has not been made imperative in the City of Laoag that would institutionalize a process aimed to ensure sustainable future developments while it remains largely a city with lush natural environment, ensure an accelerated, integrated and inclusive sustainable development through actions that would strengthen environmental resilience, drive social improvement and reduce poverty, enhance economic growth at the same time builds capacity to withstand and manage anticipated adverse effects of climate change.

Urban Design and Development

The Central Business District is characterized by a variety of period architectural styles and of low and medium rise buildings and residential houses. The streetscapes generally do not have physical and visual aesthetics and distinctive character to create a sense of neighborhood identity and beauty, and ownership. There is a lack of walkable streets. Some streets have sidewalks, most have none and bike lanes are notably absent, a situation that does not encourage walking and biking in the area. There is an absence of public parks, public restrooms and street arts/sculptures that would provide shade, comfort, ease of pedestrian movements and visual quality along the streets. The roads surrounding Aurora Park have become dangerous entry and exit roads making the park unsafe and unusable. Aside from Aurora Park, there is no other central urban park that exists except for the Rizal Amusement Park and Mariano Marcos Stadium northeast of the urban area. Laoag can increase its open spaces for urban pocket parks to achieve urban greening for walkability and livability.

Present-day Laoag has an urban core where majority of its government functions are carried on, and economic, social, civic, religious activities are conducted. The innermost core contains the city's Spanish-period religious and government structures that include the church, city and provincial halls. There is a general sense of overcrowding in key government offices particularly the City Hall and Provincial Capitol, and this is expected to continue in the next ten (10) years. Other provincial offices are located in various buildings in the urban area. Overcrowding is aggravated by parking needs and traffic generated in the surrounding streets.

The urban core is generally a mixture of commercial and residential uses with various types of commercial establishments of different scales scattered everywhere. The Laoag City Public Market and Commercial Complex is the main magnet in the commercial area which gets crowded daily and congested with traffic during peak hours. Elsewhere in the city, lack of parking areas and extreme vehicular traffic continue to be problems due to narrow urban roads and road widening issues. Some buildings may need to be evaluated on their structural soundness due to past earthquakes.

The city has culinary attractions but there is inadequate choices of specialty restaurants and pubs serving international cuisine and decent nightlife that would feature weekend live acoustic bands. There are no investments for mixed-use low-rise developments for a complex of restaurants, small specialty shops and function halls with pocket parks to complement the heritage core of the city.

The City of Laoag has no defined physical character and identity. It has an intact heritage core but this core containing the most significant Spanish and

American -period structures is not delineated that would give a historic character and distinct identity to the city for potential international tourism. A substantial area of the Church-*convento*-atrium-belltower complex has been leased to McDonald's fast-food restaurant which has marred the original plan of the religious complex. The city has a Tourism and Arts Council but has no City Tourism Center and a pasalubong center complex with souvenir shops, coffee-internet shops, offices and hotel/transient rooms. There are no innovative interactive libraries to cater to tourists of all ages. The urban core is showing signs of congestion. The busy roads compete with pedestrians. Pedestrians cannot enjoy a walking tour since there are no pedestrianized streets or streets pedestrianized at other times of the week or day for a vehicle-safe and pedestrian-friendly heritage core. The *Pamulinawen* Festival is not competitive with recognized major Philippine festivals because it lacks adequate space to accommodate street dancing showdowns, other important provincial and city celebrations, the participants and spectators. A buffer zone is non-existent to provide protection and seamless transition from existing and new commercial developments in the urban center to the heritage core, nor a heritage conservation ordinance to regulate adaptive reuse projects, compatible activities or permitted architectural character. The Ermita Hill history has not been highlighted to add to the city's attractions.

In 2001, Republic Act 7916- the Special Economic Zone Act of 1995, amended by Republic Act 8748 established the Laoag City Special Economic Zone designating a total of 25 hectares in barangays Calayab (37) and Balacad (41), with 79.20 hectares as the ecozone industrial site. The project has not taken off pending resolution on issues on lot acquisition where only two (2) public lots have been identified and the rest is still privately-owned, and area identified as too big. The City of Laoag has high potential for international tourism, but there is lack of tourism activities and facilities implemented along the Green Growth Path for green tourism and inclusive social development to entice tourists to stay longer in the city. There is an inadequate infrastructure for major MICE (Meetings, Incentives, Conventions and Exhibits). The La Paz sand dunes is a potentially rich natural resource in terms of eco-tourism development.

There is a continuous development along this section of the city across the Padsan River due of its proximity to the Robinsons' Mall complex in neighboring San Nicolas town and being along the McArthur Highway and Laoag Airport Road characterizing the ribbon-type/linear development.

Heritage Conservation

City of Laoag is rich in history having been part of an extensive, largely coastal northwestern region of the Ilocano ethnic group engaged in the barter trade of gold with merchants from Japan, China, Malaysia and Indonesia for ceramics and silk during the pre-colonization period. Salcedo's discovery of this northern region led to its naming of "Ylocos" Province meaning "from", and "lo-oc", meaning "cove or bay", thus "people of the bay" comprising the present provinces of Ilocos Sur, Ilocos Norte, Abra and La Union. After Vigan, Captain Juan de Salcedo sailed along the coast of Laoag enroute to Cagayan in 1572.

Laoag was a busy trading port and a closely packed settlement in Ermita Hill with a population numbering more than a thousand when it was discovered by the Spanish, along the north bank of the Padsan River shining like a night beacon for river travelers, thus "light" or "laoag". It was founded in 1850 as one of the early settlements by Augustinian missionaries with a parish dedicated to Saint William the Hermit. By early 19th century, Laoag was a thriving pueblo when the Ilocos Province was split into two provinces of Ilocos Norte and Ilocos Sur by a Spanish Royal Decree on February 2, 1818 with Laoag made the capital town of Ilocos Norte. On June 19, 1965, the municipality status of Laoag was changed into a component city of Ilocos Norte, remaining its capital, proudly called by residents as "Sunshine City".

The natives were resettled in later parts of the 16th century by the Augustinians to the present urban area to improve their living conditions, designing a gridiron pattern with a plaza, church, convent and belltower in the center to comply with King Philip's 1573 Law of the Indies. The houses were constructed in marked locations while relatives were grouped in the barrios assigned with a patron saint.

The City of Laoag has a panoramic visual approach from southern Ilocos through Gilbert Bridge renamed Marcos Bridge that crosses the Padsan River towards Aurora Park, formerly Plaza de Alfonso XII, the city's central plaza. The grid streets of the urban core were intended to be walkable or travelled by horse-driven calesas. Around Aurora Park are important Spanish and American period-civic and religious buildings, namely, Ilocos Norte Provincial Capitol Building, Museo Ilocos Norte, Marcos Hall of Justice, Laoag City Hall (formerly Casa Tribunal (1861), Ilocano Heroes Hall, the famous sinking belltower, St. William's Parish Church, Laoag Central Elementary School and Holy Spirit Academy of Laoag.

The City of Laoag has mapped 118 built heritage (*Figure 1. 31*) structures in both urban and rural barangays, most of them concentrated in the urban area (población) (*Figure 1. 32*). The city's-built heritage is classified into structures of Spanish, American, pre-war, and post-war periods up to the 1960s. They are typified as religious, monuments, public, civic and school buildings, and ancestral houses holding different values of significance along architectural, historical, socio-cultural, political and technological aspects. A collection of heritage structures is found in Barangays 10 and 11 with many ancestral houses still standing along Rizal Street. The oldest existing is the Samonte House built in 1898 located in Brgy. GomBurZa.

The built heritage structures are in various states of conservation, from well-maintained, moderately maintained, improperly repaired, partially renovated or re-modelled, needing repairs and deteriorated. RA 10066, the National Cultural Heritage Law mandates the City of Laoag to protect and conserve its rich cultural and natural heritage. The originally wide and spacious Church-atrium-belltower complex has several modern structures built within it in the last fifty years, notably McDonalds. There is no heritage core that is purposely delineated by an ordinance to encompass the dominant heritage structures and most of the ancestral houses, and define its boundaries, identify the compatible adaptive re-use projects allowed, and establish a set of conservation guidelines setting forth the architectural design such as dominant style adopted in harmony with existing character of heritage structures, height, signage, materials and setback, among other aspects. The absence of a defined heritage core has affected Aurora Park where the approach to and exit from the city has become busy and dangerous around it becoming unsafe for pedestrians and people intending to relax in the park.

After more than 300 years, Spanish-influenced intangible transformations are still practiced in the city such as cultural festivals and religious traditions intended to preserve the city's cultural heritage as well. The city celebrates the month-long *Pamulinawen* Festival every February in honor of its patron Saint William the Hermit highlighting its culture and heritage through arts and crafts, cuisine, comedia, parades along Rizal Street that wind up in front of the Provincial Capitol and street dancing showdowns in front of the Laoag City Public Market and Commercial Complex.

The City of Laoag is endowed with a combination of natural heritage sites and landscape and coastal resources that include the semi-arid coastal La Paz Sand Dunes in Barangay La Paz (32-C), declared national geological monument and a coastline of 12 kilometers that stretches from Calayab (37) in the south to Caaocan in the north spanning other seven coastal barangays. The coastal areas provide livelihood for the residents and are valued for their socio-economic benefits especially along tourism, historical and cultural significance. The city has a generous share of land formations, water resources, flora and fauna. Forested hills and mountains with elevations ranging from ten (10) feet to 52 feet above sea level can be found in the northeast west of Dibua (59) while the highest among the mountain peaks is 183 feet above sea level in Barangay Bacsil North (56-A). Water bodies include the Padsan River that divides the city lengthwise from east to west, the Bacarra River providing boundary with the Municipality of Bacarra, and their tributaries, the Mangato and Daorao Creeks and small streams that all drain towards the West Philippine Sea.

Laoag is a proud home to personages who have contributed to the history of the province and the country, among them Roque Ablan, Sr., Santiago Fonacier, Tomas Fonacier, Gen. Fidel V. Segundo, Anastacia Giron-Tupas, Fred Castro and Diosdado Peralta.

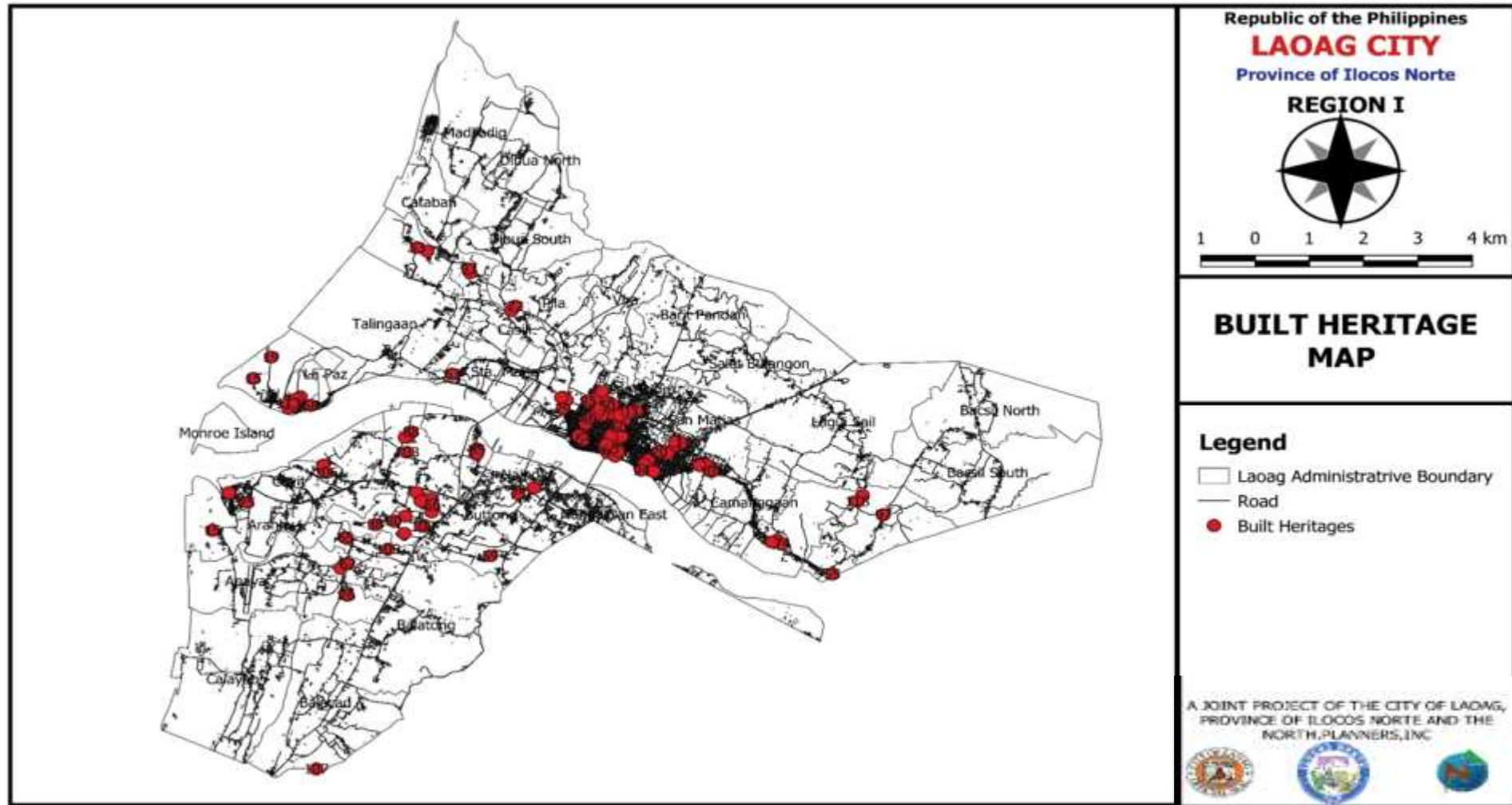


Figure 1. 31. Built Heritage in the City of Laoag



Figure 1. 32. Built Heritage in the Urban Area of City of Laoag

CHAPTER 2

VISION, MISSION, GOALS, OBJECTIVES AND STRATEGIES

I. INTRODUCTION

The Comprehensive Land Use Plan of City of Laoag 2020-2029 was prepared pursuant to Republic Act 7160 or the Local Government Code which mandates the Local Government Units “to prepare their comprehensive land use plans and enact them through zoning ordinances (Section 20).”

The Plan shall pave the way in pursuit of Laoaguenos’ vision of realizing BARO A LAOAG.

II. VISION

BARO A LAOAG that empowers its people through inclusive governance to sustain economic growth and vibrant culture while preserving the environment.

III. MISSION

The City of Laoag shall endeavor to develop empowered citizens who value environment and culture, support agro-industrialization and adopt state-of-the-art technologies towards global competitiveness.

IV. GOALS, OBJECTIVES AND STRATEGIES

Goals of the Ecosystem Sector

Based on the Goal Achievement and Ecosystem Sectoral Analyses, the following goals were formulated:

Goal 1: minimize disaster risks by ensuring the safety of the people;

Goal 2: improve and sustain good ambient air quality;

Goal 3: improve the quality of water bodies of Laoag City; and

Goal 4: enrich the forest and coastal biodiversity of Laoag City.

Objectives of the Ecosystem Sector

In order to achieve those goals of the Ecosystem Sector by 2029, the City of Laoag aims to:

1.1: reduce risk caused by flooding, earthquake and COVID-19;

1.2: decrease the number of families, critical point facilities and lifeline utilities located in disaster prone areas by 20%;

1.3: enhance the coping capacity of the economic sector;

2.1: decrease the level of PM₁₀ and PM_{2.5} in the air by 10%;

3.1: improve and maintain the water quality;

4.1: increase the forest biodiversity by 20%; and

4.2: increase coastal biodiversity by 20%.

Strategies of the Ecosystem Sector

The following corresponding strategies are keys in achieving the objectives of the Ecosystem Sector:

1.1.1: construct or upgrade flood control infrastructures in high-risk areas;

1.1.2: comply strictly with the Building Code and COVID-19 protocols in new buildings;

1.2.1: relocate families that are living in the low-lying areas;

1.2.2: install better drainage system;

1.3.1 formulate local economic development strategy with “green jobs” component;

2.1.1: establish greenbelt in the urban areas;

3.1.1: monitor regularly the different parameters of water in the City of Laoag;

3.1.2: impose upon the residents the policy of zero disposal of wastes to rivers and creeks;

3.1.3: develop a water treatment facility system for the liquid wastes;

4.1.1: designate a forest protection and production areas;

4.1.2: plant fruit-bearing trees;

4.1.2: monitor strictly the forest in the area;

4.2.1: protect mangrove areas and replant mangrove if damage occurs; and

4.2.1: implement zoning in coastal areas and coastal water.

Goals of the Social Sector

Based on the Goal Achievement and Social Sectoral Analysis, the following goals were formulated:

Goal 1: empower the people by ensuring equitable access to education;

Goal 2: empower the people by promoting good health.

Goal 3: empower the people by giving them access to affordable and safe housing;

Goal 4: empower the people by uplifting their well-being thereby improving social and economic development;

Goal 5: empower the people by allowing them to live in safe, peaceful and orderly community; and

Goal 6: empower the people by promoting healthy lifestyle and providing accessible sports and recreation facilities.

Objectives of the Social Sector

In order to achieve those goals of the Social Sector by 2029, the City of Laoag aims to:

- 1.1 increase literacy rate from 98% to 100%;
- 1.2 achieve 100% enrollment participation rate of students from Laoag for kindergarten, primary and secondary education so that Laoag shall retain its status as the educational center of Ilocos Norte;
- 2.1. decrease crude death rate from the average of 9 to 5;
- 2.2. eliminate animal bite in the top 5 leading causes of mortality;
- 2.3. address concern on malnourishment so that there will be no more malnourished children;
- 2.4: make more available and less costly burial plots;
- 3.1. accommodate the increase in population and reduce housing backlog by 50%;
- 4.1. increase the participation of the inhabitants, especially women, children and elderlies in programs focused in improving their well-being by 10%;
- 5.1. reduce the incidence of fire and crimes by 50%; and
- 6.1. increase the number of barangays having sports/recreation facilities by 50%.

Strategies of the Social Sector

The following corresponding strategies are keys in achieving the objectives of the Social Sector:

- 1.1.1. encourage innovation and train teachers to be technologically adept to prepare them to face the new normal;
- 1.1.2. prepare for natural hazards by relocating schools with high exposure to hazards and by availing of technology and improving internet capability;
- 1.2.1. increase the number of teachers and classrooms in accordance with the projected enrollment and required ratios;
- 1.2.2. recommend expansion of tertiary-level schools that have not attained the standard area requirement;
- 2.1.1. construct more barangay health stations and hire more medical personnel to comply with the minimum requirements;

- 2.1.2. provide low-cost but effective medicine and medical equipment especially those related to pneumonia, hypertension and diabetes mellitus;
- 2.1.3. provide incentives to healthcare professional to encourage them to work in Laoag;
- 2.1.4. encourage the construction of tertiary-level hospital for specialized treatment;
- 2.2.1. implement aggressive programs such as dog impounding, tagging and vaccination subject to laws and regulations in coordination with concerned departments such as City Veterinary Office;
- 2.3.1. provide more feeding programs with balanced meals and provision of vitamins for children below six (6) years old;
- 2.4.1. construct additional city cemetery or crematorium;
- 3.1.1. relocate low-income Laoageños whose houses are exposed to hazards such as flood;
- 3.1.2. for those who were displaced, may avail of government programs such as community mortgage program with assistance from the LGU;
- 3.1.3. subsidize housing for the poorest families who still could not afford the available financial schemes for homebuyers;
- 3.1.4. allocate land for socialized housing;
- 4.1.1. encourage women, children and elderlies to participate in programs such as counseling and skills training for them to be productive members of the society;
- 4.1.2. construct additional day care centers to accommodate increase in population;
- 4.1.3. provide adequate medicine and vitamins for senior citizens;
- 4.1.4. allocate budget for the affected families/individuals by natural hazards;
- 5.1.1. hire more firemen, policemen and jail personnel as per requirement;
- 5.1.2. construct additional police substation for police visibility in barangays were there are more incidence of crimes;
- 5.1.3. provide more programs for reformation of CICLs to allow reintegration in the society;
- 5.1.4. expand the area of police headquarters to assist clientele better;
- 5.1.5. provide more vehicles for policemen; and
- 6.1.1. construct basketball courts or any other sports or recreation facilities in every barangay.

Goals of the Economic Sector

Based on the Goal Achievement and Economic Sectoral Analyses, the following goals were formulated:

Goal 1: increase agricultural productivity and income;

Goal 2: establish a globally competitive agribusiness system;

Goal 3: establish a globally competitive agro-industrial hub; and

Goal 4: become an internationally recognized tourism destination in South East Asia

Objectives of the Economic Sector

In order to achieve those goals of the Economic Sector by 2029, the City of Laoag aims to:

- 1.1. ensure food security while protecting the environment;
- 2.1. increase agricultural production and income;
- 3.1. promote sustainable agricultural practices;
- 4.1. increase the number and scale of commercial establishments;
- 5.1. increase the level of employment generated by the subsector;
- 6.1. promote sustainable commerce and trade practices;
- 7.1. increase the number and scale of industrial establishments;
- 8.1. increase the level of employment and income generated by the subsector;
- 9.1. increase the number of employment and incomes in the subsector; and
- 10.1. create a tourism identity.

Strategies of the Economic Sector

The following corresponding strategies are keys in achieving the objectives of the Economic Sector:

- 1.1.1. enhance farming capabilities through wider access to agricultural mechanization and sophisticated farming methods, such as multiple cropping, crop diversification, use of high yielding, climate resilient, pest and disease resistant varieties;
- 2.1.1. ensure Laogeños' accessibility to agricultural mechanization and sophisticated farming methods;
- 2.1.2. promote the development of sustainable domestic and foreign markets for agricultural commodities in order to enhance access and generation of income;

- 2.1.3. improve agricultural infrastructures for production, processing and marketing of farm products;
- 2.1.4. establish scaled up linkages between farmers, processors and distributors of agricultural products;
- 2.1.5. explore and develop new markets (local, national and international) for farm products;
- 2.1.6. provide additional support to farmers in terms of trainings, credit and finance facilities;
- 2.1.7. improve information and communication facilities for better access to markets;
- 2.1.8. develop livelihood diversification for farmers to improve their incomes;
- 2.1.9. encourage private sector investment in storage and post-harvest technologies and facilities;
- 2.1.10. introduce risk transfer instruments;
- 3.1.1. encourage and promote organic farming for environmental protection;
- 3.1.2. introduce climate resilient agricultural practices;
- 3.1.3. encourage and promote organic farming for environmental protection;
- 4.1.1. establish an effective incentive scheme to attract local and foreign investments in key and supporting industries - (OFW's and OFW families);
- 4.1.2. improve competitiveness and ease of doing business;
- 4.1.3. establish adequate and effective support programs for small and medium scale enterprises;
- 4.1.4. establish an adequate infrastructure support (transportation, information and communication facilities);
- 5.1.1. identify labor market needs and develop the appropriate skills to match industry requirements;
- 5.1.2. invest in human capital development such as education, training, healthcare and other social services to suit the needs of the agribusiness;
- 5.1.3. establish sufficient infrastructure support -transportation, information and communication facilities;
- 6.1.1. encourage eco-friendly and energy-efficient production technologies and facilities;
- 7.1.1 attract local and foreign investments in key and supporting industries - (OFW's and OFW families) by establishing an effective incentive scheme;
- 7.1.2. encourage competitiveness and ease of doing business;

- 7.1.3. establish support programs for small and medium scale enterprises;
- 8.1.1. specify labor market needs and develop the appropriate skills to match industry requirements;
- 8.1.2. support the development of human capital such as education, training, healthcare and other social services to suit the needs of the agribusiness;
- 8.1.3. establish an adequate infrastructure support - transportation, information and communication facilities;
- 8.1.4. use eco-friendly and energy efficient production technologies and facilities;
- 9.1.1. promote intensively tourism packages through face-to-face or online platforms;
- 9.1.2. coordinate and strengthen the linkage between stakeholders (tourist operators, transport operators, hotel and lodging facilities and food business owners);
- 9.1.3. promote the city as an agri-tourism, eco-tourism, religious tourism, food tourism and cultural tourism destination;
- 9.1.4. encourage community participation in creating tourism products and services;
- 9.1.5. establish tourist/visitor's center; and
- 10.1.1 preserve, restore, rehabilitate and maintain historical landmarks and heritage sites.

Goals of the Infrastructure Sector

Based on the Goal Achievement and Social Sectoral Analysis, the following goals were formulated:

Goal 1: generate sustainable, efficient, comfortable and affordable transportation system in the city;

Goal 2: Secure the availability of safe and potable water in both the rural and urban barangays of the city;

Goal 3: Design and construct enough and quality drainage infrastructure, wastewater treatment and disposal;

Goal 4: Tap and maximize renewable opportunities as power source;

Goal 5: Establish advance and excellent communication services for the city; and

Goal 6: Construct environment-friendly infrastructures.

Objectives of the Infrastructure Sector

In order to achieve those goals of the Infrastructure Sector by 2029, the City of Laoag aims to:

- 1.1: enhance the walkability in the urban areas of the city;
- 1.2: improve existing mode and situation of public transportation in the city;
- 1.3: improve the traffic situation in the urban areas of the city;
- 2.1: increase the coverage of waterworks system in all barangays by 50%;
- 3.1: extend irrigation system services to unserved barangays by 20%;
- 3.2: reduce flooding incidence in highly susceptible areas by 50%;
- 4.1: prioritize the use of renewable energy sources;
- 4.2: decrease the power outage incidence by 50%;
- 5.1: improve the communication facilities and services for community updates of information by 30%;
- 5.2: increase internet connectivity services to all public and private sectors by 100%;
- 6.2: heighten the implementation of the city's waste management system;
- 6.4: advocate high risk areas as no build-zone; and
- 6.5: sustain and maintain a clean and green environment to balance the effect of urbanization on the environment.

Strategies of the Infrastructure Sector

The following corresponding strategies are keys in achieving the objectives of the Infrastructure Sector:

- 1.1.1: oblige the large commercial corporations and establishments along roads to provide crossing for pedestrians;
- 1.2.1: foster the use of electronic vehicles, bike lane development and other green and smart transportation;
- 1.3.1: create off-street parking in the Central Business District for the minimization of traffic backlogs;
- 1.4.1: update/create and implement comprehensive Traffic Management Plan;
- 1.4.2: upgrade existing weathered rural road networks and airport equipment to ensure safety;
- 2.1.1: expand water connections in unserved barangays;
- 2.2.1: develop surface water as source and find other possible sources to augment water supply;
- 3.1.1: extend irrigation facilities to areas with inadequate irrigation;

3.1.2: draft and implement ordinance on rainwater harvesting to regulate run off in the city;

3.2.1: construct additional drainage waterways and structures in flood-prone areas;

3.2.2: rehabilitate and improve all existing drainage structures and water system;

4.1.1: prioritize the use of solar energy;

4.2.1: engage in sustainable approach to rural electrification;

5.1.1: enlarge cell-site coverage to reach unserved barangays;

6.1.1: craft an Air Quality Management Plan implemented through ordinance in consonance with Clean Air Act;

6.2.1: establish a better solid waste management policy (composting facilities and Materials Recovery Facility [MRF]);

6.3.1: require waste-water treatment/management to projects, activities and developments that pose danger to the environment;

6.4.1: oblige waste-water treatment/management to projects, activities, and developments considered dangerous to the environment; and

6.5.1: impose an improved solid waste management (composting facilities and MRF).

Goals of the Special Areas

Goal 1: improve the local economy by engaging in environment-friendly agricultural, commercial and industrial activities;

Goal 2: maximize physical urban development and aesthetic values; and

Goal 3: maximize biodiversity and cultural values.

Objectives of the Special Areas Sector

In order to achieve those goals of the Special Areas Sector by 2029, the City of Laoag aims to:

1.1: act as the nexus of green technology and innovation in the north in the next ten (10) years;

1.2: ensure air, land and water resources are clean in the next ten (10) years, with the help of the City Environment and Natural Resources Office (CENRO);

2.1: implement planned and balanced developments in four quadrants of the city in the next ten (10) years, through the efforts of the City Planning and Development Office (CPDO);

2.2: ensure that the city achieves visual quality, character and overall quality of life in the city in the next ten (10) years, through the Laoag Heritage Conservation and Urban Development Council;

3.1: heighten residents' awareness and appreciation, and pride of place and heritage in all-ages, levels and sectors of the society in the City of Laoag in the next three (3) years, through the Department of Education (DepEd) in coordination with the city government of Laoag;

3.2: enact Special Zoning Ordinances and related ordinances for the protection and conservation of the tangible and intangible cultural resources and natural resources of the city in the next three (3) years; and

3.3: enact Special Zoning Ordinances and related ordinances to protect and conserve cultural and natural resources of the city in the next three (3) years.

Strategies of the Special Areas Sector

The following corresponding strategies are keys in achieving the objectives of the Special Areas Sector:

1.1.1: implement wastewater and septage treatment plant project in the next five (5) years, through the City Engineering Office in coordination with the CENRO;

1.1.2: implement green infrastructure practices for storm water and flood mitigation projects such as water detention ponds, bioswales, vegetative swales, infiltration trenches and water detention ponds in the next five (5) years, through the City Engineering Office in coordination with Department of Public Works and Highways (DPWH) and City Disaster Risk Reduction and Management Office (CDRRMO);

1.1.3: introduce innovations in the Materials Recovery Facility (MRF) that will process recyclable materials for marketing to manufacturers as raw materials for new products, and in the system of garbage collection in the next three (3) years, through CENRO;

1.1.4: endorse the adoption of public e-jeeps and e-tricycles while establishing a multi-modal transport hub for a clean, convenient, and sustainable public transport system, through CENRO;

1.1.5: implement the Laoag City Sustainability Training Center for the conduct of traditional industries and livelihood trainings for gainful employment of residents in their own communities especially catering to community tourism, through the City Social Welfare and Development Office (CSWDO);

1.2.1: implement the sanitary landfill project in the next three (3) years, through the City Engineering Office in coordination with CENRO;

1.2.2: invite investors in green industries, i.e. clean energy (solar, mini-hydro, wind), organic farming, sustainable fishing, (aquaculture), waste reduction, pollution control, green transportation, etc. within the next ten (10) years, through the Office of the City Mayor;

1.2.3: enact a Local Green Building Code to require rainwater harvesting, urban and/or roof gardens, permeable pavements, among others, in the next three (3) years, by the City Council;

1.2.4: establish demo/experimental/model farms for innovative/sustainable agricultural practices, i.e. permaculture, hydroponics and aquaponics, urban agriculture, agro-forestry and food forests, biodynamic farming, natural animal raising, etc., through the City Agriculture Office;

2.1.1: enforce strictly the provisions of PD 1096- The National Building Code of the Philippines complying with architectural requirements including provision for parking and setbacks, and structural requirements to ensure that buildings are safe and sound in the next ten (10) years, through the City Engineering Office;

2.1.2: widen roads and provide sidewalks and bike lanes for a safe, walkable and bikeable city in the next five (5) years, through the City Engineering Office in coordination with the DPWH;

2.1.3: create a traffic plan re-routing the entrance and exit to the city to get in and out of the city efficiently and fast in the next three (3) years, through the City Engineering Office in coordination with the City Traffic Management Office;

2.1.3: create a traffic plan in the next three (3) years, through the City Engineering Office in coordination with the City Traffic Management Office;

2.1.4: adopt a development scheme roughly in four quadrants of the city, i.e., establish a north growth eco-tourism development node in the former garbage dumpsite; east development growth node with the Ermita Hill Native Settlement as attraction; Laoag City Special Economic Tourism Zone as stimulus; and the west growth development node with the government center as main magnet, in the next ten (10) years, through the CPDO;

2.1.5: propose a multi-modal transport hub in the west for a systematized, organized traffic and transit in the next five (5) years, through the CPDO in coordination with the City Traffic Management Office;

2.2.1: review and approve the development plan of proposed government center complex and relocation site in the next three (3) years, by the CPDO, City Engineering Office and Laoag Heritage Conservation and Urban Development Council;

2.2.2: review and approve development plan for the proposed public market and relocation site in the next three (3) years, by CPDO, City Engineering Office and the Laoag Heritage Conservation and Urban Development Council;

2.2.3: introduce partial pedestrianization of the Heritage Zone and complete pedestrianization around Aurora Park and street going to the Church-convento-belltower-atrium complex in the next three (3) years, through the Laoag Heritage Conservation and Urban Development Council;

2.2.4: formulate design guidelines for the urban design and development of the city in the next three (3) years, through the Laoag Heritage Conservation and Urban Development Council;

2.2.5: propose appropriate cultural activities in places and structures that will house them for the residents to enjoy a vibrant cultural life, in the next ten (10) years, through the City Tourism Council in coordination with the Laoag Heritage Conservation and Urban Development Council;

2.2.6: create pocket parks with public art in all parts of the city in the next five (5) years through the City Engineering Office in coordination with the CENRO and Laoag Heritage Conservation and Urban Development Council. The theme of the public art may include the history and values of the city becoming cultural landmarks in themselves, transforming public spaces into places that can lift the spirit and connect with the city;

3.1.1: make a GIS inventory map of the built heritage structures in the urban area, through the City Tourism Office in coordination with the CPDO;

3.1.2: create and print coloring books and workbooks on built tangible and intangible and natural heritage resources of the city for grade school pupils, and inclusion of inabel weaving and other traditional crafts as electives in senior high school, through the DepEd City Division in coordination with the City Mayor's Office and City School Board;

3.1.3: gather senior citizens and elicit oral history of the different places of the city at various periods of history to add to the intangible heritage resources of the city, through the City Tourism Office in cooperation with the City Office of Senior Citizens Affairs;

3.1.4: conduct tour-guiding trainings for local residents, tricycle and calesa drivers, shop/stall/store owners, college students, teachers, housewives and other stakeholders, through the City Tourism Office;

3.1.5: conduct a seminar on heritage conservation of the city's resources for the City Councilors and Section Chiefs, through the City Tourism Office in coordination with the Mayor's Office and Vice-Mayor's Office;

3.2.1: undertake documentation of the major heritage structures, followed by the heritage houses, and come up a Statement of Significance of each structure, through the City Tourism Office in cooperation with the Department of Architecture of DWCL and NWU;

3.2.2: enact a Special Zoning Ordinance and related ordinances to protect and conserve other built heritage resources in other barangays of the city in the next three (3) years, by the City Council. Said Special Zoning Ordinance shall delineate Heritage and Buffer Zones in the urban area, specifying allowable and incompatible uses and Design Guidelines,

3.2.3: create a Laoag Heritage Conservation and Urban Development Council, through the Office of the City Mayor. Said Council shall review and recommend approval, disapproval or give recommendations for compliance prior to approval, all development plan applications in the Heritage and Buffer Zones, Ermita Hill, La Paz and Calay-ab Sand Dunes, eco-tourism projects and urban design of the city; and the same shall be composed of the City Mayor as Chair; the City Tourism Committee Chair as Vice-Chair; sectoral members coming from each of the UAP and PIA Chapters, City Chamber of Commerce, City Tourism Officer, BFP, PICE,

IIEE, INEC, Laoag City Water District, City Environment Committee Chair; and City Engineer as Secretariat;

3.2.4: delineate a Heritage and Buffer Zones as a vibrant walkable “small district” within the city center to provide appropriate context and setting for the major heritage structures of the city, through the City Engineering Office in coordination with the City Planning and Development Office and City Tourism Council;

3.2.5: enact a Special Zoning Ordinance to Protect and Conserve the La Paz and Calay-ab Sand Dunes by the City Council; said ordinance shall be delineating the protected zones and specifying the allowable and incompatible uses and activities. Said ordinance and related ordinances to preserve and conserve other natural heritage resources of the city to be enacted in the next three (3) years;

3.3.1: undertake the cultural mapping for tangible immovable and immovable, intangible and natural heritage resources, through the City Tourism Office and sectoral representatives (DepEd, CHED/academe, CSOs, youth, church, OSCA, City Section Offices, SKF, ABC, etc.), with NCCA under its Philippine Registry of Cultural Property (PRECUP) program established through Article V Section 4 of the National Heritage Act of 2009, otherwise known as Republic Act 10066;

3.3.2: delineate a representative portion of Ermita Hill to recreate as the earliest native settlement in the city for heritage tourism, playing up the story of the nightlamps from the settlements to guide river travelers in nearby Padsan river, thus, the name “laoag” (light); this shall be done by the City Tourism Office in coordination with the CPDO and City Engineering Office;

3.3.3: promote, through the City Tourism Office, to highlight the intangible heritage resources of the city based from the completed Cultural Mapping and attract a continuous flow of tourists by creating year-round festivals in addition to the Pamulinawen Festival,;

3.3.4: promote the La Paz (32-C) and Calay-ab (37) Sand Dunes and sea coast as sustainable tourism attractions by training and engaging barangay residents in the management of these natural resources, through the City Tourism Office in coordination with CENRO;

3.3.5: promote the forested hills and mountains as controlled ecological-tourism attractions by training and engaging barangay residents in the management of these natural resources, through the City Tourism Office in coordination with CENRO;

3.3.6 establish more museums to include private home museums, interactive children’s museum, among others, in addition to the Museo Ilocos to promote tangible movable and intangible heritage resources of the city, through the City Tourism Office in cooperation with the National Museum and private homes with historical significance..

CHAPTER 3

THE CONCEPT/STRUCTURE PLAN

The Concept/Structure Plan shall be the ten-year framework that shall guide the development and/or redevelopment of land in the City of Laoag, providing the patterns of spatial development that the city shall undertake. It is expressed by diagrams of proposals for development/redevelopment areas, growth centers, layout of primary infrastructure network and main transportation routes, conservation and protected areas, and other key features for managing the direction of development. The land use proposals may alter the distribution pattern of existing land uses but they are made with the ultimate aim of achieving rational and optimum land utilization. These proposals embodied in the Structure Plan are based on meeting the sectoral goals, objectives and strategies framed in the Comprehensive Land Use Plan.

A spatial strategy, on the other hand, provides the strategic policies for the development and use of the land in the city. It is an abstract conception of the desired pattern of the city's physical development realized through creative combination of built-up areas and open spaces. This concept organizes and guides the location and allocation of spaces for different land-using activities, the regulation of public and private investments, and the preservation of resources that must be protected against damaging human intrusion and other agents of destruction.

I. SETTLEMENT PATTERNS

A. Urban Core/Poblacion Area

1. *Existing Settlement Pattern: Grid Development*

The City of Laoag is a wide spreading land bisected into two parts by the powerful Laoag River. The population is distributed over this wide area in 80 barangays. The larger land contains the central urban area, the original growth node. The población was originally laid out in rectangular street blocks from east to west forming approximately 450 street blocks in varied sizes which were subsequently divided into barrios, each named after a patron saint. This pattern expanded from a rectangle where the plaza, church, convent, belltower, "tribunal" and other church and civic buildings were erected.

Currently, the settlement pattern in the area follows the same grid development pattern, characterized by rectangular pattern of blocks defined by parallel and intersecting road network. The city's urban core is resting on a generally flat/level terrain. This layout provides easy access to plots and structures.

2. *Proposed/Planned Development: Continuation of Grid Development*

The existing settlement pattern shall continue, expanding towards the periphery- westwards, northwards, eastwards, southwards and southeast across Laoag River. With the identification of proposed major growth areas in five (5) nodes of the city, the centers of these growth areas shall be laid out in a grid development pattern. The existing configuration of the urban area provides a reference point for the definite location of proposed growth centers in its

peripheries. Moreover, development in the urban area has already taken a definite shape and pattern, thus, shall serve as blueprint for the physical layout of development in the proposed growth centers.

Outside and around the city's urban core is the rural area where settlement patterns are less defined but generally follows the linear/ribbon/strip and nucleated development, characterized by a radial and circumferential system of settlement. Generally, built-up areas/settlements in these areas are along main arterial barangay roads, city/provincial roads, national highways and around a designated community center.

B. General/Citywide Area

1. Existing Settlement Pattern: Combination of linear/ribbon/strip and nucleated development

a. Rural Area (Rural Barangays)

The rural area (rural barangays) has settlement patterns that are less defined but generally follows the linear/ribbon/strip and nucleated development. The road system is radial or circumferential and that's where the built-up areas/settlements are found, too - along main arterial barangay roads, city/provincial roads, national highways and around a designated community center, becoming the "urban section" of that rural area.

b. The Urban Core in Relation to Identified Growth Centers (Nodes)

The urban core or the city proper serves as the government, commercial, institutional and communications center of the whole city. It is linked with the growth centers including their influenced barangays, by a radial/circumferential road system. The city proper and those neighboring rural barangays and growth centers (nodes) form a settlement pattern similar to that of a nucleated development pattern, wherein there is an urban area which serves as the major core, functioning as a central point of activity and providing specialized services and facilities while the nodes (urbanizable barangays/areas) around it support this major center as its influence area or captive market providing neighborhood facilities and services to their respective areas or influence.

2. Proposed Settlement Pattern: Combination of Linear/ and Radial Circumferential Pattern

a. Rural Area (Rural Barangays)

There is a vast supply of potential buildable areas for expansion and growth offering a lot of alternatives in choosing or planning for spatial development, but existing settlement patterns is largely determined by its road network. For the City of Laoag, the best option is to continue the existing settlement pattern in the rural area on a regulated scale. The ribbon/linear type of settlement will be continued; however, the radial/circumferential system will also be encouraged. Continuing the ribbon/ linear system ensures easy access to facilities, goods and services while the radial/circumferential system which is related to nodal/central type of development will bring about a more efficient and effective development since the

road system leads to low-density areas or anchor points such as a commercial center or housing project.

b. The Urban Core in Relation to Identified Growth (Nodal) Centers

At present, the urban core or city proper serves as the government, commercial, institutional and communications center of the whole city. It is linked to the rural barangays by road extensions that developed into radial/circumferential road systems.

The urban core shall serve as the major nucleus functioning as a central point of activity, providing specialized services and facilities, with more nuclei (nodes/urbanizable barangays/areas) being created radiating from it. The city proper, neighboring rural barangays and growth centers (nodes) in the west, north, east, south and southeast shall form a settlement pattern resembling that of a nucleated development pattern.

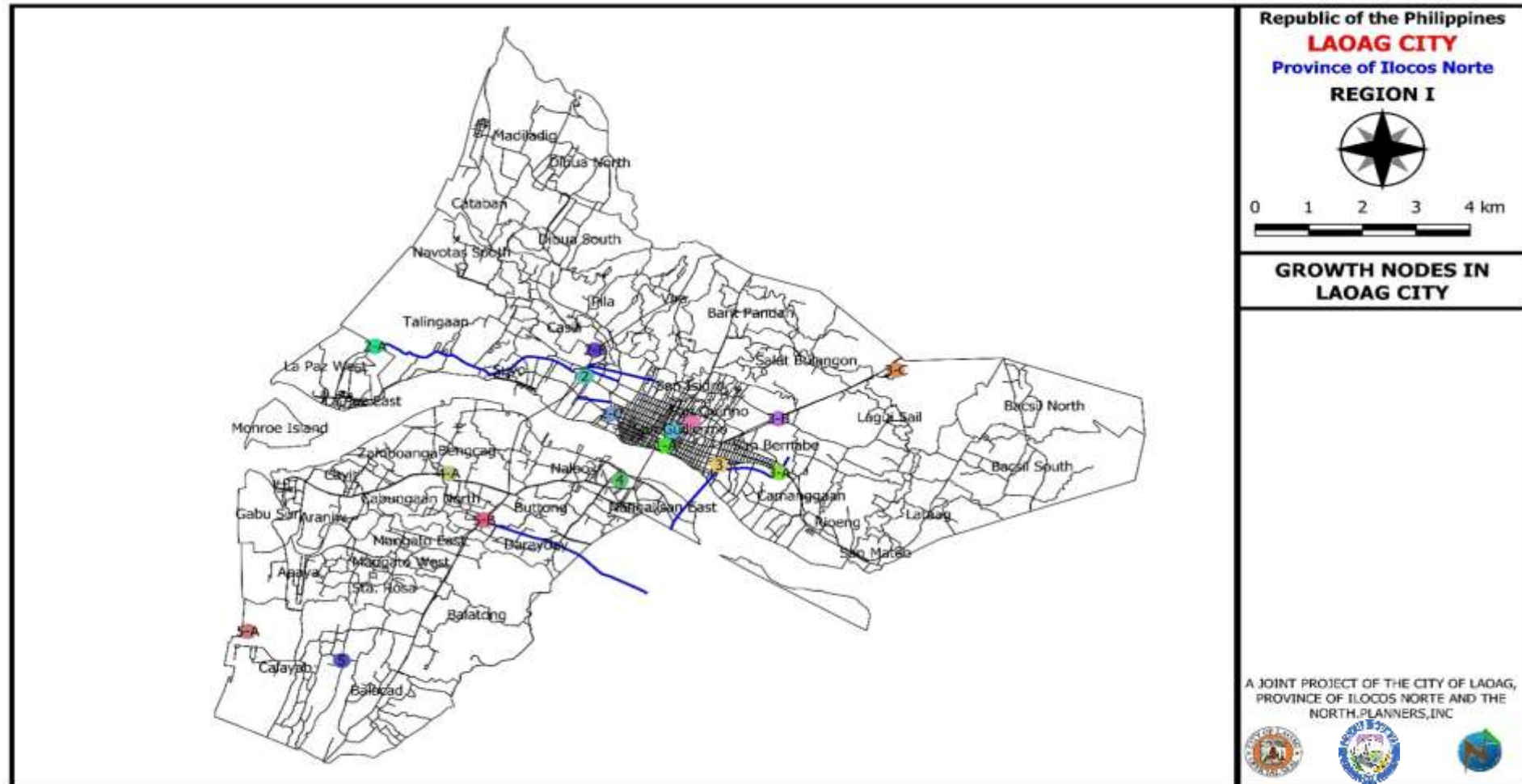


Figure 3. 1. Growth Nodes in the City of Laoag

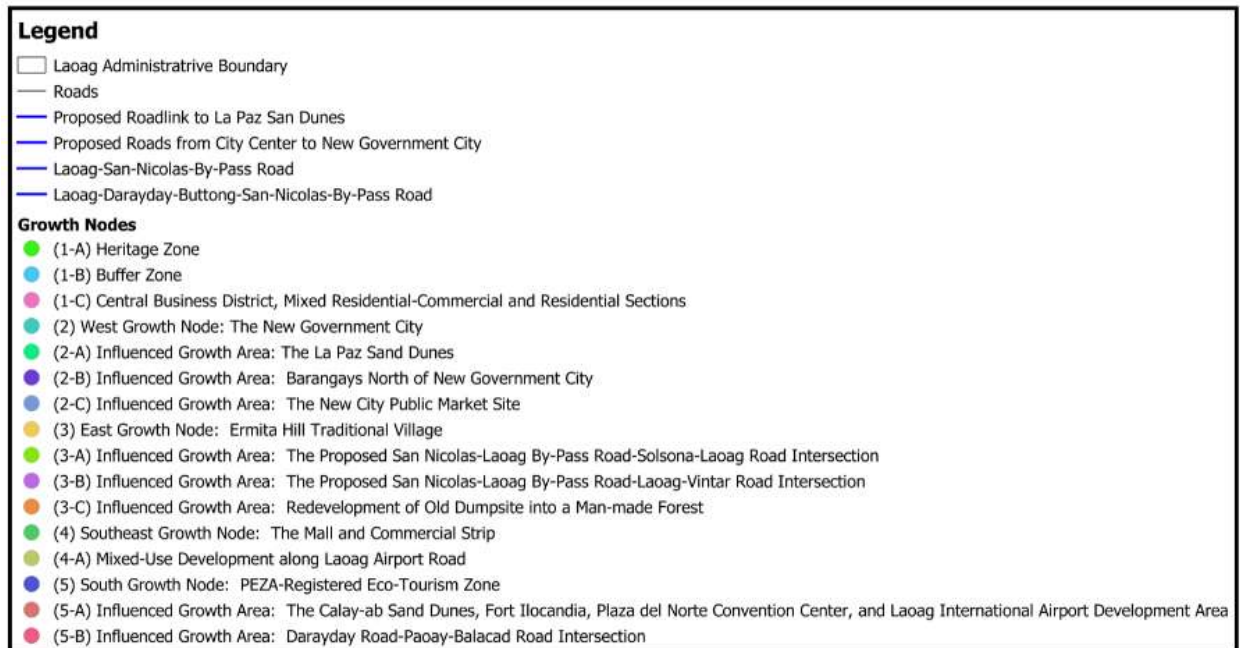


Figure 3. 2. List of Proposed Growth Nodes

II. GROWTH CENTER CONCEPT STRATEGY

The growth center concept strategy shall help the City of Laoag plan for the future by identifying where growth and development can occur and what it shall want that growth to look like, and plan ahead for the infrastructure needed to support that growth. The growth centers are selected on the basis of their potentials, resources, location, accessibility, existing facilities, utilities and physical features, serving as linkage between the rural areas and the urban core.

At the same time, directing future growth to specific areas is a strategy to preserve the character of some parts of the community, including natural/open spaces, historic areas and boundaries that provide a sense of place. Development of these areas shall be integrated for a coordinated and cost-effective planning and implementation of programs and projects. In this strategy, physical development shall be limited to the identified areas taking into account the limited resources of the city and amount of support from the national government to attain the sectoral goals towards the realization of the city’s vision.

Uniform development in all sections of the city shall be assured by assigning growth nodes in the west, north and east, and in the south and southeast across the river of the Central Growth Node. These growth nodes shall function to spread the economic activities, facilities and services to equalize development in key sections of the city, serving their own areas of influence and capturing their own market in support to the Central Growth Node.

A. Central Growth Node: The Heritage Core, Buffer Zone and Central Business District

The urban core/city proper (*poblacion*) shall continue to be the city’s Central Growth Node. Presently, it is serving as the site of the provincial government center as well the commercial, institutional, commercial, educational, recreational and communications center. The Central Business District (CBD), city public

market, major sports center, playgrounds, historical landmarks, clinics and hospitals are located in this area.

Its strategic location makes it appropriate as the urban core of the city. It is traversed by the Manila North Road that is being plied by buses going to Manila, Baguio City and the rest of Luzon area in the South; by buses to the North going to Cagayan Valley and to the neighboring towns to the East.

However, with the increasing need of more spaces for the city government to better serve its population, relocation of the city hall is necessary. Traffic congestion in the urban core created by bustles of activity in the city public market also necessitates transfer in a bigger location where there is ample parking space.

While the urban core shall continue to function as a center of commerce, recreation, tourism and education serving the entire city, nearby towns and provinces and Region 1, defining and delineating it into specific zones will improve its growth, urban design, character, quality and sense of place according to zones' potentials, resources, location, existing facilities, utilities and physical features. Thus, the urban core or the Central Growth Node shall be delineated into three sections: the proposed Heritage Zone, the Buffer Zone or transition zone, and the Central Business District, comprising the commercial, mixed residential-commercial and residential sections.

1. The Heritage Zone

The Heritage Zone shall encompass the city's major heritage structures that include Plaza Aurora, St. William's Cathedral and belltower, the Provincial Capitol, Museo Ilocos, present Laoag City Hall (for adaptive re-use), Heroes Hall, Holy Spirit Academy of Laoag and Laoag Central Elementary School.

2. The Buffer Zone

The Buffer Zone covers the street blocks that immediately surround the Heritage Zone.

3. Central Business District, Mixed Residential-Commercial and Residential Sections

This section of the urban core are all the outer street blocks after the Buffer Zone and constitutes the Central Business District, mixed residential-commercial and residential sections of the city.

B. West Growth Node: The New Government City

The West Growth Node shall be the "new government city" which shall host the new Laoag City Hall, provincial branches of national agencies and related and support land uses. This proposed growth node shall be nucleated by the intersection of Laoag Bypass Road and extension of GomBurZa Street, enabling the development of the city's western section and influencing the peripheral barangays, particularly Barangay La Paz with its famed sand dunes at the western end, and immediate barangays northwards of the Laoag By-Pass Road towards the town of Bacarra. The proposed relocation site of the City Public Market which is midway to the new government city shall be supported by the new government city because of its accessibility with the construction of wide, parallel and

perpendicular road extensions from the urban center for convenient, fast and increased entry and exit points.

1. *Influenced Growth Area: The La Paz Sand Dunes*

The development of a new government city in the western part of the city will influence the development of La Paz Sand Dunes, and this envisioned development is harmonized with the Metro Ilocos Norte Development Plan that identifies Barangay La Paz Sand Dunes as a priority area for development. Whilst the sand dunes will largely remain protected throughout as a natural heritage resource of the city, nature-based tourism-related development is proposed such as private resorts (pods, villas with private pools), activity area (hot-air balloon, horseback riding, fat bike riding, outdoor physical activities); track for off-road activities (dune buggy, dune bashing, quad bike, fat bike); proposed road access and connection; retail commercial (food and beverage, souvenir shops); tourist information center (information kiosk, restroom, waiting area, briefing area); parking area; zorbing area; mixed-used commercial (hostel, accommodation, restaurants, souvenir/specialty shops, and 4-meter easement (perimeter sand boardwalk/seaside rail bike).

2. *Influenced Growth Area: Barangays North of New Government City*

Continuing a little farther north of the proposed new government city shall be a commercial development to support the new city.

3. *Influenced Growth Area: The New City Public Market Site*

The proposed new City Public Market site shall be beside the central terminal. It is midway between the Central Growth Node (City Center) and proposed new government center.

C. East Growth Node: Ermita Hill Traditional Village

The East Growth Node shall be based on the development of the Ermita Hill Traditional Village partly as a reconstructed native settlement to become a cultural tourist attraction, and the rest of the area as reforested hill with tourism amenities. It shall influence the peripheral barangays to engage in traditional crafts and arts to support the cultural tourism strategy for this growth node. Further, the creation of an intersection of existing major arterial roads- the Laoag-Vintar Road and Laoag-Solsona Road with the proposed San Nicolas By-Pass Road will help spur development in the east side of the city and support the Ermita Hill Traditional Village. And farther towards the town of Vintar will be another influenced growth area which is the proposed redevelopment of the old dumpsite into a man-made forest with low-impact tourism amenities.

1. *Influenced Growth Area: The Proposed San Nicolas-Laoag By-Pass Road-Solsona-Laoag Road intersection*

The construction of the proposed San Nicolas-Laoag By-Pass Road that will intersect with Solsona-Laoag Road will be a catalyst in the development of this node. It is expected that this major access will conveniently bring in more tourists to Ermita Hill taking this alternate road from the south.

2. *Influenced Growth Area: The Proposed San Nicolas-Laoag By-Pass Road-Laoag-Vintar Road Intersection*

The construction of the proposed San Nicolas-Laoag By-Pass Road that will intersect with Laoag-Vintar Road will stimulate the development of the existing light industrial development of this area. Any additional light industrial activity in this area is seen as stimulus to the activities in the nearby Ermita Hill Traditional Village.

3. *Influenced Growth Area: Redevelopment of Old Dumpsite into a Man-made Forest.*

Another potential influenced growth area towards east is the proposed redevelopment of the city's old dumpsite into a man-made forest with low-impact tourism amenities, and the nearby hills and mountains as added natural attractions perfect for nature-based tourism. This strategy will create a demand for tourism which is lacking in Laoag at present and will allow this area to grow and develop by itself.

D. Southeast Growth Node: The Mall and Commercial Strip

The Southeast Growth Node shall cover the development of the whole stretch of Laoag Airport Road and the Manila North Road Nangalisan Section up before the Laoag Bridge. The Manila North Road Nangalisan Section shall be allotted for commercial development with a mall before the Laoag Bridge as the central magnet supported by large commercial establishments to serve as seamless spillover of Robinsons Mall complex and commercial establishments in San Nicolas town.

1. *Mixed-Use Development along Laoag Airport Road*

The Laoag Airport Road shall be characterized by mixed-use development such as commercial, commercial-residential, medium and high-density residential (apartments, hotels, condominium units) and institutional. The urban design for this whole length of mixed-used development shall be formulated so as to create an architecturally impressive and organized built-up development from the airport to the city proper.

E. South Growth Node: PEZA-Registered Eco-Tourism Zone

The South Growth Node shall encompass the proposed PEZA-registered Eco-Tourism Zone, with the Fort Ilocandia, Plaza del Norte Convention Center, the Calay-ab (37) Sand Dunes and Laoag International Airport as support amenities. This zone is accessed from the Laoag Airport Road and Laoag-Paoay Road.

The PEZA-Registered Eco-Tourism Zone shall cover 79.2 hectares to be developed exclusively into tourism-related activities. This Special Use Zone shall be co-managed by locally-owned small and medium tourism enterprises having structures built with low- impact designs and practicing sustainable operation methods, and involves the community people for the conservation of the ecology and biodiversity of the area which in return provides the economic incentives to them. This zone shall encompass the area sandwiched between the designated Light Industrial Zone along the Laoag-Paoay Road on one side.

Tourism-related activities that shall be allowed to operate in this zone include eco-resorts, theme parks, eco-camping grounds, yoga retreats, meditation centers, eco-friendly cottages, organic farms, eco-lodges. This type of facilities uses less energy and water, relies on earth-friendly amenities like solar gardens, smart lighting, solar panels and advanced onsite energy, water and waste management systems. Local suppliers for food and materials are used wherever possible, and furniture is handcrafted and produced by local craftspeople. Other sustainability measures include growing fresh produce on-site from organic farming.

c. Influenced Growth Area: The Calayab Sand Dunes, Fort Ilocandia, Plaza del Norte Convention Center, and Laoag International Airport Development Area.

The Calayab (37) Sand Dunes stay protected as a natural heritage resource while nature-based tourism-related activities similar to La Paz (32-C) Sand Dunes development shall be allowed within the periphery of Fort Ilocandia and Plaza Del Norte Convention Center. The expansion and modernization of the Laoag International Airport will improve attraction of the city and province as tourist and business destination and spur growth and development of the surrounding communities. The airport will also create a demand for cargo warehousing. Warehouses shall be located in the area zoned as Light Industrial along the Laoag-Paoay Road, which is ideal for cargo trucks, thus avoid creating traffic along the Manila North Road.

d. Influenced Growth Area: Darayday Road-Paoay-Balacad Road Intersection.

This node located at Brgy. Mangato (38) is envisioned to develop as a support growth area to the PEZA-registered Eco-Tourism Zone which shall be largely commercial with a proposed mall development in the area. This area shall provide the shopping needs of guests, visitors and residents in PEZA-registered Eco-Tourism Zone and in the Calay-ab (37) Sand Dunes, Fort Ilocandia, Plaza del Norte Convention Center and travellers at Laoag International Airport.

III. ROAD NETWORK SYSTEM

The City of Laoag has a radial circumferential road network system. This system is characterized by major radial roads extending from the urban core or Central Growth Node to areas/barangays of influence, the rest of the city and to nearby towns and provinces. This type of road network system shall be maintained for the planning period.

The following are existing radial roads emanating from the urban core:

- Manila North Road to Manila
- Laoag-Allacapan Road to the North
- Laoag-Sarrat Road to the East
- Laoag-Piddig Road and Laoag-Vintar Road also to the East

The Laoag Airport Road, Laoag-Paoay Road and the Manila North Road-Nangalisan section connects the area South of the Laoag River to rest of the city and the province.

The Laoag By-Pass Road which passes through the western section of the city, from the boundary with the Municipality of Bacarra, in barangays in the north to Barangay Bengcag in the south, crossing the Laoag Airport Road, and continues on to the Laoag-Paoay Road, has greatly improved the city's circulation system and diffused traffic in the city's urban core. More significantly, a major intersection of the Laoag By-Pass Road shall be created with the extension of GomBurZa Road from the urban core to serve as the nucleus of the proposed "New Government City".

The following are the proposed arterial roads:

- San Nicolas-Laoag By-Pass Road in the east to connect to Solsona-Laoag Road thence to Laoag-Vintar Road.
- Proposed Darayday Road to connect to Laoag-Paoay Road.

CHAPTER 4

PROPOSED LAND USE

A. LAND USE ALLOCATION MODEL

Considering the vision of City of Laoag in 2029, the proposed general land use paves its way to “BARO A LAOAG”. The land use allocation was based on the priority goals identified by the people of Laoag during a series of stakeholders’ meetings. The goals were then translated into a mathematical optimization model (**Table 4.1**).

Goal 1 is to allocate the land to residential areas to address the projected housing needs as determined in the sectoral analysis. Goal 2 is to minimize environmental cost brought by land conversion. The third goal pertains to minimization of disaster risk considering the six (6) hazards, namely, flood, landslide, storm surge, tsunami, earthquake and COVID-19 pandemic. Goal 4 is maximizing social development by prioritizing areas with low social development index and determining the optimal number of social development sites. Goal 5 is to maximize land suitability taking into consideration the requirements of each land use. Goal 6 which is maximizing economic value is obtained by considering the gross income of commercial establishments and farmers out of the six (6) major crops. And lastly, Goal 7 is maximizing cultural value by preserving the identified heritage sites.

The land use allocation model also set nine (9) initial constraints so that the solution would be feasible and optimal (**Table 4.2**). The first constraint ensures that allocation will not go beyond the total land area of Laoag to be managed. Constraint 2 ensures that the allocation assigned will not consume water beyond the water supply of Laoag. The third constraint ensures that the allocation for the different crop can meet the consumption demand of Laoaguenos. Constraint 4 warrants that at least one (1) social development structure is established within 667 hectares. Constraint 5 ensures that cultural heritage sites can be compatibly assigned residential, institutional or commercial land uses; and natural heritage sites are assigned ecological tourism land uses only. The sixth constraint warrants that social development site and cultural heritage site cannot be assigned at the same area. Constraint 7 sets the minimum space requirements for 2029 on residential (3,811.65 ha), commercial (339.34 ha), social development sites (10.63 ha) and cultural heritage sites (25.75 ha). The eighth constraint warrants that the built-up areas, such as industrial, residential, commercial and institutional, will remain as is. And Constraint 9 ensures that only one land use is assigned in one grid.

Table 4. 1. Mathematical Optimization Model for Land Use Allocation in the City of Laoag

Goal	Objective Function	Optimization		Equation
1	Minimize total area allocation for residential	Minimize	=	$\sum_{g=1}^{ng} land_use_{g,2} * size_g$
2	Minimize environmental cost	Minimize	=	$\sum_{g=1}^{ng} land_use_{g,u} * env_cost_{g,u}$
3	Minimize disaster risk	Minimize	=	$\sum_{g=1}^{ng} land_use_{g,1,2,9,11} * disaster_risk_g$
4	Maximize social development	Minimize	=	$\sum_{g=1}^{ng} social_dev_site_g * social_g$
		Maximize	=	$\sum_{g=1}^{ng} social_dev_site$
5	Maximize land suitability	Maximize	=	$\sum_{g=1}^{ng} land_use_{g,u} * suitability_{g,u}$
6	Maximize economic value	Maximize	=	$\sum_{g=1}^{ng} land_use_{g,3-9} * gross_income_g$
7	Maximize cultural value	Maximize	=	$\sum_{g=1}^{ng} heritage_site_{g,u} * cultural_value_g$

Table 4. 2. Constraints Set for Land Use Allocation in the City of Laoag

No.	Constraint/Target	Equation
1	Land area requirement	$\sum_{g=1}^{ng} land_use_{g,u} * size_g \leq total_land$
2	Water requirement	$\sum_{g=1}^{ng} land_use_g * water_u \leq total_water$
3	Demand per crop	$\sum_{g=1}^{ng} land_use_{g,3-8} * produce_u \geq demand_crop_u$
4	At least one (1) social dev't site per 667 y = 1 + 667*i z = 668 + 667*i	$\sum_{g=1}^{ng} social_dev_site_{g,y,z} \geq 1$
5	Cultural heritage site assigned only to residential or institutional	$heritage_site_g \leq land_{use_{g,11}} + 100 * B$ $heritage_site_g \leq land_{use_{g,2}} + 100 * (1 - B)$
6	Social development site cannot be a cultural heritage site	$heritage_site_g + social_dev_site_g \leq 1$

Table 4.2. Cont...

No.	Constraint/Target	Equation
7	Minimum space requirements per land use	$\sum_{g=1}^{ng} land_use_{g,2} * size_g \geq space_residential$ $\sum_{g=1}^{ng} land_use_{g,9} * size_g \geq space_commercial$ $\sum_{g=1}^{ng} social_dev_site_g * size_g \geq space_social$ $\sum_{g=1}^{ng} heritage_site_g * size_g \geq space_cultural$
8	Built-up areas will not change their existing land use classification	$land_use_{g,1,3,9,10,11} \geq exist_land_use_{g,1,3,9,10,11}$
9	One assignment, one grid	$\sum_{g=1}^{ng} land_use_{g,u} == 1$

B. OPTIMIZATION RESULTS

The land use allocation in City of Laoag for 2029 was facilitated by the use of multiple goal linear programming (MGLP) as a decision-support system. This tool is utilized to provide a science-based solution with the many complementary and conflicting goals of the local government unit.

Table 4. 3 reveals that the prioritized goals of Laoagueños will be achieved in 2029 given the land use allocation provided by Gurobi, an MGLP software. The residential areas would be optimally allocated in 3,811.65 hectares to accommodate the additional populace and relocate families who are living in disaster-prone areas. The environmental cost entailed in land conversion would be reduced to 3,614 from the potential cost of 83,560. The total average disaster risk score of City of Laoag of 63,758 would be minimized to 25,913.80 by allocating safer places to residential, commercial industrial and institutional uses. In order to address the social development backlogs of Laoag, there were sixteen (16) social development sites allocated.

The land suitability would be maximized to 53,618, much higher than lowest potential score of 16,712. This implies that different land uses were placed where they have high suitability. The goal of maximizing economic values of the agricultural and commercial lands would also be achieved. With land use allocated specifically to the seven (7) crops and the commercial establishments, City of Laoag would gain an economic value of Php 3,473,750,528.82. The cultural value of the city would be maximized to a score of 750 by preserving rich natural and built heritage indicated on the map.

Table 4. 3. Optimization Run Results on the Land Use Allocation in City of Laoag

	Goal	Unit	Potential	Optimal
1	Allocate residential areas	ha		3,811.65
2	Minimize environmental cost		83,560.00	3,614.00
3	Minimize disaster risk		63,758.10	25,913.80
4	Prioritize social devt	sites		16.00
5	Maximize land suitability		16,712.00	53,618.24
6	Maximize economic value	Php		3,473,750,528.82
7	Maximize cultural value		181.00	750.00

The total land area of 11,976.00 hectares of City of Laoag would be used up optimally (*Table 4. 4*). Water requirement of the different crops and the water usage of the different consumers of built-up areas, estimated at 100,900,978 cu.m., would not go above city’s water supply of 318,983,032 cu.m. With allocation provided, the production of tomato (15,618 mt), cowpea (2,121 mt), mungbean (293 mt), mango (335 mt), corn (1,102 mt) and tobacco (3,285 mt), would be able to meet the per capita consumption of Laoagueños. Half of the demand for rice of Laoag, would be met by the production of 9,404 mt.

Table 4. 4. Results of the Constraints Set in the Optimization Run

Constraints	Unit	Potential	Optimal
Total land area	ha	11,976.90	11,976.90
Water supply/Water requirement	cu.m.	318,983,032.40	100,900,977.76
Crop demand/Crop production			
Rice	mt	9,221.72	9,403.79
Tomato	mt	547.77	15,617.74
Cowpea	mt	379.91	2,121.22
Mungbean	mt	174.42	292.87
Mango	mt	320.41	335.11
Corn	mt	9.60	1,101.54
Tobacco	mt	57.37	3,284.76

C. PROPOSED GENERAL LAND USE

City of Laoag has a total land area of 11,976.90 hectares, consisting of 10,824.69 ha land part and 1,152.22 ha river.

Industrial Land Use

From the existing land use, industrial use occupies 494.47 hectares or 4.13% of the total land area (*Table 4. 5 and Figure 4. 1*), which only composed of a few industries at Brgys. San Bernabe (28), San Matias (23) and Lagui-Sail (54-A). The Laoag City Government identified the economic zone located at the Brgy Apaya (42), Balacad (41), Balatong (40), Calayab (37), and Sta. Rosa (39) however no industries have been established yet in the area. This area is intended for light non-pollutive industries or I1.

There would be reduction of 0.94% or 112.09 hectares in the proposed industrial land use City of Laoag (*Figure 4. 2*), making it 382.38 ha. This would be converted into commercial zone which can be used for tourism economic zone.

Residential Land Use

The existing residential use occupies a total land area of 3,311.66 hectares or 27.65% (*Figure 4. 1*). To meet the housing need, specifically for the relocation of families living in high-risk areas and for the additional population, the proposed residential area would be increased to 3,811.65 hectares or 31.82% of the total land area (*Figure 4. 2*). That would be an additional of 499.99 hectares or 4.17% increase. From this area, the existing socialized housing occupies 5.30 ha and 67.56 ha are proposed for cultural heritage sites.

Agricultural Areas

The current agricultural area covers 4,123.16 hectares or 34.43% of the total land area. The proposed agricultural land use, in general, would have a 5.34% increase drawn from the open area, resulting in 4,762.81 hectares coverage. From this, rice should be planted in 1,561.79 hectares, tomato in 814.42 hectares, cowpea in 233.10 hectares, mungbean in 232.44 hectares, mango in 31.03 hectares, corn in 198.05 hectares and tobacco in 1,691.98 hectares, such that the demand of Laoagueños would be met. Those seven (7) crops are recommended to be planted in the areas indicated on Figure 2. This does not limit other crops that can be planted in the area after the major cropping season.

Commercial Land Use

Existing commercial area only covers 127.10 hectares or 1.06% of the total land area. This could be increased to 378.56 hectares or 3.16%. The current commercial areas along the National Road and Airport Road would be expanded. Additional commercial areas along the By-pass Road in the west, specifically at Brgys. San Lorenzo (1), Sta. Maria (30-B), Vira (55-C), Pila (57), Casili (58), is proposed to decongest the current urban areas.

Environment Land Use (Forest/Duneland/Tourism)

The existing areas for forest, duneland and tourism cover 1,054.93 hectares or 8.81% of Laoag. The existing forest area of 227.79 hectares would be retained. The forest area located at Brgy Bacsil North (56-A) and Bacsil South (56-B) is bound to be protected. The forest at Brgy Dibua South (59-A), Dibua North (59-B), Pila (57), Barit (55-A), Salet-Bulangon (55-B), and Vira (55-C) would be devoted for production, such as agroforestry.

The tourism zone would be expanded to 978.11 hectares, drawn from the designated economic zone. Hence, giving an additional 150.96 hectares for the environmental area. The proposed environment land use would make up 1,205.90 hectares.

Institutional Land Use

The institutional land use, composed of government buildings, cemeteries, parks and infrastructures, measures a total land area of 186.00 hectares or 1.55%. The additional 44.48 hectares for the institutional land use would be allocated for the additional government offices at Brgys. Casili (58) and Sta. Maria (30-B) for 8.83 hectares, expansion of Laoag International Airport for 10.96 hectares, sanitary landfill at Brgy. Balatong (40) for 14.01 hectares, cemetery/columbarium and crematorium at Brgy San Lorenzo (1) for 1.89 hectares and the social development sites for 8.79 hectares. The additional (16) social development sites distributed in areas where there is a need for such include health facility, sports facility, jail, police substations, social welfare facility.

Open Area/Grassland

The existing open area and grassland compose the 1,527.36 hectares or 12.75% of the total land areas of the City of Laoag. Almost all the developments in the different land uses (residential, agricultural, and commercial) will be drawn from the open area or grassland, thus reducing it to 0.44% or 52.91 hectares.

River

River lies in 1,152.22 hectares or 9.62% and it will be retained as is.

Cultural Heritage Sites

From the existing residential and institutional uses, there are 181 sites identified with high cultural importance. The optimal solution allocated 150 cultural heritage sites covering a total area of 80.09 hectares, of which 67.56 hectares are residential units and 12.54 hectares are government-owned. These need to be declared as cultural heritage sites.

Table 4. 5. Existing and Proposed General Land Use of City of Laoag

Existing General Land Use	Area (ha)	Percent (%)	Proposed General Land Use	Area (Ha)	Percent (%)	Land Use Area Change (ha)	Percent Change
Industrial	494.47	4.13	Industrial	382.38	3.19	(112.09)	(0.94)
Residential	3,311.66	27.65	Residential	3,811.65	31.82	499.99	4.17
Socialized Housing	5.30		Socialized Housing	5.30			
			Cultural Heritage Sites	67.56			
Agricultural	4,123.16	34.43	Agricultural	4,762.81	39.77	639.65	5.34
			Rice	1,561.79			
			Tomato	814.42			
			Cowpea	233.10			
			Mungbean	232.44			
			Mango	31.03			
			Corn	198.05			
			Tobacco	1,691.98			
Commercial	127.10	1.06	Commercial	378.56	3.16	251.47	2.10
Environment	1,054.93	8.81	Environment	1,205.90	10.07	150.96	1.26
			Forest	227.79			
			Tourism	978.11			
Institutional	186.00	1.55	Institutional	230.48	1.92	44.48	0.37
			Government Offices	196.58			
			Cemetery	12.57			
			Cultural Heritage Sites	12.54			
			Social Devt Site	8.79			
Open Area	1,527.36	12.75	Open Area	52.91	0.44	(1,474.45)	(12.31)
River	1,152.22	9.62	River	1,152.22	9.62	-	0.00
Total	11,976.90	100.00		11,976.90	100.00		

Figure 4. 1. Existing General Land Use of City of Laoag

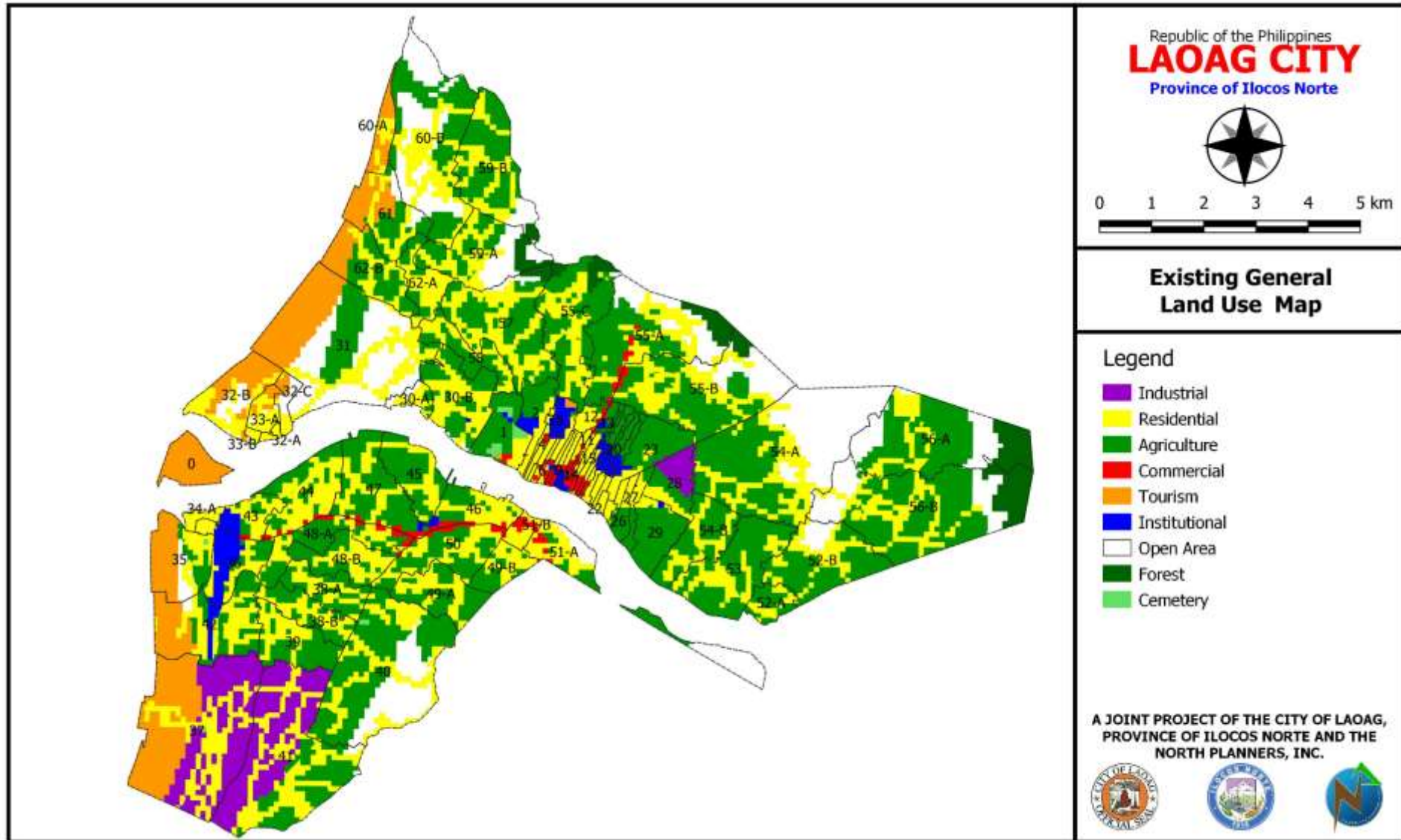
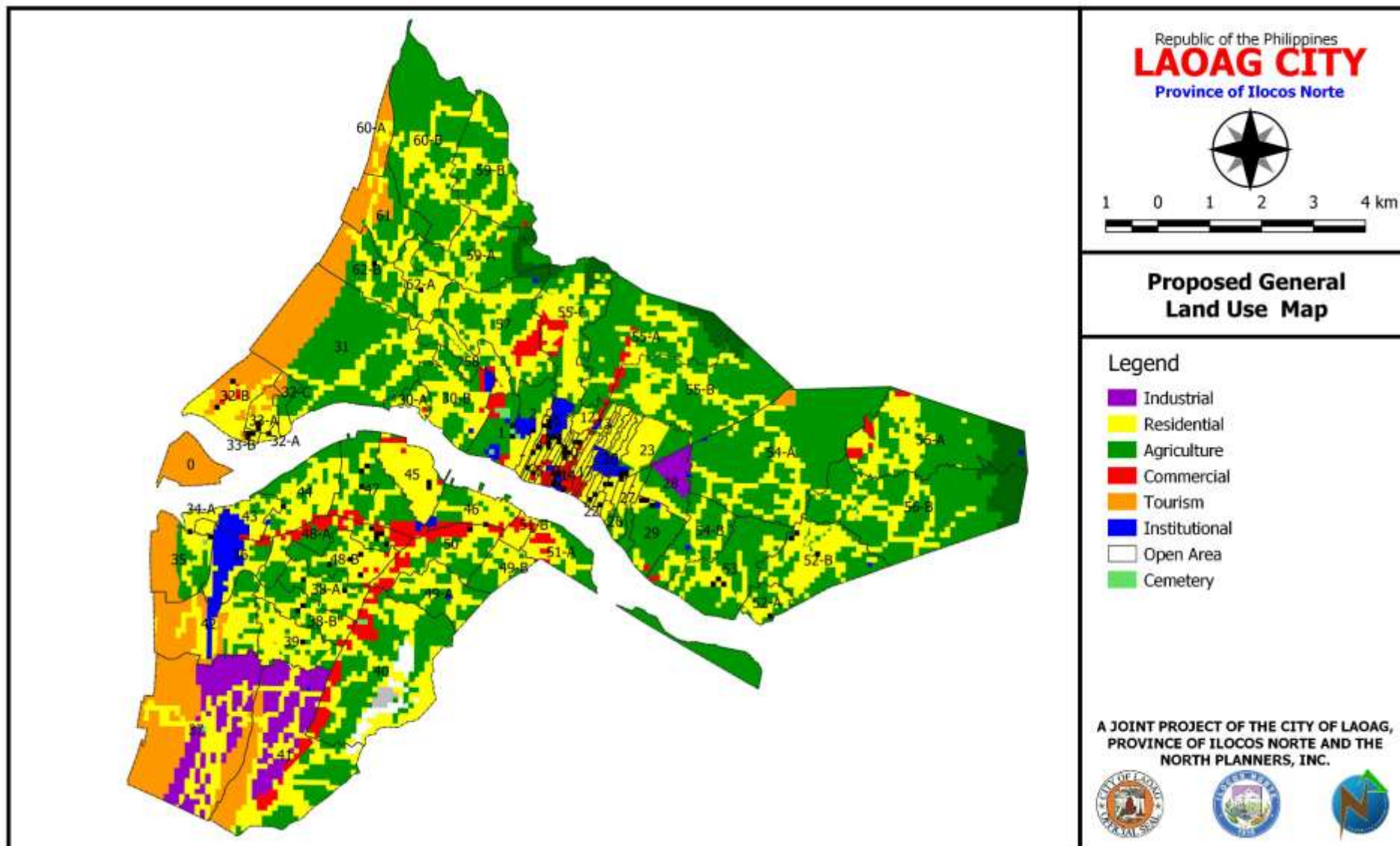


Figure 4. 2. Proposed General Land Use of City of Laoag



D. PROPOSED PROTECTION AND PRODUCTION AREAS

From the proposed agricultural area of 4,762.81 hectares, 53.77% or 2,561.07 will be under protection area and 46.23% or 2,201.75 will be for the production area. This is based on the Network of Protected Areas for Agriculture and Agro-Industrial Development (NPAAAD) identified by the Department of Agriculture. Agricultural protection areas include all irrigated areas, expansion for agriculture areas and fragile agricultural lands, whereas agricultural production areas include agro-industrial croplands and all irrigable lands. Specific crops under protection and production areas are presented in *Table 4. 6* and *Figure 4. 3*.

The proposed land use for forest area covers 227.79 hectares. From this, 52.11% or 118.71 ha would be under the protection area and 47.89% or 109.08 ha would be under the production area.

The forest area located at Brgy Bacsil North (56-A) and Bacsil South (56-B) is bound to be protected. The forest at Brgy Dibua South (59-A), Dibua North (59-B), Pila (57), Barit (55-A), Salet-Bulangon (55-B), and Vira (55-C) would be devoted for production, such as agroforestry.

Table 4. 6. Proposed Protection and Production Areas, City of Laoag

Land Use	Protection Area (ha)	Production Area (ha)	Total Area (ha)
Agricultural Area			
Rice	851.33	710.46	
Tomato	412.82	401.61	
Cowpea	125.60	107.50	
Mungbean	116.90	115.54	
Mango	25.83	5.20	
Corn	103.95	94.10	
Tobacco	924.64	767.34	
	2561.07	2201.75	4762.81
Forest Area	118.71	109.08	227.79
Total	2689.74	2310.83	

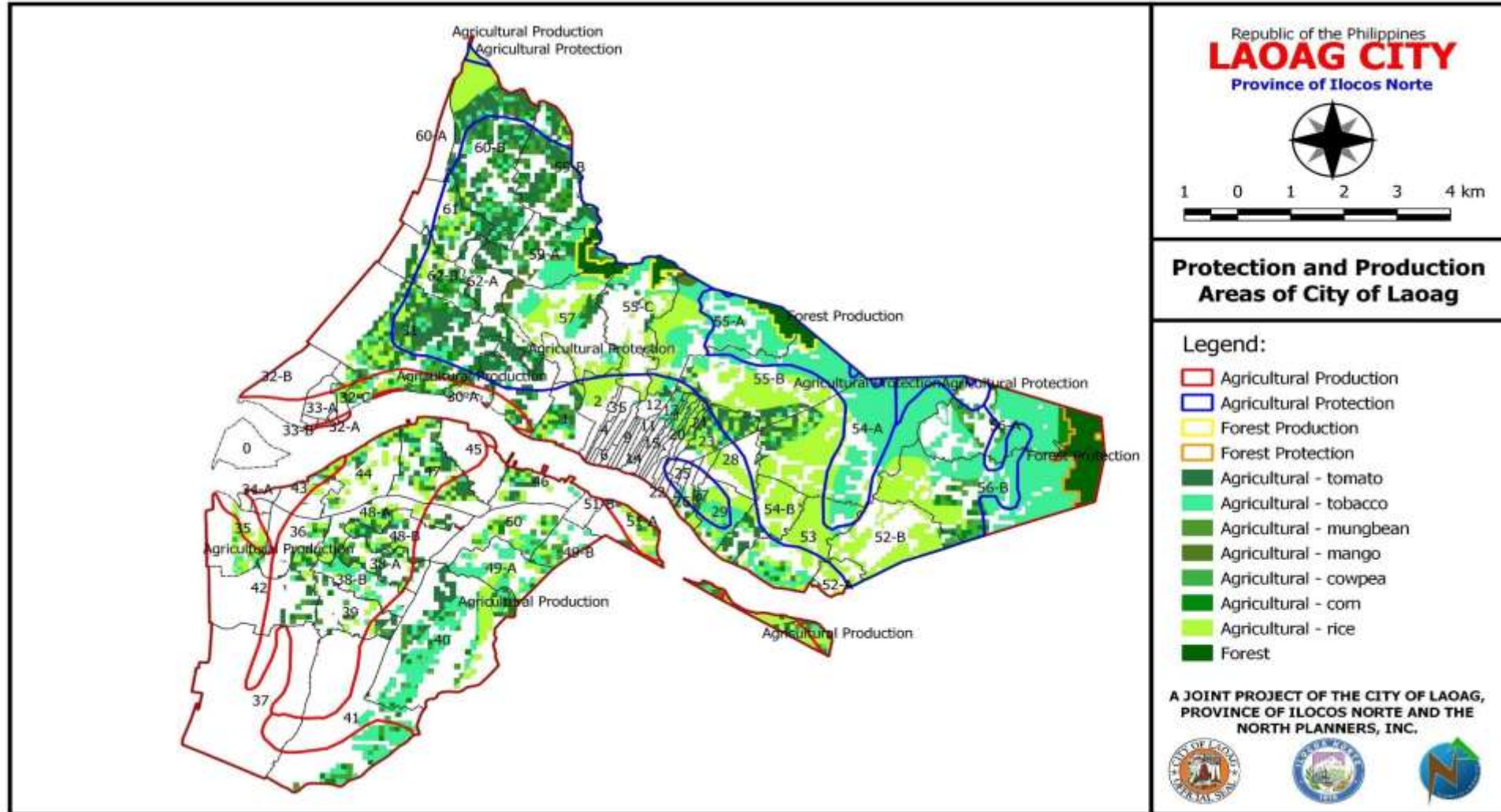


Figure 4. 3. Proposed Protection and Production Areas of the City of Laoag

E. PROPOSED URBAN LAND USE

The city has a total land area of 11,976.90 hectares and is primarily rural having 50 of the 80 barangays are in rural area. Thus, 834.76 hectares is occupied by the urban core of población while 11,142.14 hectares is being occupied by rural barangays.

Residential Areas

Existing residential area is found in all the thirty urban barangays encompassing 255.81 hectares or 30.67% of the total urban land use (*Figure 4.4*). The proposed residential areas will be increased by 32.59 hectares, giving a total of 271.82 hectares (*Table 4.7and*). Of which 26.54 hectares would be preserved or developed to cultural heritage sites. The intensity of the land use is low to medium density residential use. It is situated primarily along the northern bank of the Laoag River, borders of the Central Business District (Central Urban Core), in the vicinity of several schools and near the roads going to the municipalities of Vintar, Sarrat and Bacarra.

Commercial Areas

Commercial Areas cover 45.57 hectares or 5.46% of the total urban land use of the city. The proposed commercial will be 59.07 hectares or 7.08%. The large portion of this land use is the Central Business District which is bounded on the west by Nolasco Street and General Segundo Avenue, in the east by Zulueta Street, by M.H del Pilar in the north and by Juan Luna Street and F.R. Castro Street in the south.

Institutional

Existing institutional land use, which includes government buildings, parks and cemeteries, covers an area of 95.1 hectares or 11.40%. The area of institutional in proposed will be 99.50 hectares or 11.93%. Of this, 86.0 hectares would be devoted to government buildings (offices, hospitals/clinics, churches, public/private schools, and parks), 12.5 hectares for cultural heritage sites and 1.0 hectare for social development site (hospital, jail, police station).

Industrial Areas

Industrial land use is 4.92% of the total urban land use or 41.01 hectares and is predominantly situated at the periphery of población and in proposed industrial area, the area would be reduced to 40.46 or 4.85%.

Agricultural Areas

The intensity of agriculture in City of Laoag is high, it encompasses the largest land use in the city having a total of 392.35 hectares or 47.04% of the total urban area. It will be decreased to 363.22 hectares or 43.55%. Specifically, rice would be planted to 159.31 ha, tomato to 73.13 ha, cowpea to 12.38 ha, mungbean to 9.0 ha, corn to 8.33 ha and tobacco to 88.68 ha. This is to attain the optimum benefits of using the land.

Environment/Tourism

This zone occupies 3.87 hectares or 0.46% of the city's urban land area. This would be reduced to zero since tourism zone would be focused on the coastal areas and the built-up tourism spots would be reclassified as cultural heritage sites.

Open Area

Open areas in the city are the undeveloped lands having no built structures or buildings and it accounts the least area of the city's existing urban land use of only 0.36 hectares or 0.04%. This small area would be converted to agricultural use.

Proposed Cultural Heritage Land Use

The areas hosting structures with high cultural values were identified to be preserved or developed into cultural heritage sites. The cultural heritage sites in the urban area will be 12.50 hectares.

Table 4. 7. Existing and Proposed Urban Land Use of City of Laoag

Existing Urban Land Use	Area (ha)	Percent (%)	Proposed Urban Land Use	Area (ha)	Percent (%)	Urban Land Use Area Change (ha)	Percent Change
Industrial	41.01	4.92	Industrial	40.46	4.85	-0.55	-0.07
Residential	255.81	30.67	Residential	271.82	32.59	16.01	1.92
			<i>Cultural Heritage Sites</i>	26.54			
Agricultural	392.35	47.04	Agricultural	363.22	43.55	-29.13	-3.49
Commercial	45.57	5.46	Commercial	59.07	7.08	13.50	1.62
Environment/Tourism	3.87	0.46	Environment/Tourism	0.00	0.00	-3.87	-0.46
Institutional	95.1	11.40	Institutional	99.50	11.93	4.40	0.53
			<i>Government Buildings</i>	86.00			
			<i>Cultural Heritage Sites</i>	12.50			
			<i>Social Devt Site</i>	1.00			
Open Area	0.36	0.04	Open Area	0.00	0.00	-0.36	-0.04
Total	834.07	100.00	Total	834.07	100.00		

Figure 4. 4. Existing Urban Land Use of City of Laoag

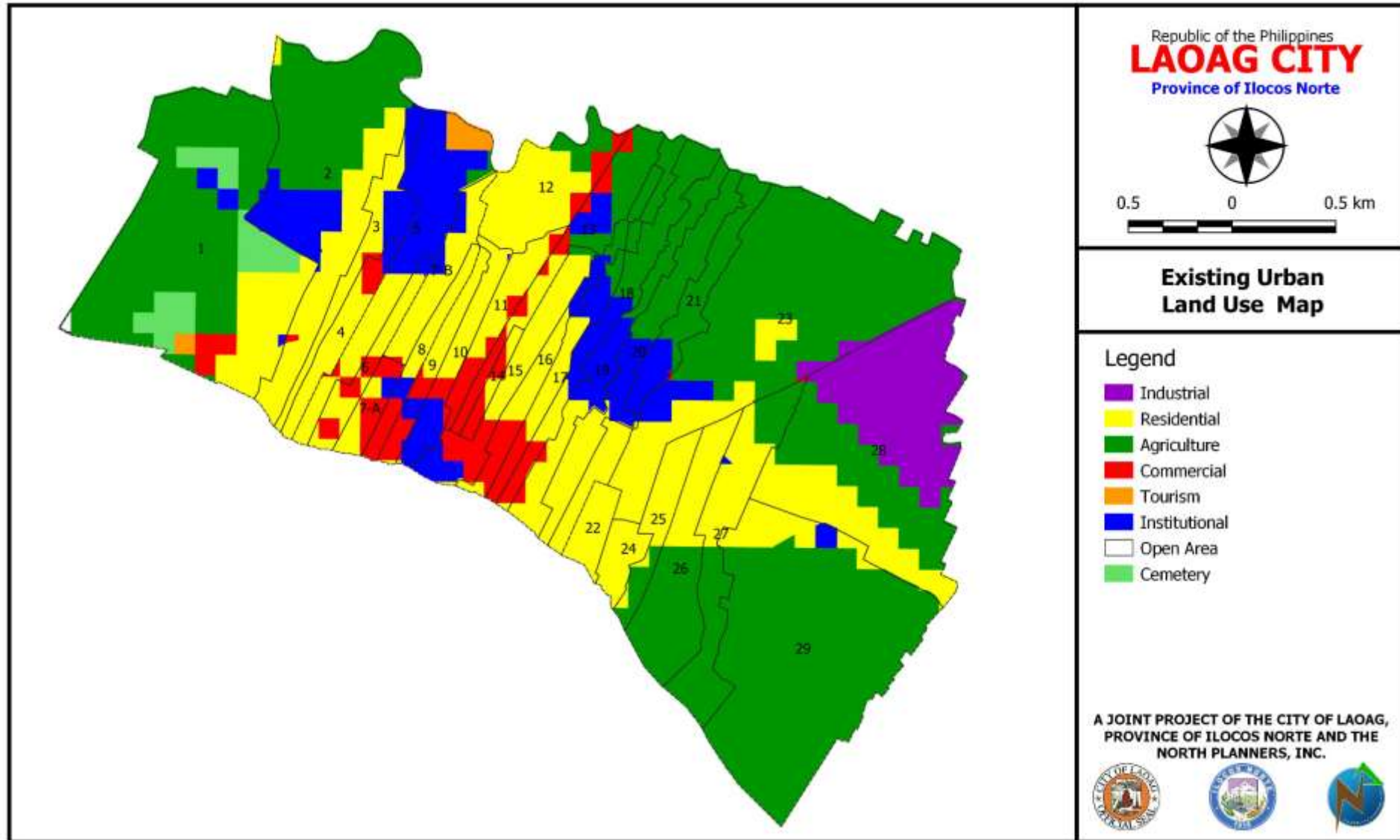
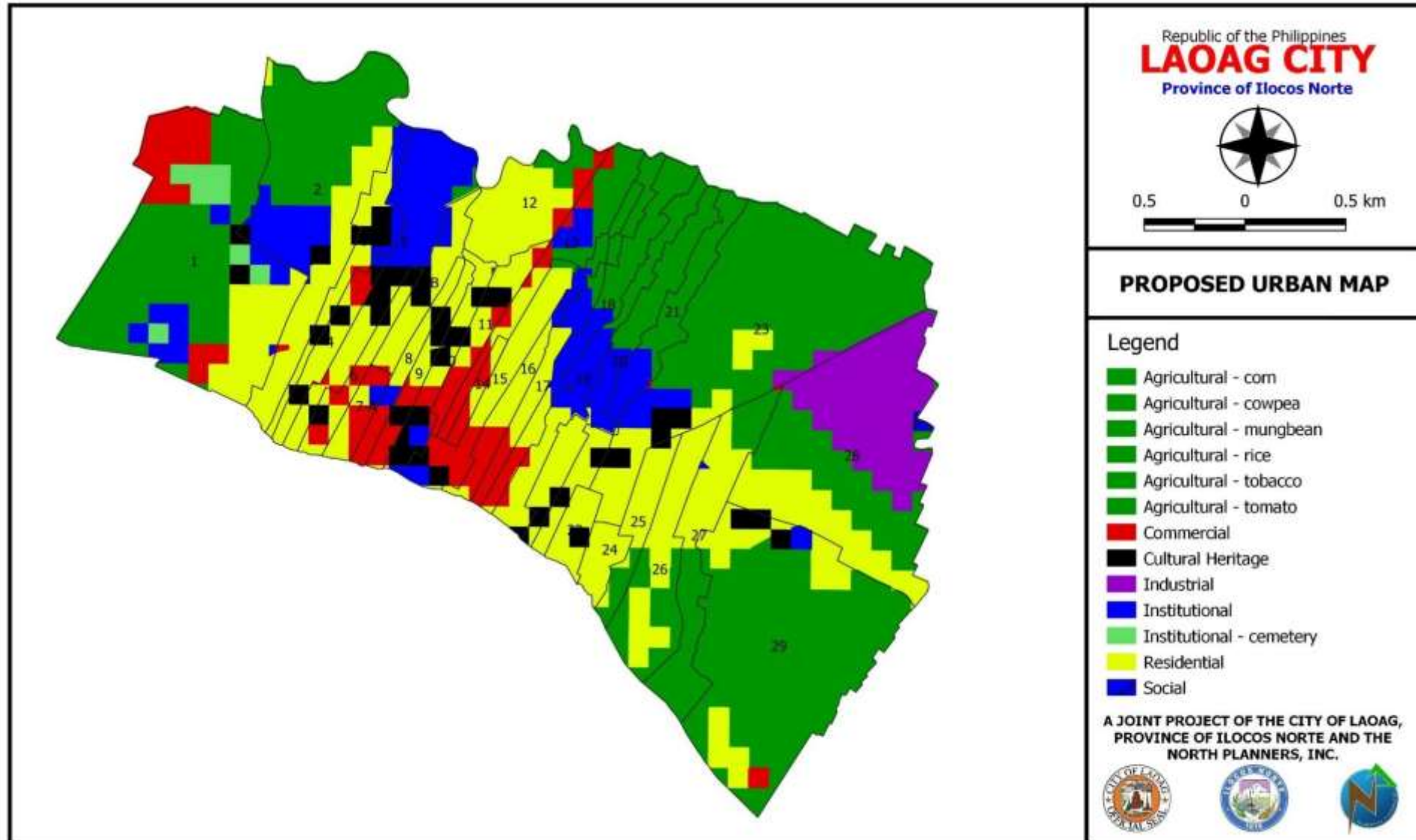


Figure 4. 5. Proposed Urban Land Use of City of Laoag



APPENDICES

METHODOLOGY

The preparation of the Comprehensive Land Use Plan of City of Laoag 2020-2029 was done through the initiative of the Local Chief Executive, Hon. Michael Marcos Keon (*Appendix 1*) and the Sangguniang Panglungsod, headed by Hon. Vicentito M. Lazo (*Appendix 2*), by virtue of Executive Order No. MMK-048, s. 2019. The City Planning Team (**Appendix 3. City Planning Team (EO No. MMK-048 series of 2019)**), headed by EnP. Ruby Ann R. Bunalade, OIC- City Planning and Development Coordinator, was facilitated by North Planners, Inc. (*Appendix 4*), an environmental consultancy firm.

The City Planning Team was guided by the 12-step process prescribe in the 2013 Housing and Land Use Regulatory Board (HLURB) Guidebook. The schedule of activities is shown in the Gantt chart (*Appendix 5*).

Organizing the City Planning Team, identifying the stakeholders and setting the vision were done in February 2020. The onset of CLUP preparation was challenged by the COVID-19 pandemic which brought the modifications in the schedule and procedures.

Setting the Goals and Objectives

Public Consultation/Stakeholders' Meeting

Series of stakeholders' meetings and workshops were conducted in June 2020 via Zoom. Stakeholders were divided into 10 groups, namely, institutional sector, informal sector, infrastructure sector, special sector, health sector, educational sector, environmental sector, barangay sectors, business, commercial sector and industrial sector, and civil society organizations sector (*Appendix 6*). Goal Achievement Matrix (GAM) and Strength, Weakness, Opportunity, and Threats (SWOT) analyses were drawn from the public consultation.

Analysis of the Situation

Sectoral Analysis

Secondary data were gathered from the different departments of the Local Government of the City of Laoag, and from other regional, provincial government agencies for the sectoral analysis.

Sectoral analysis was focused on five (5) areas: (1) Ecosystem Analysis, (2) Social Sector, (3) Economic Sector, (4) Infrastructure Sector and (5) Special Areas Sector. Ecosystem Analysis had five (5) subsectors, Climate Change Disaster Risk Assessment, Biodiversity, Air Quality and Water Quality. Data were obtained from the different offices, and DOST PAGASA, DOST PHIVOLCS, DOST Projects READY and NOAH, CDRRMO, CAO, CHO, CEO, DENR-EMB Region 1, and CENRO.

Social Sector Analysis had six (6) subsectors, namely, Education Sub-Sector, Social Welfare, Protective and Orders, Housing, Health and Sanitation and Sports and Recreation. Data were obtained from Dep-Ed and different schools, CSWD, CHO, PNP, BFP and BJMP.

Economic Sector had four (4) subsectors: Agriculture, Commerce, Industry and Tourism. Data were drawn from CAO, BPLO, City Tourism Office.

Infrastructure Sector had four (4) subsectors: Transportation, Power, Water and Information and Technology. Data were obtained from CEO, INWD, INEC, SMART, GLOBE, PLDT, NIA, and DPWH.

Special Sector had three (3) subsectors: Green Growth, Urban Design and Development and Heritage Conservation. Data were obtained from the Provincial Government, City Tourism Office and CPDO.

The City's Technical Working Group also met with North Planners, Inc to solicit more data and identify problems specific to each sector (*Appendix 8*).

Based on the data collected, current and projected needs of subsectors were computed. Policy and program interventions were identified according to the technical findings.

Ocular Inspection

Ocular inspection of the City of Laoag was conducted by some members of the City Planning Team and the North Planners, Inc. in July 2020 (*Appendix 9*).

Climate Change and Disaster Risk Assessment (CDRA)

CDRA was conducted using the 2015 CLUP Guidebook: Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the CLUP of HLURB and the 2017 Books 3 & 4 -Enhanced LGU Guidebook on the Formulation of LCCAP (Process Guide and References) of LGA-DILG, as references.

The data on projected seasonal change in rainfall and temperature in the Mid-21st Century (2036-2065) for Ilocos Norte relative to 1971-2000 was provided by DOST PAGASA. The corresponding impacts and adaptation options were identified by the City of Agriculture.

There were six (6) hazards that had been assessed in the City of Laoag, flood, landslide, storm surge, tsunami, earthquake and COVID-19. Flood hazard map was obtained from LIPAD, landslide and storm surge hazard maps were obtained from Project NOAH, tsunami hazard and earthquake impact maps were obtained from DOST-PHIVOLCS and the COVID-19 map was generated from the data of City Health Office (CHO) of the City of Laoag.

For the exposure database, five (5) sectors were considered population, economic, environment sector, critical point facilities, lifeline utilities. The data were obtained from the City Social Welfare and Development Office, City Agriculturist Office, City Engineering Office, Disaster Risk Reduction and Management Office, City Planning and Development Office and City Health Office. Series of meetings with the representatives of the different representatives were held to prepare the CDRA report.

Disaster risk scores of the city were computed by multiplying hazard scores with vulnerability scores. Hazards considered in this study include flood,

landslide, storm surge, tsunami, earthquake and COVID-19. Vulnerability on the other hand, is a function of sensitivity and adaptive capacity.

Biodiversity Analysis

Flora and fauna biodiversity assessment was conducted for seven (7) days in two ecosystems: coastal ecosystems at Brgys. Apaya (42), Gabu Sur (35), Calayab (37) and Caaocan (60-A) and the forest ecosystem at Brgys Bacsil North (56-A) and Bacsil South (56-B) (*Appendix 10*). This is a collaborative effort of OCPDC, CENRO and North Planners, Inc.

Preparing the Land Use Plan

Model formulation

With the assistance of technical consultant, Dr. Jerrold M. Tubay, faculty member of Institute of Mathematical Sciences and Physics, University of the Philippines Los Baños, the model of land use allocation of the City of Laoag was formulated.

The model formulation was based on the priority goals identified by stakeholders during the series of public consultation.

The tools that were used in gathering all the data for land use allocation are secondary data and primary data. The data (*Appendix 11*) needed are based on the identified priority goals in the city.

Land suitability

Delineation of land management units was done by overlaying the soil type, slope, land cover and administrative boundary maps using geographic information system (GIS). River was eliminated from total land area, leaving residential, commercial, industry, institutional, open area and agricultural area as the land to be managed. The generated land management unit was further divided into one-hectare grid.

Land suitability classification using the limitation method regarding number and intensity of limitations devised Food and Agricultural Organization (FAO) was adopted in this study. The seven (7) major crops of the city were evaluated, namely, rice, corn, cowpea, mungbean, tomato, mango and tobacco.

Crop requirements were obtained from Land Evaluation authored by Sys, et al. Land characteristics of the study sites area were evaluated against the requirements of the crops. They include slope (t), flooding (w), drainage (h), coarse fragments or surface stoniness (s), soil depth (d) and fertility limitations (f). Ranges of classes used in land suitability were highly suitable (S1), moderately suitable (S2), marginally suitable (S3), currently not suitable (N1), and permanently not suitable (N2) (Sys, C.; Van Ranst, E.; Debaveye, 1993). These were translated into land suitability index scores (5, 4, 3, 2 and 1, respectively) assigned to each grid as inputs to Multiple Goal Linear Programming (MGLP).

Factors considered in the land suitability for residential use include slope, existing land use, accessibility, and hazard susceptibility. The first three factors are cited in the National Housing Authority-Memorandum Circular (NHA-MC) 2015-

0015. Six experts (three engineers and three human settlements planners) were solicited to provide weights of the different factors in a pairwise manner. Their answers were subjected to Analytical Hierarchy Process (AHP) devised by Saaty.

Land suitability for industrial use considered the slope, groundwater resource, erosion, flood hazard and existing land use. For commercial use, the factors are the land cost, existing land use, slope, accessibility and hazard susceptibility.

Economic value

Economic values of the different land uses were drawn from primary and secondary data. City Agriculturist Office (CAO) of the City of Laoag provided the agricultural data for the different major crops. The assessed values of residential and commercial lands were gathered from the City Assessor's Office, whereas, the income of commercial establishments was obtained from the Business Permit and Licensing Office (BPLO).

Cultural mapping- cultural value

Cultural value was obtained through cultural mapping by the City Tourism Office which the scores were identified as 1 and 5, 1 as non-present of cultural and 5 as present in the City of Laoag.

Social Development Index

The data from the different sub-sectors of the Social Sector (number of enrollment, number of hospital beds, available lot cemeteries, number of sanitary toilet, number of ejection, number of social welfare centers, number of police vehicles, number of crimes below 18, crime adult, number of sports facilities) were given corresponding score for each barangay, generating the social development index score.

Average disaster risk score

The average disaster risk score of each grid was obtained from the vulnerability of the population sector of each hazard multiplied by the likelihood of occurrence of the hazard and multiplied by the average hazard susceptibility score of the 6 hazards under study.

Data encoding and processing

All the data mentioned above were encoded in one spreadsheet. Running the model was done using Gurobi®, a mathematical optimization software (Appendix 11. List of Data and Data Source) .

Presenting the Initial Results to the Local Government Unit of City of Laoag

Results of the optimal land use allocation were presented to the Executive and Legislative offices of the City of Laoag on December 11, 2020, to draw comments and suggestions (*Appendix 12*). This became the basis in drafting the Integrated Zoning Ordinance.

Appendix 1. City Mayor and Heads of City Government Offices



CITY MAYOR: Hon. MICHAEL MARCOS KEON

HEADS OF OFFICES

- | | |
|---|-----------------------------|
| 1. Atty. Roxanne Lee I. Castro | - City Administrator |
| 2. Atty. Josephus R. Nerez | - City Legal Officer |
| 3. Mr. Enrico A. Aurelio | - Sanggunian Secretary |
| 4. Mr. William Albino Antonio R. Agcaoili | - Community Affairs Officer |
| 5. Mr. Arturo Diomedes B. Gayban | - OIC, City Treasurer |
| 6. EnP Ruby Ann Ramos-Bunalade | - OIC, CPDC |
| 7. Ms. Nelda C. Casas | - OIC, City Budget Officer |
| 8. Mr. Ferdinand Quiroga | - OIC, City Accountant |
| 9. Ms. Felicar Alba-Ancheta | - CHRM Officer |
| 10. Mrs. Jean P. Manuel | - City Civil Registrar |
| 11. Engr. George A. Dimalaluan | - OIC, City Assessor |
| 12. Dr. Renato R. Mateo | - City Health Officer |
| 13. Mrs. Marilyn G. Martin | - City Agriculturist |
| 14. Mrs. Perlita B. Cabello | - OIC, CSWD Officer |
| 15. Engr. Manuel N. Aurelio | - OIC, City Engineer |
| 16. Dr. Arturo M. Cabello | - City Veterinarian |
| 17. Dr. Eliezer John P. Asuncion | - Chief of Hospital |
| 18. Mr. Jun Miguel | - OIC, LCPMCC |
| 19. Ms. Mylene Isabel A. Pascual | - OIC, CENR Officer |

Appendix 2. Sanggunian Panlungsod



CITY VICE-MAYOR: Hon. Atty. VICENTITO M. LAZO

SANGUNIANG PANLUNGSOD MEMBERS

1. Hon. Juan Conrado A. Respicio
2. Hon. Roger John C. Fariñas II
3. Hon. Handy T. Lao
4. Hon. Justine Clarence G. Chua
5. Hon. Edison U. Chua
6. Hon. Derick B. Lao
7. Hon. Jason Bader Ll. Perera
8. Hon. Roque Benjamin C. Ablan
9. Hon. Jaybee G. Baquiran
10. Hon. Edison H. Bonoan
11. Hon. Mikee V. Fariñas (ABC)
12. Hon. Anzhelyka Faye Lao (SK)

Economic Sector

1. City Agriculture: Mrs. Marilyn G. Martin, City Agriculturist
2. City Tourism: Mrs. Ana Carmela V. Remigio, Tourism Officer
3. Trade and Industry Office: Ms. Rosario Q. Quidola, OIC-Provincial Director, DTI
4. SP Rep: Hon. Handy T. Lao, Chairman, Committee on Agriculture, Cooperative and Livelihood
Hon. Justine Clarence G. Chua, Chairman, Committee on Trade, Commerce and Industry
5. TESDA Rep: Ms. Shirley S. Pascua, Supervising Specialist, TESDA
6. PESO Rep: Ms. Mylene Isabel A. Pascual
7. Business Sector Rep: Mr. Pastor Albano, Jr., PCCI President





Infrastructure/Physical and Special Ares Sector




1. City Engineer Office: Engr. Roy A. Tomas, City Engineer
2. INWD Rep: Engr. John Teodoro, INWD Manager
3. Electric Coop Rep: Engr. Felino Agdigos, INEC Manager
4. TeleCom Rep: SMART- Ms. Elaine B. De los Santos, Manager
GLOBE- Ms. Vina Lao, Manager
PLDT- Mr. Joel Torres, Manager
5. Irrigators Association Rep: Mr. Elpidio Lamug
6. PNP Rep: PCMS Ernesto Ramiscal
7. Academe: Mr. Marju Miguel, Education Program Supervisor, Dep. Ed.- Laoag
8. Assessor: Engr. Ruben J. Domingo, City Assessor
Engr. George Dimalaluan, Asst. City Assessor
9. PPDO Rep: Engr. Pedro Agcaoili, PPD Officer
10. Urbanism: Arch. Rex Hofileña

Ecosystem/Climate & Disaster Risk Assessment (CDRA)

1. CDRRMO: Ms. Erlinda V. Caspe, SAR Team member
2. LnB Rep: Dr. Noel Daquioag, Brgy. Chairman, Brgy. 52A, Laoag City
3. DENR Rep: Ms. Noemi Ruadap, CENRO



	<p>Dr. Gella Patria L. Abella, EnP Project Team Leader Ecosystem Sector Analyst</p> <ul style="list-style-type: none"> • BS Human Ecology, maj in Human Settlements Planning - UPLB • MS & PhD in Environmental Science - UPLB • Associate Professor, Central Luzon State University
	<p>Arch. Maria Jorquesa A. Hakcholna, EnP Project Team Member Infrastructure Sector Analyst</p> <ul style="list-style-type: none"> • AB Architecture - University of Santo Tomas • MA Urban and Habitat Planning, <i>Cum Laude</i> - Saint Louis University • Doctor of Philosophy in Urban Planning - SLU -on-going
	<p>Arch. Fatima Nicetas R. Alonzo, EnP. Project Team Member Special Areas Sector Analyst</p> <ul style="list-style-type: none"> • AB Architecture - Saint Louis University • Master of Architecture - University of the Philippines, Diliman • Ph.D. in Environmental Studies - Miriam College on-going • Dean, College of Architecture, University of Northern Philippines, Vigan City
	<p>Dr. Judith A. Teaño, EnP Project Team Member Economic Sector Analyst</p> <ul style="list-style-type: none"> • BS Agricultural Business - University of the Philippines at Los Banos • MS in Economics - De La Salle University • Phd in Economics - Ateneo de Manila University • Associate Professor, Central Luzon State University

	<p>Atty. Dick Fernandez, EnP Project Team Member Social Sector Analyst</p> <ul style="list-style-type: none"> • Bachelor of Science in Political Science, <i>Cum Laude</i> • Bachelor of Laws, Saint Louis University • Lawyer, Fernandez Law Office, San Jose City, Nueva Ecija
	<p>Mr. Neal Vincent L. Fernando Project Research Assistant</p> <ul style="list-style-type: none"> • BS in Environmental Science - Central Luzon State University • Research Interests: <ul style="list-style-type: none"> Wildlife studies Parasitology Environmental Impact Assessment Traffic Impact Assessment Land Use Planning
	<p>Mr. Ace Angelo A. Labuguen Project Research Assistant</p> <ul style="list-style-type: none"> • BS in Environmental Science - Central Luzon State University • Research Studies: <ul style="list-style-type: none"> Vulnerability Assessment in the Municipality of Masinloc, Zambales • Research interest: <ul style="list-style-type: none"> • Disaster risk assessment • Vulnerability assessment • Environmental Impact Assessment • Land Use Planning



Hon. Michael Marcos Keon and the North Planners, Inc.

Appendix 5. Schedule of Activities for CLUP Preparation

ACTIVITY	2020																																									
	FEB		MAR				APR				MAY				JUN				JUL				AUG				SEP				OCT				NOV				DEC			
	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4				
1. Organize																																										
Getting endorsement/ approval of SP	█																																									
Preparation of work program planning																																										
Organization and briefing of team																																										
2. Identify Stakeholders																																										
Listing of stakeholders dissemination																																										
Action planning																																										
Information Dissemination																																										
3. Set the Vision																																										
Conduct of visioning workshops																																										
Adoption of the vision and informing public the adopted vision																																										
4. Analyze the Situation																																										
Sectoral and Physical land Use Study																																										
a. Base Map Preparation																																										
b. Data gathering and Land Use Survey**																																										
c. Mapping of results (Organizing results with maps, graphs, tables, etc.)																																										
d. Consultation/ Validation workshops																																										
e. Needs/Issues analysis and projection																																										
f. Cross-sectoral analysis and integration																																										
5. Set the goals and objectives																																										
Goals and Objectives Formulation																																										
6. Establish Development Thrusts and Spatial Strategies																																										
Goals and Objectives Formulation																																										
7. Prepare the Land Use Plan (draft)																																										
Goals and Objectives Formulation																																										
8. Draft of Zoning Ordinance and Other Development Controls																																										
Goals and Objectives Formulation																																										
9. Conduct of Public Hearing*																																										
Goals and Objectives Formulation																																										
10. CLUP Review, Adoption and Approval																																										
Goals and Objectives Formulation																																										
Endorsement for review to appropriate body																																										

Appendix 6. Stakeholders' Meeting/Public Consultation

1. Informal Sector



2. Education Sector



3. Business Sector



4. Tourism Sector



5. Social Service Sector



6. Health Sector



7. Barangay Sector



8. Institutional Group



9. Infrastructure and Environmental Sector



Appendix 7. Sample Attendance Sheet During Stakeholders Meeting/Public Consultation



Date: June 6, 2020

Course Title: Stakeholders Meeting - Agri
Venue: City Basketball Court

Trainer:

No.	NAME OF PARTICIPANT	POSITION	OFFICE	REMARKS/OTHER INFORMATION REQUIRED		Signature
				Time-In	Time-Out	
1	GRACIANO C. DAMPO	TREASURER	SPPA	9:35		<i>[Signature]</i>
2	GLENDO SAMUEL MARANO	PRESIDENT	SPPA LAAG	9:35		<i>[Signature]</i>
3	FRANCISCO C. MARTIN	PRESIDENT	LAAG. VIGIL	9:00		<i>[Signature]</i>
4	JUVENAL CLARO	V.PRES.	L.C	9:00		<i>[Signature]</i>
5	EUPPIO TUNGALAN JR	KAG. CAPU	CAPU TRKS	9:01		<i>[Signature]</i>
6	Georgy Feymi	AT	OCA (AGR)	9:05		<i>[Signature]</i>
7	Efron Mafa	(BR) SEC.	PAFC			<i>[Signature]</i>
8	SUPRIANO MATED	BR VP	CAFC			<i>[Signature]</i>
9	MARCINO B. MORAN	CAFC CHAIRMAN	CAC			<i>[Signature]</i>
10	MARCOS P. DOMINGO	SP-H.H.I	9PO			<i>[Signature]</i>
11	GEN. F. REBUENIDO	SP-AP1	CPD			<i>[Signature]</i>
12						
13						
14						
15						

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Appendix 8. Technical Working Group and the North Planners, Inc. Meetings



Appendix 9. Ocular Inspection



Appendix 10. Biodiversity Assessment



Appendix 11. List of Data and Data Source

Maps	Source
<i>Delineation of land management units</i>	
Administrative boundary of City of Laoag	CPDO, City of Laoag
Land cover of the municipality	CPDO
Soil type of the municipality	DA-BAR
Slope of the municipality	DA-BAR
Area covered by corals and mangrove	CAO
Data	Source
<i>Land use allocation</i>	
Land suitability classification	
Crop requirements	SYS, I. C., VAN RANST, E., & DEBAVEYE, I. (1993). Land Evaluation . In Part III: Crop Requirements.
Land qualities of soils of Laoag City	Carating, R., Galanta, R., & Bacatio, C., (2014). The Soils of the Philippines.
Slope	DA-BAR
Hazard susceptibility	
Flood	LIPAD
Landslide	Project NOAH
Storm Surge	Project NOAH
Tsunami	DOST-PHIVOLCS
Earthquake	DOST-PHIVOLCS
Existing land use	City Planning Development Office, Laoag City
Accessibility	Road Map from City Engineering Office, Laoag City
Total economic value of agricultural land	
Gross income of farmers	City Agriculturist Office, Laoag City
Assessed value of land	City Assessor's Office
Total economic value of built-up land	
Gross income of commercial establishment	Business Permit and Licensing Office
Assessed value of residential and commercial lands	City Assessor's Office
Disaster risk scores of the laoag city	
Exposure	City Social Welfare and Development Office City Agriculturist Office City Engineering Office Disaster Risk Reduction and Management Office City Planning Development Office City Health Office

Comprehensive Land Use Plan of City of Laoag 2020-2029

Data	Source
Sensitivity	City Social Welfare and Development Office City Agriculturist Office City Engineering Office City Planning Development Office City Health Office
Adaptive Capacity	Disaster Risk Reduction and Management Office
<i>Constraints on land use allocation</i>	
Minimum residential area requirement 2015 population and growth rate	PSA, 2015
Housing condition	http://rso11.psa.gov.ph/sites/default/files/attachments/Household%2C%20Number%20of%20Household%2C%20average%20size%2C%20by%20mun.pdf
Minimum production requirement per crop	
Per capita consumption	City Agriculturist Office
Average production	City Agriculturist Office
Water availability	
Water consumption	Ilocos Norte Water District
No. of commercial establishments	Business Permits and Licensing Office
Water supply	Ilocos Norte Water District
Water consumption	Ilocos Norte Water District

Appendix 12. Data Encoding and Processing

This screenshot shows a spreadsheet with a grid of data. The columns are color-coded: yellow for 'Weight Matrix of Land Use Types', purple for 'Subsidiarity Rating', green for 'Subsidiarity Rating of Agricultural Uses', and red for 'Subsidiarity Rating'. The rows list various land use types with their corresponding values.

This screenshot shows a spreadsheet with a grid of data. The columns are color-coded: orange for 'Subsidiarity Rating', green for 'Subsidiarity Rating of Agricultural Uses', and red for 'Subsidiarity Rating'. The rows list various land use types with their corresponding values.

Appendix 13. Presentation of Initial Results to the LGU



GOAL ACHIEVEMENT ANALYSIS

Among the different elements of the vision (Appendix 14), people of City of Laoag put equal weights (0.28) on the people as society and the local economy. Some stakeholders believed that when the local government takes care of the people everything else will follow, whereas others believed that when the economy of the local government is good, then all other aspects will follow. However, the concern on the natural environment to make it sustainable, clean, attractive and restored shortly followed having weighted score of 0.23. The built environment which pertains to housing, buildings, roads, bridges and built heritage also was not that far from the weighted score, in fact, it got 0.21.

Results of the Goal Achievement Matrix (GAM) Analysis during the stakeholders' meeting or public consultation reveal that among the alternative development strategies, the people of City of Laoag prioritized environmental protection which got an average total score of 9.24 (1). Stakeholders viewed that all kinds of development should consider protection of the environment. It is followed shortly by social development with 9.17. Agricultural development ranked third with a score of 8.98, followed by tourism development with 8.94 and lastly by commercial and industrial development with 8.65. It is noteworthy that the scores of the different alternative strategies were not far from each other, which implies that stakeholders want all these development strategies to happen in the City of Laoag.

The results of this GAM analysis became the basis of the priority development goals that were translated into the land use allocation model processed in the multiple goal linear programming (MGLP).

SWOT ANALYSIS

Results of the SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats/Challenges) are presented in Appendices 16 to 19). These, and the sectoral analysis, were the basis of the Objectives and Strategies of each sector.

Appendix 14. Weights of the Different Elements of the Vision

	Weight	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
VISION	100%	Social Development (health, education, social welfare, peace & order) <i>(Panangpatan-ay ti Kabibiag)</i>	Tourism Development <i>(Panangpatan-ay ti Turismo)</i>	Commercial and Industrial Development <i>(Panangpatan-ay ti Komersio ken Industria)</i>	Agricultural Development <i>(Panangpatan-ay ti Agrikultura)</i>	Environmental Protection (coastal, rivers, forest, biodiversity) <i>(Panangsaluad ti Aglawlaw agraman nainsigudan ken dagiti pasdek a tawid)</i>
People as society (empowered, vigilant, resilient) <i>Dagiti umili kas maysa a komunidad (naikkan ti turay, natibker ken nadaras a makabangon, ammona ti kalinteganna)</i>	0.28	9.73	8.09	9.00	9.45	9.45
Local economy (sustainable, diversified, environment-friendly) <i>Ekonomia ti lugar (agtultuloy, nadumaduma, saan nga makadadael ti aglawlaw)</i>	0.28	9.09	9.55	9.82	9.91	9.45
Natural environment (sustainable, clean, attractive, restored) <i>Nainsigudan nga aglawlaw (agtultuloy, nadalus, makapaguyugoy, naisubli ti dati a kondision)</i>	0.23	9.09	9.18	6.64	8.64	10.00
Built environment- housing, buildings, roads, bridges, built heritage (balanced, planned, sustainable) <i>Amin a paset ti aglawlaw a nabangonan (balanse, naplano, agtultuloy)</i>	0.21	8.64	9.00	8.82	7.45	7.82
	1.00					

Appendix 15. Goal Achievement Matrix

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
VISION	Social Development (health, education, social welfare, peace & order) <i>(Panangpatan-ay ti Kabibiag)</i>	Tourism Development <i>(Panangpatan-ay ti Turismo)</i>	Commercial and Industrial Development <i>(Panangpatan-ay ti Komersio ken Industria)</i>	Agricultural Development <i>(Panangpatan-ay ti Agrikultura)</i>	Environmental Protection (coastal, rivers, forest, biodiversity) <i>(Panangsaluad ti Aglawlaw agraman nainsigudan ken dagiti pasdek a tawid)</i>
People as society (empowered, vigilant, resilient) <i>Dagiti umili kas maysa a komunidad (naikkan ti turay, natibker ken nadaras a makabangon, ammona ti kalinteganna)</i>	2.73	2.27	2.52	2.65	2.65
Local economy (sustainable, diversified, environment-friendly) <i>Ekonomia ti lugar (agtultuloy, nadumaduma, saan nga makadadael ti aglawlaw)</i>	2.57	2.69	2.77	2.80	2.67
Natural environment (sustainable, clean, attractive, restored) <i>Nainsigudan nga aglawlaw (agtultuloy, nadalus, makapaguyugoy, naisubli ti dati a kondision)</i>	2.08	2.10	1.51	1.97	2.28
Built environment- housing, buildings, roads, bridges, built heritage (balanced, planned, sustainable) <i>Amin a paset ti aglawlaw a nabangonan (balanse, naplano, agtultuloy)</i>	1.81	1.88	1.84	1.56	1.64
Average Total	9.17	8.94	8.65	8.98	9.24
Rank	2	4	5	3	1

Appendix 16. SWOT Analysis of the Ecosystem Sector

	INTERNAL	
	STRENGTHS (S) (Pagpigsaan)	WEAKNESSES (W) (Pakarigatan, Pagkapsutan)
SWOT ANALYSIS Ecosystem Sector	<ul style="list-style-type: none"> ○ Observance of the code on Oplan dalus ○ Enactment of city ordinances on environment concerns ○ Implementation of environment programs (no use of single plastic, etc.) ○ Existence environmental measures-resolution/ordinances ○ Existing environmental city officer ○ Existence SWM Board ○ Increasing Environmental Awareness ○ Decreasing Population ○ The status of environment is still good (Air& Water) 	<ul style="list-style-type: none"> ○ Funding ○ Lack of staff in ENRO ○ Landfill concerns (location and implementation) ○ Water sewerage/Canal system concerns that cause flood

	OPPORTUNITIES (O) <i>(Mabalin a pagsayaatan)</i>	SO Strategies <i>(Ania ti mabalin nga aramiden)</i>	WO Strategies <i>(Ania ti mabalin nga aramiden)</i>
EXTERNAL	<ul style="list-style-type: none"> ○ Support of the provincial government on environment programs ○ Assistance of non-government organizations on programs on environmental protection and conservation ○ Strong relationship with environmental sectors such NGAs, DENR, NGO, PINAKBET Academe 	<ul style="list-style-type: none"> ○ Provide awards to barangays and schools organization and individuals that/who display or implement excellent environmental programs ○ Establishment Brgy. Environment Officer ○ Maintain population growth & regulate in-migration 	<ul style="list-style-type: none"> ○ Coordination among LGUs on the implementation of environmental programs ○ Realization of Sanitary Landfill ○ Additional Deputized Enforcer of Environmental Code

Appendix 17. SWOT Analysis of the Social Sector

SWOT ANALYSIS Social Sector	INTERNAL	
	STRENGTHS (S) (Pagpigsaan)	WEAKNESSES (W) (Pakarigatan, Pagkapsutan)
	<p><i>(Barangay Sector)</i></p> <ul style="list-style-type: none"> ○ Business District of the Province ○ Available area for economic growth <p><i>(Education Sector)</i></p> <ul style="list-style-type: none"> ○ Strong Leadership in the Organization ○ ISO 9001:2015 Certified ○ Presence of skilled information and communications technology (ICT) human resources to provide assistance and expertise ○ Sufficient number of teachers ○ Sufficient number of classrooms 	<p><i>(Barangay Sector)</i></p> <ul style="list-style-type: none"> ○ Limited access to internet connection ○ Limited space for economic base expansion ○ No federated civil society organizations (CSOs) ○ No federated Tanod <p><i>(Education Sector)</i></p> <ul style="list-style-type: none"> ○ Ten (10) schools have weak connections to internet in Schools Division Office (SDO) of Laoag; some students cannot access online learning modalities due to lack of internet connections ○ Lack of availability of equipment/gadgets for Digital Learning for both teachers and students

	<ul style="list-style-type: none"> ○ Availability of water supply, toilets, and handwashing facilities to all schools ○ Presence of Radio Station for alternative mode of instruction for learners who have no online access ○ Availability of Learning Resources: Outcome Based Education Learning Resources which are most essential learning competencies (MELC) aligned ○ Continuous Training of teachers and SDOLC personnel with the trends in the New Normal ○ Each barangay has a day care center ○ Presence of a state university known as Center of Excellence and with accredited programs, and private higher education institutions (HEIs) with accredited programs and ISO-certification ○ DepEd Division office as ISO-certified ○ Existence of pool of consultants on education ○ Awards received by school administrators and faculty 	<ul style="list-style-type: none"> ○ Nine (9) schools are in need of additional standard facilities for group handwashing ○ Seven (7) schools are situated in flood-prone areas ○ Twenty-Six (26) classrooms still for connection to Electrical Grid Power Supply ○ Teachers' unfamiliarity with video conferencing across different platforms as prescribed by DepEd (Microsoft teams, Google Meet and Workplace) ○ Outdated/Insufficient copies of MELC aligned materials, modules and references in school libraries ○ Insufficient funds to sustain the Learning Alternative Delivery Modes ○ No perfected agreement with stakeholders to support the Learning Continuity Plan (printing press, telco, radio, others)
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	<ul style="list-style-type: none"> ○ Students and faculty-coaches/trainers as winners in various competitions in different levels ○ Classrooms, laboratory rooms and other activity areas are adequate, spacious and can be restructured in the observance of social distancing ○ Updated trainings for teachers ○ Presence of a laboratory school 	<ul style="list-style-type: none"> ○ Overlapping of senior high school (SHS) track offerings of adjacent Senior High Schools ○ Competition of course offerings among higher education institutions (HEIs) ○ Non-uniformity on transfer credits ○ Incomparable school fees between SUC and private HEIs ○ Fast turn-over of faculty from private to DepEd public schools and the state universities and colleges (SUC) ○ Enrollment decreased during pandemic ○ Fast turnover of faculty and personnel due to salary
--	--	--

		<p>(Health Sector)</p> <ul style="list-style-type: none"> ○ Full support of city officials ○ Commitment of the hospital officials & employees to work harder for the improvement of the operation of the hospital ○ Competence of healthcare personnel; physicians, nurses and midwives are equipped with knowledge, attitude and skills (KAS) through seminars in different programs of DOH so we are able to provide the services to our patients and clients ○ NGOs are helping in government projects 	<p>(Health Sector)</p> <ul style="list-style-type: none"> ○ Lack of budget ○ Lack of medicine/medical supplies ○ Lack of equipment/facilities ○ Lack of doctors, specialists, nurses, and midwives ○ Some programs are compromised because funds are re-aligned due to pandemic ○ Lack of protectives devices PPEs during COVID pandemic
EXTERNAL	<p>OPPORTUNITIES (O) <i>(Mabalin a pagsayaatan)</i></p>	<p>SO Strategies <i>(Ania ti mabalin nga aramiden)</i></p>	<p>WO Strategies <i>(Ania ti mabalin nga aramiden)</i></p>
	<p>(Barangay Sector)</p> <ul style="list-style-type: none"> ○ Strong CSOs ○ Presence of barangay associations 	<p>(Barangay Sector)</p> <ul style="list-style-type: none"> ○ Provide incentives for barangay stakeholders 	<p>(Barangay Sector)</p> <ul style="list-style-type: none"> ○ Identify properties to be registered as heritage sites

	<p><i>(Education Sector)</i></p> <ul style="list-style-type: none"> ○ Strong leadership of LGU officials, NGAs and other government agencies ○ Presence of private organizations/entities/individuals supportive to the cause of education ○ Presence of Executive Order mandating all Telecom companies to provide services for free in times of emergencies as shared by USEC Alain Del B. Pascua (EO 205 S. 1987 & NTC MC-04-08-88) ○ Presence of DILG Circular stating the support that the LGU must provide to ensure implementation of Learning Continuity Plan ○ Scholarship/fellowship grants from CHED, DepEd, and TESDA ○ LGU subsidies and financial assistance to faculty and students 	<p><i>(Education Sector)</i></p> <ul style="list-style-type: none"> ○ Tap LGU leadership to convince telecommunications companies to provide free airtime for radio-based instruction and free use of community channels for TV-based instructions, by invoking the existing laws that mandate such ○ Forge partnership for the reproduction of printing of available MELC aligned learning resources. ○ Tap the LGU, NGAs, NGOs to provide sanitation, disinfection supplies as well as maintenance and improvement of school facilities ○ Partner with expert resource speakers to ensure continuous upskilling of teachers in line with the trends in the new normal ○ Share resources among educational institutions ○ Coordinate with agencies/bodies/organizations that 	<p><i>(Education Sector)</i></p> <ul style="list-style-type: none"> ○ Tap LGU officials for support on internet connectivity and provision of materials/equipment needed ○ Launch the “I’M SAFE NOW” project, Investing and Mobilizing Support for Accessible and Future-ready Education: A fundraising project for the installation of VSAT Satellite Communication System for the schools with weak to no internet connectivity ○ Request Internet Service Provider (ISP) to install boosters to strengthen internet connectivity ○ Implement the mandated activities of Brigada Eskwela (DM 053 s, 2020) ○ Propose the construction of drainage system and elevation of floor levels flood prone schools to be funded through SEF
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	<ul style="list-style-type: none"> ○ Additional benefits/support/assistance from the government for private schools ○ Provisions of laptops and other technology gadgets for learning both for teachers and students ○ Provisions of health materials to mitigate the spread of diseases (COVID, Dengue, etc.) ○ Facilitating the safety of school personnel and the students by providing medical assistance ○ Availability of experts from the university ○ Receiving overwhelming support from PTA and LGU 	<p>provide scholarship/fellowship/assistance</p> <ul style="list-style-type: none"> ○ Collaborate among schools on moral enrichment/recovery programs ○ Upgrade internet connectivity ○ Tap expertise of other experts from the university to develop applications and software to be used for NEW normal teaching-learning ○ Tap expertise of other experts from the university to conduct teacher training 	<ul style="list-style-type: none"> ○ Follow-up the of Sub-Allotment and Release Order for the Electrification Project of SDO Laoag City ○ Roll-out the DepEd CO and RO sponsored trainings on video conferencing platforms to teachers ○ Utilize funds downloaded for the reproduction of MELC aligned materials and source out additional funding form other stakeholders ○ Comply with the law (Executive Order) for the free airtime to deliver education to learners ○ Review of policies on the track offerings for SHS to focus on school specialization ○ Orient parents regarding the strategy ○ Prioritize granting scholarship slots to schools with accredited programs or international certification
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			<ul style="list-style-type: none"> ○ Create consortium among educational institutions on academic program offerings ○ Increase financial subsidies to faculty and students of private schools ○ Upgrade or purchase new laptop for teachers for fast access to the internet for additional learning materials ○ Spearhead orientation seminar for parents/guardians especially in guiding the studies of their children especially regarding the use of digital technology in support to the delivery of learnings ○ Develop applications and software for remote and blended learning ○ Reach out to PTA and LGU for other learning materials and facility that the university cannot provide such as, but not limited to internet connectivity
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	<p>(Health Sector)</p> <ul style="list-style-type: none"> ○ Laoag City Government Hospital (LCGH) good reputation ○ Coordination of barangay health units and city health office, especially during pandemic ○ Financial support from the government and different organizations/other private sectors/individuals ○ Proper trainings of healthcare workers 	<p>(Health Sector)</p> <ul style="list-style-type: none"> ○ Encourage investors through a public private partnership in terms of logistic, by providing equipment and medical supplies especially in the areas of laboratory, radiology and dialysis units ○ Capacitate healthcare personnel by providing trainings ○ Increase virtual medical conference ○ Increase health workers ○ Increase medical facilities & equipment ○ Increase barangay health units ○ Maintain cleanliness/orderliness ○ Maintain available transportation ○ Provide additional benefits to all health workers 	<p>(Health Sector)</p> <ul style="list-style-type: none"> ○ Be efficient in using resources to lessen expenses ○ Provide the needed drugs & medicines, medical supplies, hospital equipment ○ Encourage visiting consultants/medicine specialists to enter into agreement with LCGH ○ Disseminate information on health protocols to avoid spread of COVID-19 ○ Provide additional incentives for nutrition workers ○ Allocate additional funds & programs to solve malnutrition ○ Open communication between the government and private sector in terms of health matters ○ Prioritize health in budget appropriation ○ Network with other stakeholders like IO's, NGO's ○ Hire additional physicians, nurses, and midwives to meet the ratio: -1 Physician is to 20,000 population
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			<ul style="list-style-type: none"> -1 nurse is to 10,000 population -1 midwife is to 5,000 population ○ Provide enough PPEs during pandemic
	THREATS (T) <i>(Pangta, Mabalín a pakadadaelan)</i>	SO Strategies <i>(Ania ti mabalín nga aramiden)</i>	WO Strategies <i>(Ania ti mabalín nga aramiden)</i>
	<p><i>(Barangay Sector)</i></p> <ul style="list-style-type: none"> ○ Flooding ○ Illegal drugs <p><i>(Education Sector)</i></p> <ul style="list-style-type: none"> ○ Declaration of public health emergencies due to COVID-19 pandemic resulting to demand in internet connectivity to support online learning, decrease in enrollment and possible decline in revenue collection leading to the reduction of available resources ○ Hazards (especially during rainy season) and other health threats ○ Promising work outside Ilocos Norte 	<p><i>(Barangay Sector)</i></p> <ul style="list-style-type: none"> ○ Integrated drainage system ○ Strengthen P&O Councils ○ Establish PNP Assistance Center <p><i>(Education Sector)</i></p> <ul style="list-style-type: none"> ○ Launch the “I’M SAFE NOW” project to augment the resources provided by the LGU ○ The DepEd thru the leadership of SDS, initiated innovations towards learning continuity to make education inclusive amidst the COVID-19 pandemic ○ Revive, improve and upgrade the INCAT Radio Station as a means to deliver Radio-based instruction and to provide instructional support to parents along 	<p><i>(Barangay Sector)</i></p> <ul style="list-style-type: none"> ○ Strengthen various sectors <p><i>(Education Sector)</i></p> <ul style="list-style-type: none"> ○ Initiate the Project ROOM 101: An initiative to provide free offline/online tutorials for learners by teacher’s volunteers ○ Establishment of VSAT Satellite Communication System to support online learning to schools with weak to no internet connectivity ○ Secure memorandum of agreement (MOA) with stakeholders to provide instructional support for

		<p>with teachers who may provide assistance to parent as needed</p> <ul style="list-style-type: none"> ○ Assign skilled ICT human resources to explore other possibilities to address internet connectivity limitations ○ Strengthen information dissemination about COVID awareness through text ○ Strengthen school stability ○ Enhance linkage among schools with LGUs on pandemic measures ○ Ensure wide dissemination of information from DOH and LGU ○ Avail distance learning (offline or online) including blended learning modality ○ Provide additional financial support for students ○ Maintain strong collaboration among school, family and LGU especially in the deliveries of learning materials ○ Ensure active collaboration with the University Health and Wellness Center ○ Provide sustainable economic assistance to parents such as hiring them as personnel in IGPs and farms of the university 	<p>distance learning not only to teachers and learners but also to parents</p> <ul style="list-style-type: none"> ○ Follow health protocols ○ Formulate school’s guidelines regarding pandemic and natural calamities and other related occurrences ○ Coordinate with barangay officials for the distribution of learning materials ○ Further sustainable inter-university as well as MMSU-LES-LGU-PTA linkages to minimize physical mobility to avoid transmission of the disease ○ Improve/strengthen the income
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	<p><i>(Health Sector)</i></p> <ul style="list-style-type: none"> ○ COVID-19 pandemic and other health risks which result overworked health workers 	<ul style="list-style-type: none"> ○ Remodel systematic plan and strategies on how to overcome the problems/ issues that cause low income to private schools/educational institutions <p><i>(Health Sector)</i></p> <ul style="list-style-type: none"> ○ Provide additional funds for nutrition activities and other health programs ○ Ensure that employee compensation/benefit should be ideal ○ Allocate designated quarantine/isolation facilities for COVID patients ○ Continue advocacy on health issues & concerns ○ Increase staying capacity ○ Provide additional training, remuneration, benefits to healthcare workers ○ Involve adolescent and women of reproductive age to alleviate their well-being on all the activities and programs on population management ○ Observe policies set by the government amidst covid-19 crisis 	<p><i>(Health Sector)</i></p> <ul style="list-style-type: none"> ○ Specific programs to address malnutrition ○ Ensure safe and support for BNS by providing adequate incentives & trainings ○ Increase budget on medicine ○ Increase allocation in health prevention ○ Empower business health workers (BHWs) ○ Provide enough PPE supplies for healthcare workers ○ Follow health protocols ○ Disseminate information on how to prevent spread of COVID-19 and strengthen partnership with other stakeholders advocating health awareness
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			<ul style="list-style-type: none">○ Implement programs to ensure welfare of adolescent and women of reproductive age and to equip them with knowledge about reproductive health
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Appendix 18. SWOT Analysis of the Economic Sector

	INTERNAL	
	STRENGTHS (S) (Pagpigsaan)	WEAKNESSES (W) (Pakarigatan, Pagkapsutan)
SWOT ANALYSIS Economic Sector	<ul style="list-style-type: none"> ○ Availability of areas for aquaculture ○ Wide fishing ground and rich marine resources ○ Existence of Mangrove Areas ○ Existence of Monroe Island ○ Regular coastal clean-up ○ Existence of Material Recovery Facilities (MRF) ○ Availability of fish nurseries ○ Suitability of areas for oyster production ○ Government agencies are supportive for livelihood projects ○ Existence of payao, fish cage and fish nursery ○ High amount of fish catches ○ Existence of other Support Services 	<ul style="list-style-type: none"> ○ High costs of aquaculture production inputs and low quality of fingerlings ○ Overstocking of fish at the aquaculture projects ○ Many fisherfolks shifted to fish caging ○ The mangrove project did not benefit many and recipients failed to sustainably operate the mangrove project ○ The Monroe Island is privately owned ○ Unregulated/Illegal fishing grounds and practices ○ Lack of a sound and efficient solid waste management plan ○ There are no sanctions for dumping wastes along riverbanks ○ Non-functioning MRF ○ Some owners of lot for the fish nursery are reluctant to adopt oyster culture production ○ Lack of adequate cold storage facilities

	<ul style="list-style-type: none"> ○ Existence of banks, financing and lending institutions ○ Existence of Community Fish Landing Center (CFLC) ○ Availability of government agencies' projects (BFAR, LGU Laoag) in the form of facilities and equipment such as fish aggregating device-payao, tuna hand lines, gillnets, and fish nets ○ Availability of Trainings and orientations on the latest aquaculture technologies ○ There are demonstrations for Food Processing Operations ○ Full support of the DA by giving out (plastic crates, flower inducers, fertilizers, mango grafted seedlings, and others) ○ Existence of Rural Based Organizations (RBO's) such as CFARMC, RIC and 4H; members are receptive to skills trainings and educational programs ○ Hardworking fisherfolks 	<ul style="list-style-type: none"> ○ Aquaculture farmers have a lot of uncollected payments ○ Lack of some support services ○ High interest rates on loans and voluminous paper requirements of lending institutions ○ Limited budget for livelihood projects and Coastal Resource Management (CRM) recipients ○ Lack of trainings for CRM related capacity building for fisherfolks ○ Some fisherfolks are not cooperative and non-compliant to BFAR policies, laws and ordinances ○ Some fisherfolks are not members of Aquaculture associations ○ Negative values and traits ○ Some farmers still practice traditional fishing ○ Some fisherfolks are not aware of the policies and ordinances ○ Ineffective implementation of policies and ordinances on illegal fishing ○ Some Aquaculture farmers/operators are not yet registered with SEC/CDA
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	<ul style="list-style-type: none"> ○ Laoagueños Practice Bayanihan ○ Good Governance ○ Presence of fishery and environmental related policies and ordinances ○ Annually, the Department of Agriculture conduct project interventions such as seeds (vegetable seeds), and fertilizer (organic & inorganic) provision ○ Active participation of all the members ○ Conduct of FFS to vegetable areas. ○ Organized SEC registered tricycle drivers and operators' associations ○ Active participation of constituents in the different programs of the City Government ○ Organized DOLE and SEC registered Calesa Associations under the supervision/monitoring of the Department of Agriculture and Tourism 	<ul style="list-style-type: none"> ○ Not all members benefit from government programs and other support ○ High cost of vehicle spare parts ○ Low Fare relative to operational costs ○ Limitations on the roads that can be travelled and lack of parking spaces in the City of Laoag ○ High cost of fuel ○ Lack of repair shops for Calesas ○ Lack of additional income for Calesa operators/drivers ○ Limited & not enough to sustain all the growers ○ Lack of efficient and adequate urban planning ○ Limited commercial space/parking areas/areas for business expansion ○ Traffic/Congested Roads ○ High rental gates for commercial spaces ○ Absence of recreational facilities & centers ○ Lack of new/additional computerized system to the enhance city's operations ○ Multiple lot owners
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		<ul style="list-style-type: none"> ○ Active participation of all members in the association’s programs and activities ○ Relatively efficient and adequate road networks and alternate routes (Diversion Roads) to accommodate commuters ○ Skilled Workforce ○ Existence of an International and Domestic airport ○ The City is compliant with RA 11032, Ease of Doing Business Act ○ Information Technology support facilities are in place (internet providers, utility providers, etc.) and available within the vicinity of the Bypass road 	
	OPPORTUNITIES (O) <i>(Mabalin a pagsayaatan)</i>	SO Strategies <i>(Ania ti mabalin nga aramiden)</i>	WO Strategies <i>(Ania ti mabalin nga aramiden)</i>
EXTERNAL	<ul style="list-style-type: none"> ○ Establishment of fish ports ○ There are still a lot of room to grow for the tourism industry ○ Existence of projects from BFAR and other agencies that create livelihood to fisherfolks 	<ul style="list-style-type: none"> ○ Enact and implement policies/ordinances ○ Close Monitoring & Strict Implementation of Fishery Laws 	<ul style="list-style-type: none"> ○ Issue and implement policies/ordinances ○ Strictly enforce coastal and environmental laws ○ Create opportunities for partnership in the CM program implementation

	<ul style="list-style-type: none"> ○ Additional income of fisherfolks from fishery projects & tourism industry ○ Presence of available market for agricultural produce ○ High price of vegetables during off-season ○ Existence of City Government of Laoag support to various farmers, fisherfolks, drivers and operators associations ○ Increasing number of tourists who hire tricycle for special trips at higher contract prices There are livelihood projects from the DA, BFAR and Tourism Department ○ Increasing number of tourists in the locality ○ There are markets for products ○ There are processing facilities for some commodities ○ Mango is a focus commodity of HOCC 	<ul style="list-style-type: none"> ○ Regular Monitoring & Establishment of partnership/networks ○ Grow off-season high value vegetable to take advantage of high price ○ Conduct a vegetable derby to encourage the production of the best varieties ○ Propose livelihood projects to various TODA/JODA and CODA (Calesa Operators and Drivers Association) ○ Provide loan assistance to TODAs/JODAs and CODAs for a more presentable tricycles/jeepneys/calesas with better features for tourists ○ Associations to request for additional support from Agriculture and Tourism Department for a more attractive tricycle, jeepney, calesa ○ Provision of farm facilities equipment & agricultural machineries ○ Request for farm machineries (hauling trucks, pover sprayer by the resolution to be submitted to DA). ○ Invite businesses to invest in Laoag City to cater to additional 	<ul style="list-style-type: none"> ○ Mobilize local and international financial resources ○ Stakeholder capacity building on CM ○ Collecting of membership fees annual fee ○ Requesting free vegetable seeds (east west, rango, allied company) ○ Association to proposed subsidy on fuel and spare parts ○ Association to proposed additional roads for more passenger ○ Association to proposed fare standards to tourist ○ Association to propose higher fares specially tourist per for rent calesa ○ Association to propose more roads in the city available for calesa for tourist ○ Collecting of membership fee & annual fee to all members ○ Collecting of membership fee & annual fee to all members ○ Convert Idle Lands (Diversion Road) to Commercial Areas ○ Present cost and benefits analysis to the administration ○ Encourage future stakeholders and investors with a solid plan for a good investment
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	<ul style="list-style-type: none"> o Existence of Mango Processing (for dried mango, mango wine & vinegar) o Availability of job opportunities o Availability of new and computerized government application system o Newly constructed bypass road allows the development of a new, modern and technology-based business district 	<p>demands for products and services which will be brought about by developments in the area. This will eventually spur job opportunities & economic growth.</p> <ul style="list-style-type: none"> o Allocate funds for the acquisition of computerized government application systems o Enact an ordinance to convert an area to be developed as a modern technology-based business district o Continuous provision of public service from the efficient government employees. 	<ul style="list-style-type: none"> o Wide experienced/skilled employees to utilize existing machineries and equipment
	<p>THREATS (T) <i>(Pangta, Mabalin a pakadadaelan)</i></p>	<p>SO Strategies <i>(Ania ti mabalin nga aramiden)</i></p>	<p>WO Strategies <i>(Ania ti mabalin nga aramiden)</i></p>
	<ul style="list-style-type: none"> o Climate Change o Water and Air Pollution and increase of Solid Waste o Waste generation of tourism industry waves & breeding grounds of fishes o Excessive use of chemicals control o Continuous high cost of fuel and spare parts 	<ul style="list-style-type: none"> o Strengthen enforcement of Coastal and Environmental Laws o Regular Monitoring & Establish partnership o Use of IPM, Physical, Chemical, Biological Control o Association to proposed subsidy on fuel and spare parts o Association to proposed more additional in generating livelihood 	<ul style="list-style-type: none"> o Strengthen flood action plan o Improvement of resilience and natural defenses of the coastal and marine ecosystem services o Implementation of pollution and waste management programs o To high cost of fuel and spare parts and limited roads to travel with increasing taxi operating in the city, tricycle will soon be eliminated in the roads

	<ul style="list-style-type: none"> ○ Investors of taxi that treats the tricycle in the city for hire ○ Calesa is fading out due to few next generation kutseros ○ Few and fading-out shops who are repairing and constructing calesa ○ High cost of feeds and repairs of Calesa ○ Hiding of products ○ High cost of OA registration ○ Pest & Diseases (Kurikong/Cecid fly) (no chemical control) ○ Traders dictates price ○ Oversupply of mango during March-April that result to low price which falls to 10.00 pesos/kg ○ High labor cost ○ High expenses cost ○ Excessive use of chemical ○ Presence of competitors outside the city (Commercial Centers/Malls) 	<ul style="list-style-type: none"> ○ Association to propose additional livelihood projects to encourage more next generation kutseros ○ Association to propose subsidy to Calesa shops ○ Linkages to government agencies ○ Training of Farmers ○ Attending trainings/workshops forum ○ Use of sticky trap (methyl eugenul) ○ Early flower inducing to prevent the pest ○ Attract investors to facilitate business growth in Laoag City via putting up new businesses & maximizing the Idle Lands ○ Institutionalize disaster recovery plan ○ Entice and work a good deal for lot owners ○ Utilize existing machineries and equipment within the barangays 	<ul style="list-style-type: none"> ○ Calesa will soon fade if there are limited roads, few shops and few next generation kutseros ○ Look for the assistance of DA, OA for OA registration ○ Inviting chemical company to present their best products for controlling pest & seek a choice to them on how to control pest ○ Redesign urban planning to address problems in road congestion and identify the threats on how to resolve them ○ Implement all mitigation measures ○ Encourage community participation in the development of the project ○ The city government to appropriate/allocate funds to acquire new machineries and equipment
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	<ul style="list-style-type: none">○ Expected return of investment may be delayed caused by force majeure.○ Lot ownership may not want to sell or will ask for a high price○ Insufficient funds to purchase new machineries and equipment○ Economic crisis due to pandemic		
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Appendix 19. SWOT Analysis of the Infrastructure Sector

	INTERNAL	
	STRENGTHS (S) (Pagpigsaan)	WEAKNESSES (W) (Pakarigatan, Pagkapsutan)
SWOT ANALYSIS Infrastructure Sector	<ul style="list-style-type: none"> ○ Presence of Laoag Airport with feeder land transportation lines. ○ Abundance in electricity. ○ Sand Dunes are natural tsunami barrier. ○ Presence of Eco-zone for industrial growth ○ Intact Heritage Core and some supportive tourism facilities. ○ Presence of advance technological infrastructures and ICT 	<ul style="list-style-type: none"> ○ Old urban core road network is a high traffic narrow road right of way which is constricted by developments. ○ Lack of walkable, pedestrian friendly streets and lacking open public parks. ○ Lack of public restrooms. ○ Lack of urban vehicular parking areas ○ Lacking domestic airline players, and no direct international flights; No seaport; no wharf. ○ Existing public transportations are lacking of comfortability ○ Weak drainage infrastructure and insufficient wastewater treatment. ○ Old buildings may not be structurally sound; Lacks Built Heritage Protection Law to defined character and identity, lacks image-ability and ideal aesthetics. ○ No Major MICE Infrastructure (Meetings, Incentive, Conventions, Exhibits)

			<ul style="list-style-type: none"> ○ Tourism activities, decent nightlife, and facilities, lacks competitiveness to entice tourists to stay longer. ○ Lack of LGU properties for a defined government center complex; ○ Laoag Public Market location no longer conducive
EXTERNAL	OPPORTUNITIES (O) <i>(Mabalin a pagsayaatan)</i>	SO Strategies <i>(Ania ti mabalin nga aramiden)</i>	WO Strategies <i>(Ania ti mabalin nga aramiden)</i>
	<ul style="list-style-type: none"> ○ Support of the provincial government on by-pass road ○ “New City” project for a Post- COVID livable city (Green, Smart Healthy City) ○ High level of foreign fund supports ○ Cordillera and Sierra Madre Mountain Range are natural typhoon barrier. ○ Political Will to pioneer an integrated Waste treatment and Management System 	<ul style="list-style-type: none"> ○ Implement a pedestrian-friendly, Green and Smart Avenue along the Airport Road and the new By-pass Roads to present Laoag City’s Image-ability and Ilocano-Heritage. ○ Encourage Public-Private Partnership and joint-venture projects on catalysts developments. ○ Provide awards to barangays, organization, and individuals that/who maintain excellent Materials Recovery Facility and Program. 	<ul style="list-style-type: none"> ○ Coordinate, create and implement a special task force among units/zones an Integrate Route Rationalization Plan with walkable Superblock concept to realize a Green Network Development in highly dense built-up areas. ○ Encourage “Home-town Staycation”, Home Town coming, and Retirement Village and establish MICE facilities. ○ Establish multi-village economic growth nodes through walkable neighborhood start-up retail facilities ○ Improvement of Road-Right-Of-Way drainage and utility systems at all road types
	THREATS (T) <i>(Pangta, Mabalin a pakadadaelan)</i>	ST Strategies <i>(Ania ti mabalin nga aramiden)</i>	WT Strategies <i>(Ania ti mabalin nga aramiden)</i>

	<ul style="list-style-type: none"> ○ COVID-19 ○ Natural Calamities ○ Cyclical Seismic threat 30-50 years such as flooding ○ Heavy siltation of Laoag river ○ Traffic Congestion 	<ul style="list-style-type: none"> ○ Create a River Esplanade at both sides of river easement. Minimum of 9 meters as per National Building Code (NBC). ○ Monitor creek and irrigation easements and re-establish the minimum 3 meters as per NBC. ○ Require Environmental Management Plan and Traffic Impact Assessment for new developments. ○ Identify and establish Wharf and retail area for both locals and tourists, possibly at Monroe Island or the delta. 	<ul style="list-style-type: none"> ○ Reinvent the city’s character and distinct identity (sense of place) to encourage leisure and energizing walks. ○ Enhance Heritage Structures for tourism sites to create employment opportunities for locals and in line with the national program for Balik-Probinsya ○ Coordination among government agencies and non-government organizations for joint programs on pocket public gardens, and tree-planting with adopt a tree. ○ Participation and awareness of every citizens in response to natural and man made disaster
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