Commerce and Trade

There are 463 registered businesses from the tertiary sector in 2016 which are engaged in trade, transportation, finance and business service, and community, social and personal services. Majority of these establishments are wholesale and retail stores selling various kinds of merchandise including meat, fish and vegetable dealers. There are also service shops, eateries, bakeries, food processors, drugstores, and amusement centers and video shops. Buying stations are found along M. L. Quezon Street where copra, palay and abaca are traded. Agricultural supplies, automotive parts dealers, appliance dealers and gasoline/refilling stations are also thriving. Trading and business transaction in Irosin are concentrated mainly at the Central Business District (CBD) in the town center. The highlights of CBD are the Irosin Public Market, Municipal Hall, Public Auditorium and the line of commercial establishments where commodity trading stations, wholesale and retail variety stores, banks and service shops are found. Presently, a commercial strip is growing from the corner of J. P. Rizal and M. L. Quezon Streets stretching all the way to the Maharlika Highway.

The financial institutions in Irosin are the Land Bank of the Philippines, Rural Bank of Irosin, East-West Rural Bank, Camalig Bank, Card Bank and Rural Bank of Guinobatan. The Land Bank of the Philippines-Irosin Branch caters to a wide range of customers from local government units, cooperatives as well as commercial and industrial establishments from micro to large enterprises. The bank likewise accept savings, current and time deposits and foreign currency exchange particularly dollar and serves as a collecting agency of the Bureau of Internal Revenue (BIR), Social Security System (SSS) and Philippine Health Insurance. There are also many microfinancing institutions in Irosin namely ARDCI NGO Group, ASA Philippines Foundation, Equalshare Credit Corporation,

First Consolidate Bank, First Inner Trade Credit Corporation as well as cooperatives offering financing services.

The increasing population in the rural barangays led to the setting up of barangays centers where public markets, chapel, health centers, barangay halls and multi-purpose pavements are normally clustered. Such centers are located in the barangays of Gabao, Batang, Monbon, Patag and Gulang-Gulang. Of the convergence areas Gabao is the most progressive.

Other Population Characteristics

In terms of marital status of the population 20 years old and over in 2007, there are 4,841 single or 20.2% of the total population of the age range which is 24,016. There are more single males than females with a ratio of 183 males per 100 females. Sixty percent of those 20 years old and over is married, 8.2% is widowed, 1.6% is divorced/separated, 9.8% is common-law/live-in and 0.2% is of unknown marital status.

A vast majority of households or 98.9% speaks Bikol as language at home. Only 0.88% of households speaks Tagalog at home followed by Bisaya at 0.08%. The people of Irosin are mostly Christian where 96.22% of the total population is Roman Catholic, 1.52% is Iglesia ni Kristo and 0.074% is affiliated with the UCCP. The rest are distributed into different denominations.

In 2007, of the total population of 5 years old and over of 42,923, 26.84% is in elementary grade level, 16.83% is elementary graduate, 15.77% is high school undergraduate,

16.11% is high school graduate, 5.36% is college undergraduate, 5.56% is academic degree holder while only 0.11% has post baccalaureate education. There are more female academic degree holders than male with a ratio of 78 males for every 100 females. The literacy rate of 10 years old and over is 98% in 2015.

Environmentally Critical Areas

The environmentally critical areas in the municipality under Presidential Proclamation No. 2146 are the NIPAS areas, timberlands, areas that are prone and vulnerable to natural hazards, areas with critical slopes, areas classified as prime agricultural lands and water bodies.

The Bulusan Volcano mountain ranges including Mt. Agoho and Mt. Jormajan on the northern section have the largest constrained area where there is overlapping of NIPAS lands, the permanent danger zone, pyroclastic flow hazard zones and areas with slope of 30%. Critical slopes can also be found in the Mt. Maraot Banwa in Cawayan, Tabon-tabon and Carrideo as well as in Salvacion adjoining Buenavista and San Isidro. Other areas of critical slopes are in Casini near the boundary with Matnog and in hilly areas in Batang, Gumapia and Tongdol. The areas in the lower elevation at the valley floor that are prone to flooding during heavy rains are also considered under this category. The banks or easement of rivers and creeks are part of water bodies and are therefore constrained areas.

Timberlands not yet declared as alienable and disposable lands in Tabon-tabon, Cawayan, Bolos and Liang with a total of

76.4970 hectares are also considered as constrained areas. Prime agricultural lands are the Network of Protected Agricultural Areas or Network of Areas for Agricultural Development (NPAA/NAAD) of Irosin that falls under ECA category. These are agricultural lands that are protected from any form of conversion so as to keep and preserve the highly suitable agricultural land for primary food crops. In this regard, the existing irrigated and potentially irrigable rice lands of 2,128.39 hectares of the municipality falls under this land resource category.

The total environmentally constrained area in the municipality is estimated to be 7,625.823 hectares which represents 51% of the total land area.

Current and Future Climate Risk

Historical and current extreme weather/climate event that have affected the municipality include El Nino-related droughts and La Nina- related floods. Irosin is also is exposed to tropical cyclones and associated maximal values of 24-hour rains and winds, particular during the northeast monsoon season from October to February. From the period 1948 to 2006, there were 33 tropical cyclones that crossed the Province of Sorsogon or an average of one tropical cyclone every two years. For the same period, the number of tropical cyclone which crossed the province and 100 kilometers from boundaries was 140 tropical cyclones or an average of five every two years. One of the most intense tropical cyclone that directly crossed the

municipality was Typhoon Dinang (Lee) on December 25, 1981 with a peak intensity of 150 kilometer per hour winds.

In 2020, projected temperature increase are 0.8 ^{0}C during the month of December to February, 1.0 ^{0}C in the quarter from March to May, 0.8 ^{0}C during the 3-month period from June to August and 0.8 ^{0}C again from September to November. The highest increase in mean temperature is definitely during its warmest summer months. The projections for mean temperature increase in 2050 are quite higher with 1.8 ^{0}C, 2.2 ^{0}C, 1.9 ^{0}C and 1.7 ^{0}C in December to February, March to May, June to August, and September to November respectively. Again, the highest projected increase is during the warmest months (MAM) as can be seen in Figure 5.

On the other hand, the projected increase in rainfall volume at 2020 climate change scenarios ranges from 2% in March to May to 23% in June to August. The middle values were projected at 13% in September to November and 19% in the quarter of December to February. Projected increase in rainfall Irosin in 2050 are higher with 11% in December to February, 20% in September to November, and 31% in June to August. The warm months of March to May will have a 12% decrease. A 19% increase in rainfall volume in December to February would most likely result to an increase of 200 mm rainfall volume in 2020.

Indicated in the results of extreme daily temperature- and rainfall- trends analysis are that the number of hot days and warm nights are increasing, with the number of cool days and cold night decreasing. Total rainfall shows an increasing trend, with also an increase in the number or frequency and intensity of extreme rain events. These indicate increasing maximum and minimum temperatures coupled with increasing rainfall and thus increasing flooding risk.

Risk Areas

The risk areas in the municipality are the slopes of Bulusan Volcano, the riverbanks, the catchment basin of Cadac-an River and the hills and mountains with steep slopes.

The active crater of Bulusan Volcano is located 7.5 kilometers north from the urban center and straddling the northeastern boundary between barangay Cogon and the municipality of Bulusan. The volcano is part of the Bicol Volcanic Chain with a height of 1,559 meters and a base diameter of 15 kilometers. It is characterized as a stratovolcano formed inside a caldera. Eruption types of the volcano are caldera-forming which occurred 40,000 years ago, strombolian eruptions (1918-1919) and phreatic type (1918-1922, 1980, 2006-2007 and 2010-2011). The hazards associated with Bulusan Volcano are pyroclastic flows, lava flows, lahars and ash fall. A four-kilometer radius around the volcano is declared a permanent danger zone.

The pyroclastic flow hazard zone is about 1,632.72 hectares which encompasses the BVNP forest areas and reaches up to the built-up area of Cogon and Sito Talistison in Mapaso. On the other hand, the lava flow hazard zone overlaps the pyroclastic flow hazard zone and extends further up to five kilometers radius and includes the built-up area of Cogon, Mapaso and portions of the national highway. The lava flow hazard zone covers 2,855.87 hectares of mostly forest and agricultural use lands.

Lahar flows from 2006-2007 ash explosions are mainly confined to gullies at the slopes of the volcano which flows down to the dry creeks of Cogon, Gulang-gulang, Monbon, Mapaso and

Patag. A lahar flow in October 2007 prompted the evacuation of 1,596 persons from near and downstream of the gullies. However, in a worst-case scenario of a cataclysmic eruption of Bulusan Volcano, the areas to be affected by lahar will cover the whole Irosin valley. In this scenario, lahar will inundate the urban areas as well as built-up areas of the rural barangays except for Cawayan, Bagsangan, Salvacion, Casini and Liang. Lahar will affect 4,372 hectares or 29% of the total land area.

Recent activities of Bulusan Volcano are phreatic or steam driven which results to explosion of ash, rock and volcanic materials. The area affected by ash fall is largely determined by the volume of material ejected and the prevailing wind direction. An ash explosion in February 21, 2011 reached 3 kilometers high above the summit and ash blanketed areas to the southwest reaching as far as Masbate Island.

Irosin is listed by the MGB-DENR as among the 48 municipalities in the Bicol Region considered as geologically hazardous and highly prone to flooding and landslides. The municipality is usually affected by tropical storms and typhoons that pass through the Bicol Region. These events triggers landslides, flash floods, mudslides, widespread floods that together with high winds causes destruction to houses, buildings, roads, infrastructures and agriculture.

An estimated 792 hectares of land is frequently flooded. These are areas where heavy torrential rains of one to two days could bring about flooding. Moderate to strong typhoons could submerge these areas in 0.5 to 2.0 meters in flood waters for a few days to a few weeks. Development of urban settlements in these areas is not recommended. These areas are mostly confined to the valley floor near the convergence point of Cadac-an River, Monbon River and Buenavista River. Frequent flooding is also observed near the banks of creeks and rivers of the riparian system of the municipality. A flood assessment report indicates that 21 out of the 28 barangays are flood-

prone, namely San Isidro, Salvacion, Batang, Monbon, San Juan, Bagsangan, Tabon-tabon, Sto. Domingo, Gabao, Bulawan, Tongdol, Gumapia, Carriedo, Buenavista, Macawayan, San Pedro, Patag and Mapaso. A recent flooding incident on January 10-11, 2011 triggered by torrential rains submerged 520 hectares of rice lands and prompted the evacuation of 2,180 persons. The earliest recorded flooding happened on December 24, 1933 when the Cadac-an River burst its banks and several people perished. A concrete river control was constructed in 1937 to keep the violent surge of the river from eroding the *poblacion*.

From the hazard maps of MGB-DENR, an additional 1,336 hectares of lands are considered as occasionally to rarely flooded areas. These are areas that become inundated during moderate to strong typhoons. Flood depths vary from a few centimeters to one meter and floods may last from a few hours to a few days. The rarely flooded area nearly encompasses the whole of Irosin valley and there is no historical reference that flooding of such extent has occurred in the past.

Areas with high susceptibility to landslides are areas with high probability of occurrence of mass movements particularly rock and debris slides, slumps and debris flow. The crater walls surrounding the Irosin valley, the volcanic ravines and gullies of Bulusan Volcano and the very steep and nearly vertical slopes underlain by Tabon-tabon volcanic are rated high susceptibility areas and are unsuitable for urban land use.

Twenty-two out of the 28 barangays of Irosin have zones with landslide hazard and a total of 102 landslides were mapped. Barangays located at undulating hills and mountains have the highest number of landslide mapped where Mapaso has 11 landslide mapped, Salvacion has 15, Liang has 13, Casini has 6, Batang has 11, Gabao has 9 and Bagsangan has 7 landslide mapped. Five landslides were mapped in Patag, four each in Monbon, Bulawan, Cogon, Bolos, three in barangay Tongdol, two

in Cawayan, and one each in San Isidro, Gulang-gulang, San Julian and Buenavista.

There are no known active faults traversing the municipality of Irosin. The most active fault in the area is the Masbate Fault located 45 kilometers southwest in Masbate and Ticao Islands. Another fault in the vicinity is the Northern Samar Lineament which is located southeast about 55 kilometers in Samar Island. The nearest fault is an unnamed fault traversing the Bicol Region that ends in Sorsogon Bay located just 30 north of the municipality. All faults in the area are in a northwest to southeast orientation. The Philippine Trench is 180 kilometers to the west at the Philippine Sea.

Recorded earthquake epicenters from 1600 to 2005 in the vicinity of Irosin are mostly clustered in the Masbate Fault and in San Bernardino Strait. Past earthquakes of significant strength include the 1954 magnitude 6.7 earthquake with epicenter in Sorsogon City which is 30 kilometers away. A magnitude 7.4 earthquake also occurred in 1943 with an epicenter at San Bernardino Strait about 35 kilometers away.