

To

The Principal

Kabi Sukanta Mahavidyalaya

Bhadreswar, Hooghly

Sub: Prayer for granting permission for Educational Excursion and Field Work

Respected Sir,

An educational excursion cum field work has been organized by the Department of Geography to Gangtok and North Sikkim from 25.03.2022 to 31.03.22 with 42 students and 3 teachers. This activity is a part of our U.G. level syllabus.

In this context, we seek your kind consent and approval so that we can carry out the task smoothly.

With regards,

Place: Bhadreswar

Date: 22/3/22

Yours faithfully,

*Allowed Excursion & field work*  
*Asst. Prof. M. Ray*  
*22/03/22*  
PRINCIPAL  
KABI SUKANTA MAHAVIDYALAYA  
P.O.-ANGUS DIST. HOOGHLY

*[Signature]*  
*[Signature]*  
*[Signature]*

## 4th Semester

Sl	Name	Gender	Age
1	Akash Mondal	Male	19
2	Amarnath Nandi	Male	19
3	Animesh Das	Male	19
4	Aparna Nandy	Female	18
5	Debanjan Dey	Male	19
6	Debkumar Rajbanshi	Female	19
7	Jeyeta Das Mondal	Male	20
8	Kuntala Kundu	Female	20
9	Madhuri Lal	Male	19
10	Manas Ghosh	Female	20
11	Masoom Mondal	Male	19
12	Mrinal Bapari	Female	20
13	Neha Choudhary	Male	19
14	Purbasha Bera	Female	18
15	Radharaman Das	Male	19
16	Ramananda Basak	Female	20
17	Rima Mondal	Male	19
18	Santanu Kundu	Male	19
19	Saroda Ghosh	Female	18
20	Sayan Chatterjee	Male	19
21	Souvik Sadhukhan	Female	20
22	Subham Barik	Male	19
23	Sumana Roy	Male	20
24	Sumangal Dhali	Female	19
25	Supriya Manna	Male	20
26	Surajit Hansda	Female	19
27	Suranjan Hansda	Male	20

## 6th Semester

Sl	Name	Roll	Gender
1	Nandita Santra		Female
2	Tarun Chakraborti		Male
3	Nandini De		Female
4	Ankita Kolay		Female
5	Aditi Kundu		Female
6	Mrinal Pramanick		Male
7	Smreeti Biswas		Female
8	Shrabanti Ganguly		Female
9	Sourav Basak		Male
10	Ramen Halder		Male
11	Raju Malo		Male
12	Sreyoshi Paul		Female
13	Subha Pal		Male
14	Kabita Biswas		Female
15	Sahina Khatun		Female

Teachers.

1. Prasrajit Pal.
2. Dr. Golam Mostafa.
3. Dr. Mitrajit Chatterjee.

9/10/2022  
 Excursion  
 Field Work  
 M. J. Ghosh  
 23/03/2022  
 PRINCIPAL  
 KABI SUKANTA MAHAPATRAYANA  
 FO-ANGUS DIST. HOOGHLY

# Socio Economic Profile of the selected wards of Gantok Municipality of Sikkim









*A Field Report on*

**Socio-Economic Profile  
of the selected Wards of  
Gangtok Municipality of Sikkim**

*Under the Supervision of*

Dr. Golam Mostafa & Sri Prasenjit Pal

*Assistant Professors  
Kabi Sukanta Mahavidyalaya  
Bhadreswar, Hooghly*

Submitted as a part fulfillment of the CBCS syllabus of B.A./B.Sc. Honours  
SEM-V, Paper: CC-11 (Unit-2, Practical)



*The University of Burdwan*

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# **Chapter-1: INTRODUCTORY**

## 1.1 INTRODUCTION:

The very definition of Geography tells that it deals with the topography or structural understanding of the Earth. Therefore, a field study is must in order to understand the structure and physical features of the surface or any components of the planet. A field study is a general method for collecting data about users, user needs, and product requirements that involves observation and interviewing. Data are collected about task flows, inefficiencies, and the organizational and physical environments of users. Field studies allow geographers to gather their own (primary) data, provide opportunities to extend classroom learning through direct observation and experience, and allow for scientific research through field experiments. Field study thus helps us to understand the degree and direction of spatio-temporal dynamics.

Rapid urbanization and urban growth lead to rapid destruction of green infrastructure, high emission of greenhouse gasses (GHG) from transportation, construction, manufacturing and associated sectors. High waste generation and improper management and disposal of the waste further aggravate the problem. The ecological footprints of supplying food and basic services like water along with the destruction and deterioration of other ecosystem services makes the urban areas vulnerable to hazards and climate impacts both in the short and the long term. The problems get further accentuated because of poor regional and urban planning practices and weak implementation of planning bye laws and development control regulations.

## 1.2 RESEARCH PROBLEMS:

All of the anthropogenic activities associated with the urbanization processes have significant impact on the local climate, including heat island effects leading to increased variability and intensity of rainfall, temperature and humidity. As a result, the urban areas become more vulnerable to hazards, disasters and epidemics and disease. Under such circumstances vulnerability mapping and evolving response and coping mechanism by internalizing them in sustainable habitat planning and development practices becomes important. Local adaptation strategies are important because the meaning of urban environmental issues vary across regions and cultural realms through destruction of green infrastructure, heavy constructional works, and combustion of fossil fuels (UNHABITAT, 2011). Taking action to mitigate the problem is important but equally important is to design adaptation strategies which are locally conducive (The World Bank, 2010). In these contexts, the present study, is an attempt to explore the nature and pattern of urbanization in Gangtok City, the existing urban environmental condition and its' linkages in creating urban vulnerability as being witnessed in the region.

### 1.3 THE PROPOSED WORK:

The very field report has been prepared on the socio-economic condition of Ward Nos. 11, 12, 13 & 14 of Gangtok Municipality, the capital and leading urban center of Sikkim. The proposed work has been carried out as a part fulfillment of the CBCS syllabus of B.A./B.Sc. Honours SEM-V, Paper: CC-11 (Unit-2), in Geography of The University of Burdwan.

### 1.4 MOTIVATION OF THE STUDY:

Gangtok, the capital city of the Eastern Indian State of Sikkim, with a backdrop of the Himalayas, offers breath taking vistas, colourful lifestyles, Buddhist shrines, adventure, water sport, exquisite flora and fauna, including hundreds of varieties of butterflies. It has an amazing view of mount Kanchenjunga, the third highest mountain peak in the world. Gangtok has established itself as one of the most popular tourist destinations offering a perfect vacation to all. The city is wrapped with nature's wonders and is characterized by a laid-back culture. The inevitable physically expanding urban areas in a Gangtok City located in Eastern Himalayan range, at an elevation of about 1,650m (5,410ft) are increasing. The complexity of urban development, especially in a hilly town like Gangtok is so rapid that it demands quick response and perspective physical planning of the city. This study, hence, a humble attempt to have the urban environmental problems of Gangtok city and to establish the cohesion of the urban structure that is built on a relatively fragile geological and geographical environment.

### 1.5 LOCATION AND ACCESSIBILITY:

The present Study area is comprised of the Words Nos of 11, 12, 13 & 14 of Gangtok city, the capital of Sikkim state, which lies on a tributary of the Tista River in the southeast-central part of the Sikkim state. Gangtok was a small hamlet until the construction of the Enchey Monastery in 1840 made it a pilgrimage centre. It became a major stopover between Tibet and British India at the end of the 19th century. Following India's independence in 1947, Sikkim became a nation-state with Gangtok as its capital. In 1975 the monarchy was abrogated and Sikkim became India's twenty-second state, with Gangtok remaining as its capital. The coordinates of the area under study are of 27° 20' 20" N and 88° 36' 23" E (Fig.: 1). It has an average elevation of 1437 metres (4,714 feet).

From Bhadreswar, the Gangtok city was approached through Howrah-New Jalpaiguri Railway line from Bandel Station to New Jalpaiguri then followed by a road link of about 120 Km to reach the destination.



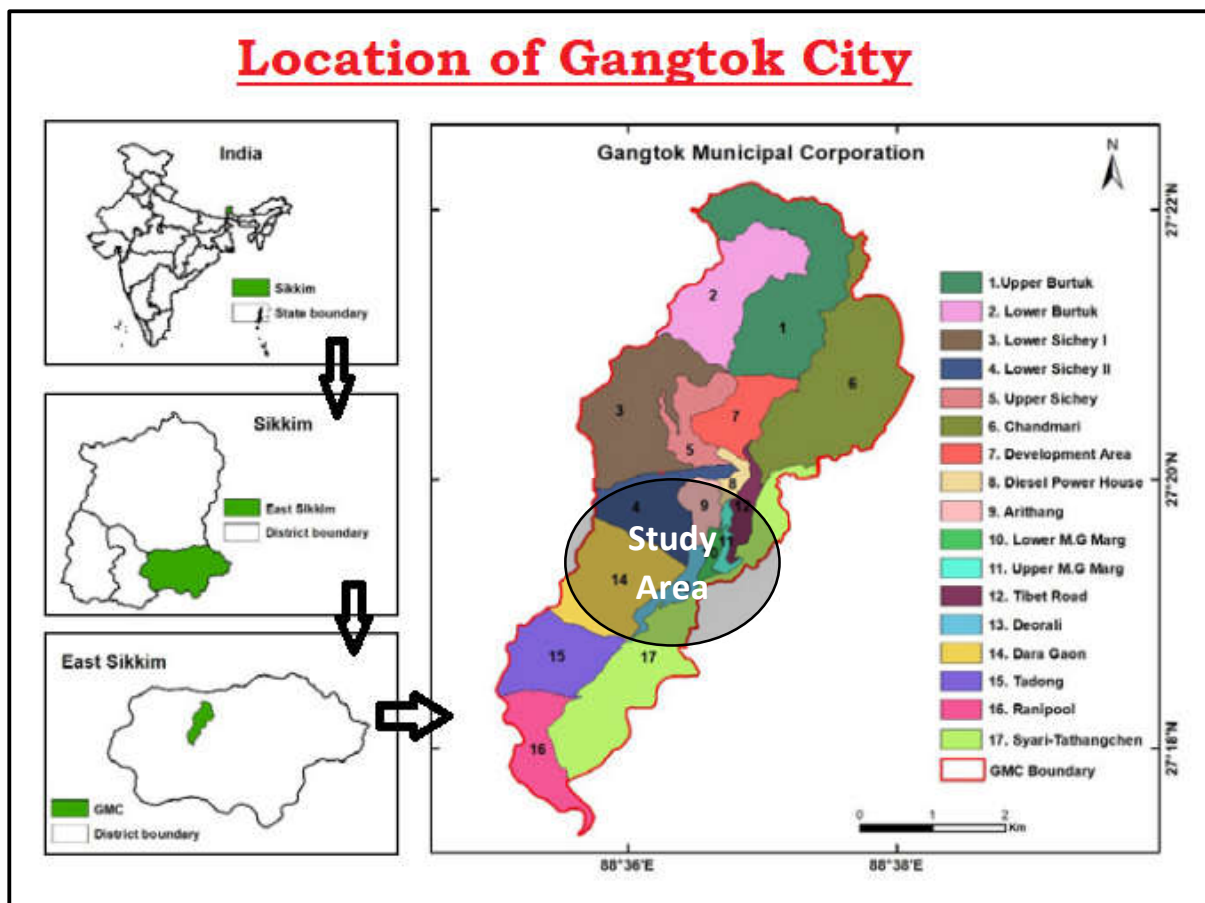


Figure No.: 1

### 1.6 OBJECTIVES:

The present work is an attempt to address the urban environmental issues and possible mitigation measures of Gangtok city of Sikkim. More specifically, the main objectives of the present study are:

- To make a profile of socio-economic development and integration with development of the inhabitants of the Gangtok City in reference to the existing urban environment,
- to identify and evaluate the urban environmental problems of the resident communities of Gangtok City regarding their standard of living, and
- to ensure people's participation in all urban developmental activities to have eco-restoration, eco-development and eco-preservation in Urban environment of Gangtok city.

### 1.7 DATABASE:

Prior to visit of Gangtok the existing literatures were surveyed and a prelude to the field work has been prepared. The limited literatures include The Gazetteer of Sikkim, (1989), by Sikkim Nature Conservation Foundation, Gazetteer of Sikkim, (1894) by the British Official H.H. Risley, Politics of Sikkim: A Sociological study, (1975), by A.C. Sinha, The Beautiful India: Sikkim, (1977), by Chib Sukhdev Singh, Annexation of Sikkim, (1984), by Dutta- Ray

Sunanda, K. Smash and Grab, The Eastern Himalayas: Environment and Economy (1986), by Sarkar, R.L., Lama and P. Mahendra, etc.

Primary data on various aspects concerned with the present work have been generated from field visit to different parts of the area (Ward No. 11, 12, 13 & 14) under study. Quantitative as well as qualitative information have been generated through direct oral interactions, group discussions with the people engaged in various occupations and having long experience in different activities performed in the study area.

### 1.8 METHODOLOGY:

Very simple and popular techniques have been adopted to frame the proposed field report. The whole work is divided into three sessions:

The **pre-field session** mainly deals with the collection and review of literatures on Gangtok and Sikkim, collection of different maps and images and secondary data related to the physical and socio-economic aspects of the study area and the preparation of working layout.

In the **field session**, the Gangtok Tourism Syndicate, Gangtok Police Station, Office of Gangtok Pollution Control Board, JNNURM Office of Gangtok and Gangtok NRDMS Office have been visited to collect different data related to urban environmental problems of Gangtok city. Group-wise door to door survey is also carried out (randomly selected households of Ward No. 11, 12, 13 & 14) to have the primary data (Total Sample size 74) on the livelihood and socio-economic status of the residents, different issues of urbanization process faced by the resident communities and the opinion of different stakeholders regarding mitigation of the urban environmental problems of Gangtok City.

In the **post-field session**, all the data collected from primary and secondary sources have been collated, tabulated and represented diagrammatically through suitable cartographic techniques to have a complete project report.

### 1.9 LIMITATIONS OF THE STUDY:

Every area is composed of different physical and socio-cultural set up. Therefore, the approach of analysis applied in the very study to prove into the impacts of dam of the selected area may not be useful for other areas with different physico-social set up. Every study suffers from some loose ends that cannot be tackled by a researcher working for different aims and objectives. One can develop other approaches to prove such queries, thus the study cannot be treated as full proof.



## Chapter-2: PHYSICAL ENVIRONMENT

The town of Gangtok in Sikkim is one of the fastest growing towns in India. Since last three decades, Gangtok is experiencing a widespread conversion of natural forest and farmland into a built up, commercial and industrial area. This unsystematic land use changes seriously affect the biodiversity of local habitat. Additionally, the urban residents have progressed faster than any other town of Sikkim.

### 2.1 PHYSIOGRAPHY & GEOLOGY:

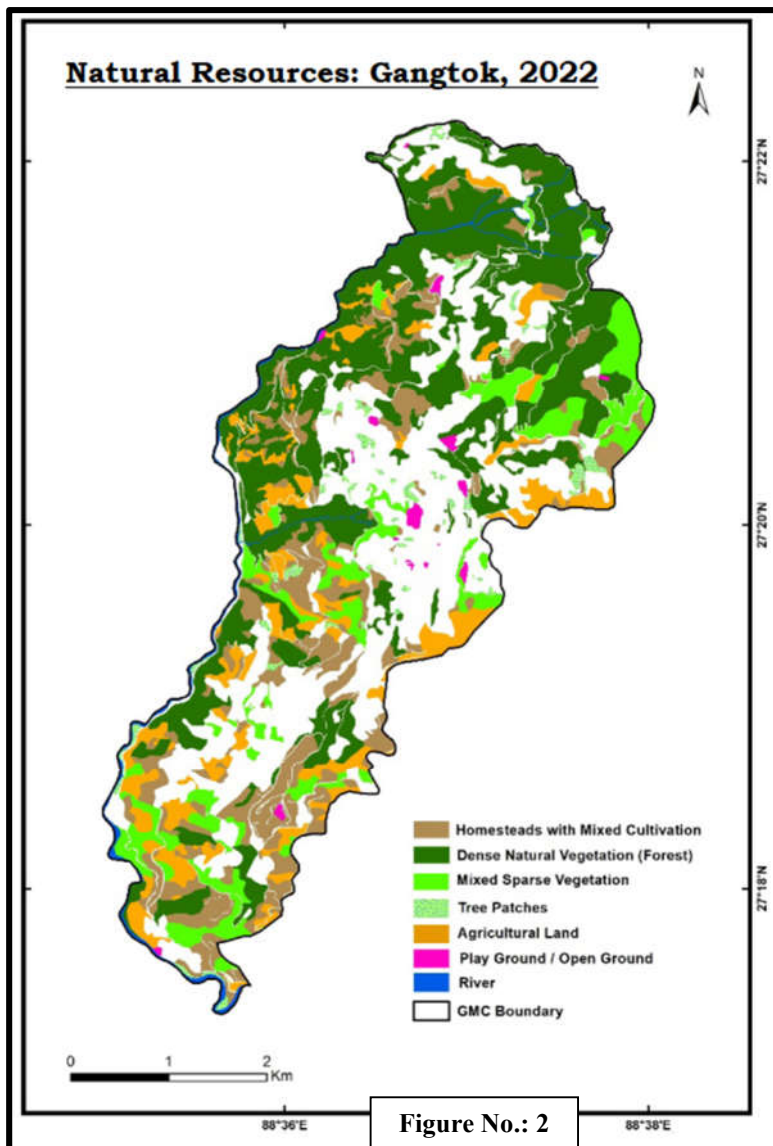


Figure No.: 2

Gangtok is located at 27.3325°N 88.6140°E (coordinates of Gangtok head post office). It is in the lower Himalayas at an elevation of 1,650 m (5,410 ft). The town is on one side of a hill, with "The Ridge", a promenade housing the Raj Bhawan, the governor's residence, at one end and the palace, at an altitude of about 1,800 m (5,900 ft), at the other. The hills are nestled within higher peaks and the snow-clad Himalayan ranges tower over the town from the distance. Mount Kanchenjunga (8,598 m or 28,208 ft)—the world's third-highest peak—is visible to the west of the city (Fig.: 2).

Most of the Sikkim state, including Gangtok, is underlain by Precambrian rocks which contain foliated phyllites and schists; slopes are therefore prone to frequent landslides. Surface runoff of water by natural streams (jhora) and man-made drains has contributed to the risk of landslides. According to the Bureau of Indian Standards, the town falls under seismic zone-IV (on a scale of I to V, in order of increasing seismic activity), near the convergent boundary of the Indian and the Eurasian tectonic plates and is subject to frequent earthquakes.



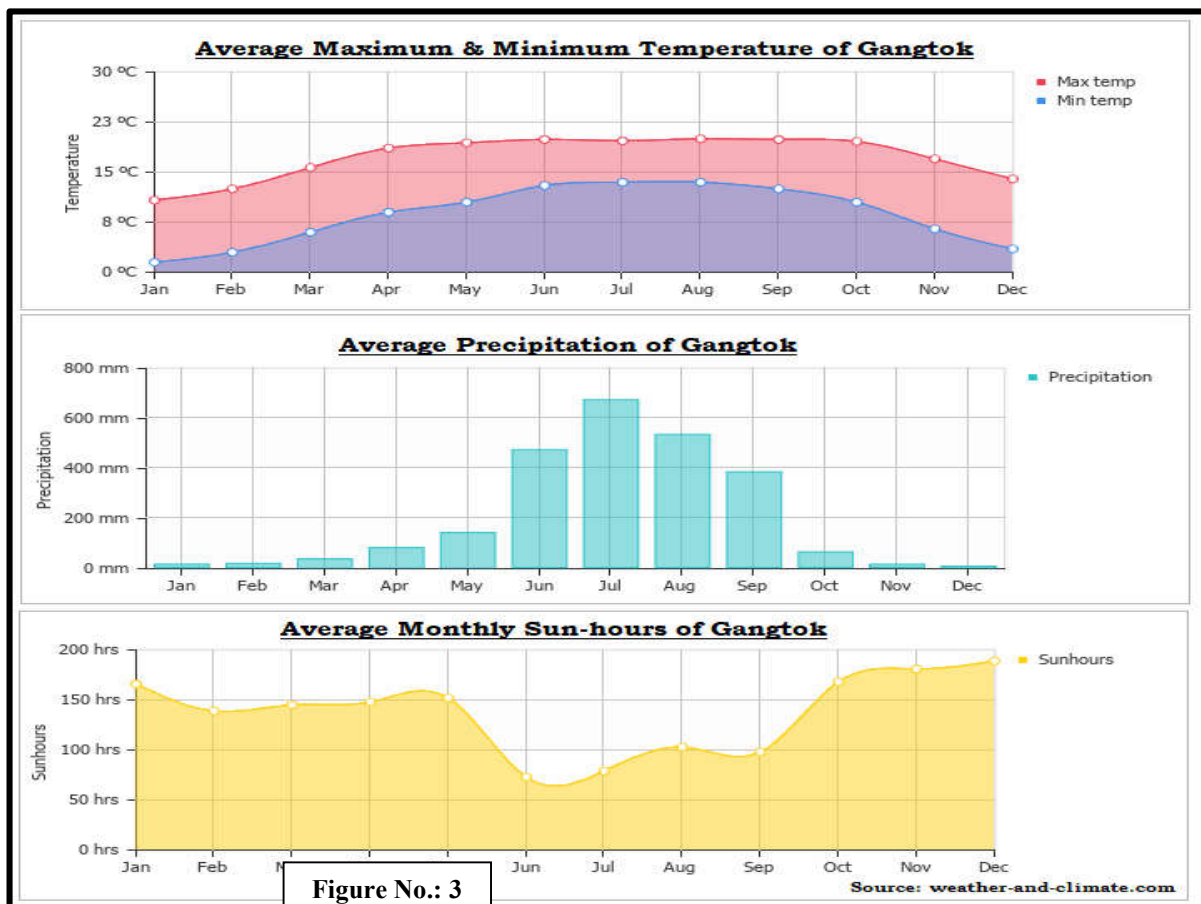
## 2.2 SURFACE DRAINAGE

The city is flanked on east and west by two streams, namely Roro Chu and Ranikhola, respectively. These two rivers divide the natural drainage into two parts, the eastern and western parts. Both the streams meet the Ranipul and flow south as the main Ranikhola before it joins the Teesta at Singtam.

## 2.3 SOIL TYPES:

It revealed that soils of Sikkim belong to 3 orders, 7 suborders, 12 great groups and 26 subgroups. It is observed that Inceptisols are dominant (42.84%) followed by Entisols and Mollisols occupying 42.52% and 14.64% respectively. The soil pH varies from 4.3 to 6.4. The organic carbon contains ranged from 0.36 to 5.6 while sand, silt and clay content of the soils were 55.098.0%, 7.0-29.0% and 4.0-24.0%, respectively. The available nitrogen, phosphorus and potassium content of the soils varied from 10.0-280.0, 4.0- 175.0 and 45.0-490.0 ppm, respectively. The total Zn, Cu, Mn, Fe, Band Mo content of the soil varied widely. The soils are rich in available Zn, Cu, Mn and Fe however; about 94% of the soil could be rated as deficient in available boron and 85% in available molybdenum. In order to correct the pH of the soil liming is being done. However, with the application of enough organic manure and fertilizers also showed improvement in Soil pH as well as the fertility status has also improved.

## 2.4 CLIMATIC CONDITION



Gangtok features a monsoon-influenced subtropical highland climate (Köppen: Cwb). Because of its elevation and sheltered environment, Gangtok enjoys a mild, temperate climate all year round. Like most Himalayan towns, Gangtok has five seasons: summer, monsoons, autumn, winter and spring. Temperatures range from an average maximum of 22 °C in summer to an average minimum of 5 °C in winter. Summers (lasting from late April to May) are mild, with maximum temperatures rarely crossing 25 °C. The monsoon season from June to September is characterised by intense torrential rains often causing landslides that block Gangtok's land access to the rest of the country. Rainfall starts to rise from pre-monsoon in May and peaks during the monsoon, with July recording the highest monthly average of 649.6 mm. In winter, temperature averages between 4 °C and 7 °C (Fig.: 3). Snowfall is rare and in recent times, Gangtok has received snow only in 1990, 2004, 2005 and 2020. Temperatures below freezing are also rare. During this season the weather can be unstable and change abruptly from bright sunshine and clear skies to heavy rain within a couple of hours. During spring and autumn, the weather is generally sunny and mild. Owing to its elevation, Gangtok is often enveloped in fog during the monsoon and winter months.

## 2.5 VEGETATION

There are densely forested regions around Gangtok, consisting of temperate, deciduous forests of poplar, birch, oak and elm, as well as evergreen, coniferous trees of the wet alpine zone. Orchids are common and rare varieties of orchids are featured in flower shows in the city. Bamboos are also abundant. In the lower reaches of the town, the vegetation gradually changes from alpine to temperate deciduous and subtropical. Flowers such as sunflower, marigold, poinsettia and others bloom, especially in November and December.

## 2.6 LAND USE CHARACTERS

Land is one of the most important natural resource. Land use refers to the purpose the land serves, for e.g., recreation, wildlife habitat, agriculture, industrial etc. In others words, land use pattern be described as the multifaceted use of the land, which includes both its use and misuse. Landuse indicates the activity to which an area of land is devoted.

Mixed land use pattern is one of the prominent features of Gangtok. The land use pattern of the study area has been categorized into six categories i.e. residential, commercial, public and semi-public, transportation, industrial and recreational. In post-merger period, public and semi area has expanded from merely 0.55 per cent in 1975 to 21 per cent in 2011; this is because of creating of more infrastructures in the public sector. As per North East Urban Development Project Report, 2012, the total size of the town in 1975 was 240.5 hectares which has expanded to 79 sq.km in 2011, including surrounding colonies. In the last three decades, it is observed

that the total development area has been increasing (Fig.: 4). The highest growth rate has been seen in the industrial sector, which shows a growth rate of 363.41 per cent from 1985 to 1995. There has also been a considerable increase in the transport (6 er cent) and recreational (1 per cent) sector in between 1975 to 2011.

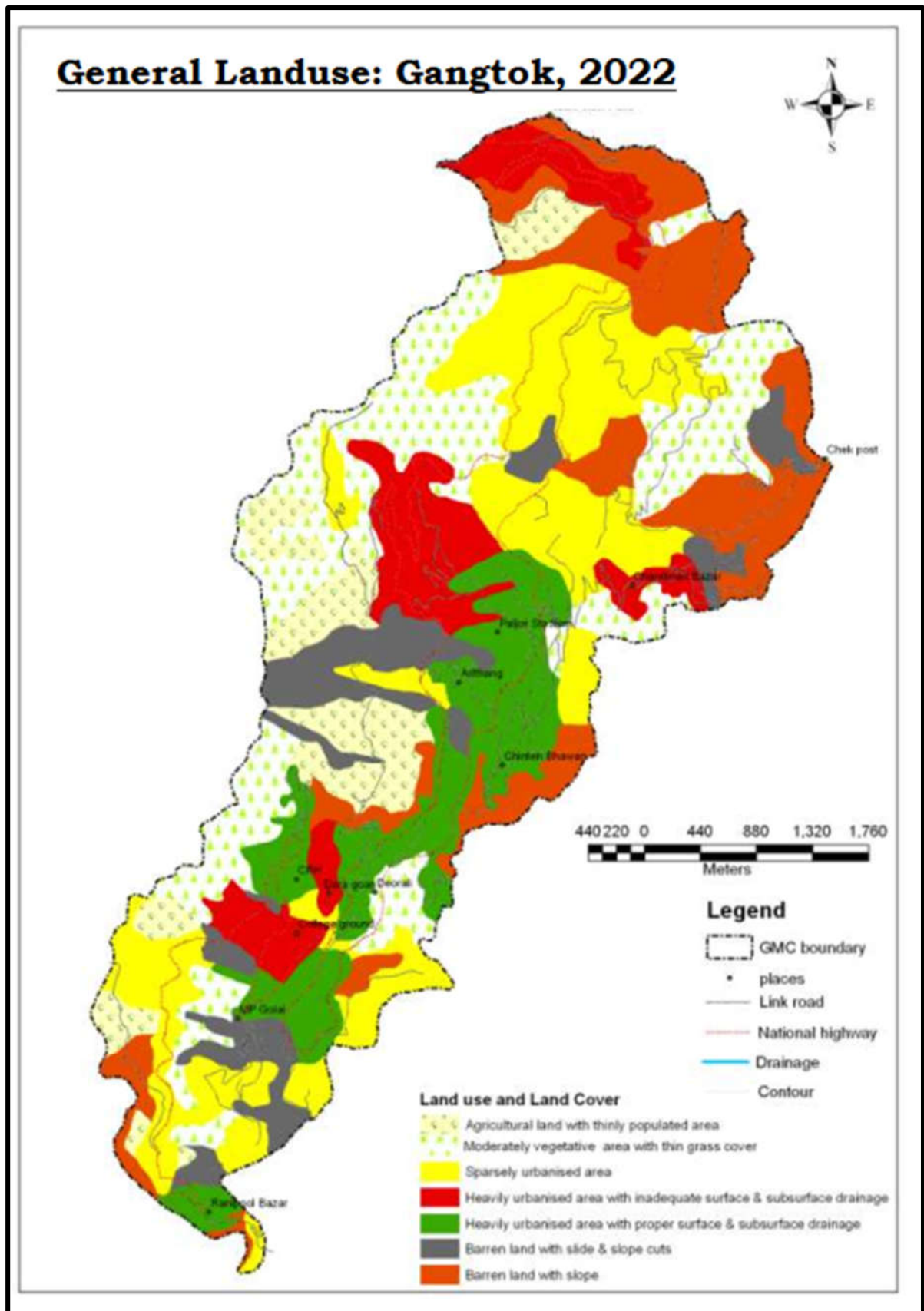


Figure No.: 4



## **Chapter-3: SOCIO-ECONOMIC ENVIRONMENT**

Due to tough terrains and other natural obstacles, the population distribution of Gangtok is uneven. Gangtok Municipal Council has been subdivided into 15 wards. Highest population is recorded in Syari-Tathangchen ward (11,028) followed by Burtuk (9957). The average density of the city is 52 persons per Km<sup>2</sup>. It shows wide variation ranging from 330 persons per Km<sup>2</sup> in Lower M.G. Marg to 19 persons per Km<sup>2</sup> in Lower Sichey. The areas that show maximum density are M.G. Marg., Deorali, Arithang and Diesel Power House area of Gangtok (Census, 2011).

### 3.1. POPULATION CHARACTER:

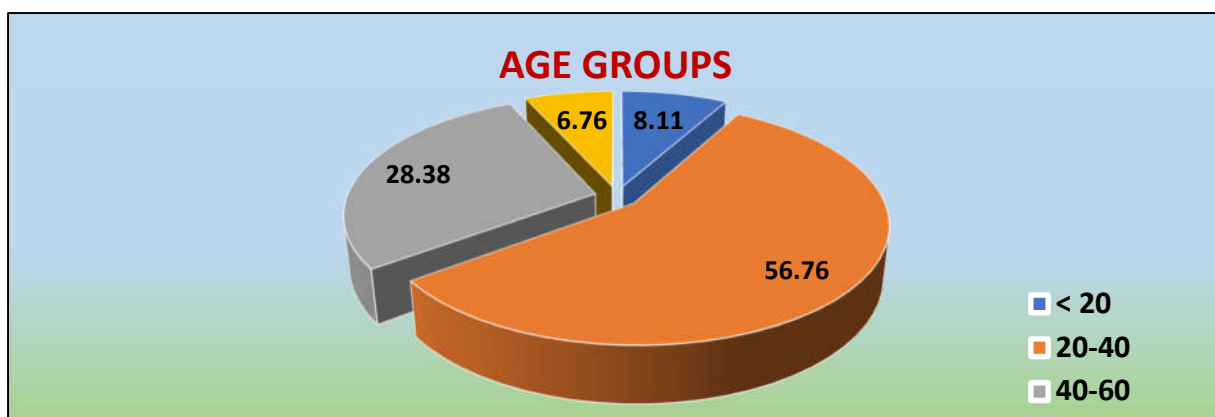


Figure No.: 5

Source: Field Survey, MAR-2022

According to our surveyed data, we have tried to figured out the population structure of the Gangtok City. In there, more than 6 members in a family is higher than 18.9%, less than 68.9% family has 3-6 members and 12.2% family has less than 3 members. The maximum male population can be seen in 21-40 age group and maximum female population can be seen in 21-40 age group. It is also shown 0-10 aged population is also high for both male (19.8%) and female (19.5%) population (Fig.: 5 & 6).

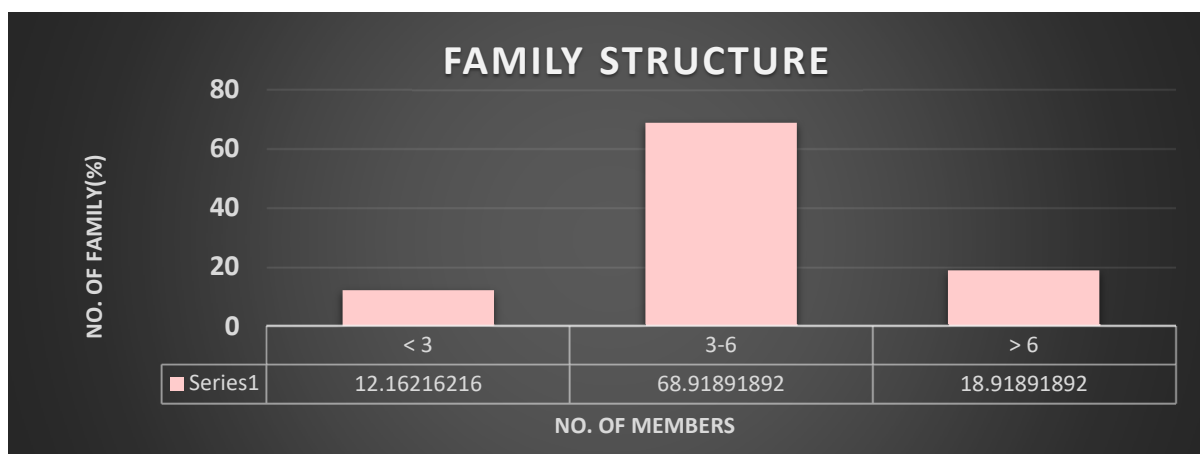


Figure No.: 6

Source: Field Survey, MAR-2022

### 3.2. LITERACY:

From the collected data, we can say that the adult literacy rate is near about 77.4%. Where male literacy is 74.5% and female literacy is 80.3%. It is observed that more than 24.32% people are primary educated where education more than higher secondary level is 44.2% (Fig.: 7 & 8).

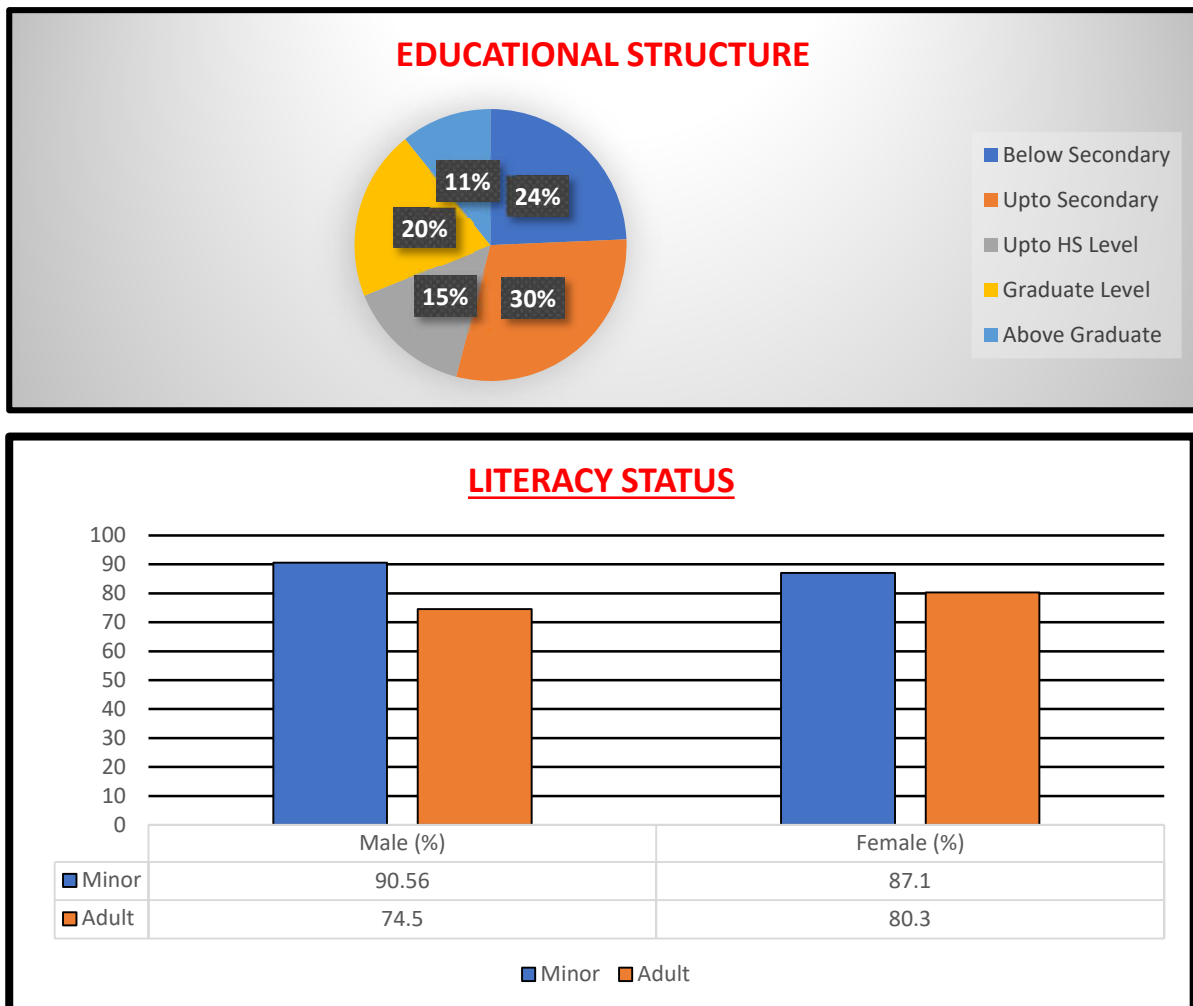


Figure No.: 7 & 8

Source: Field Survey, MAR-2022

### 3.3. OCCUPATIONAL STRUCTURE:

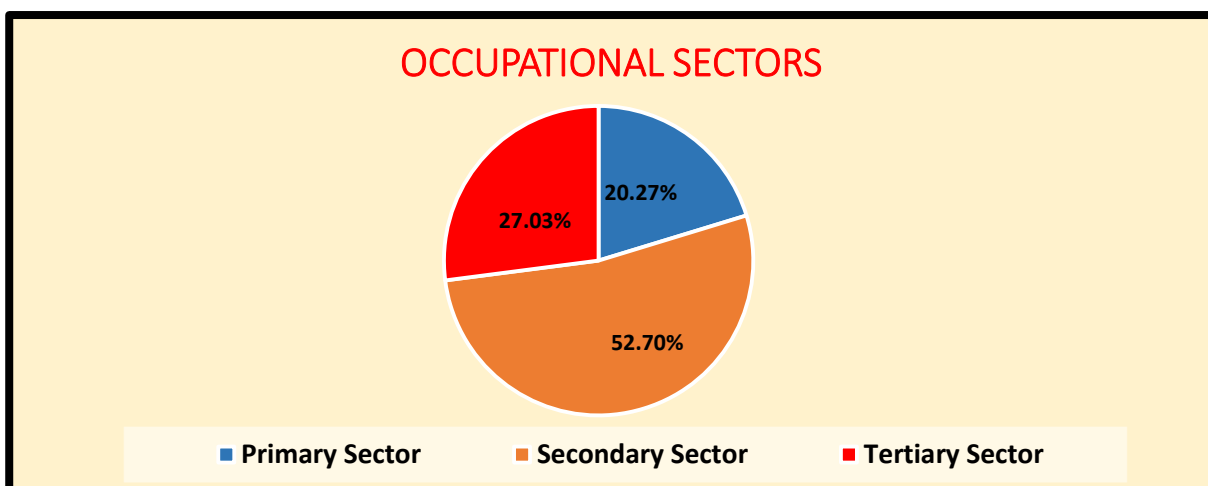


Figure No.: 9

Source: Field Survey, MAR-2022

The principal occupations have been found are salaried persons of both public and Private sectors, Business and labours of daily, contractual or permanent basis. A king size of population are engaged in tourism industry directly or indirectly (Fig.: 9). On the other hand, the higher educated people belong to service sector. It is shown from the primary survey that more than 80% people are earning 2 lakh or less annually. More than half people are saving their earning on monthly basis (Fig.: 10 & 11).

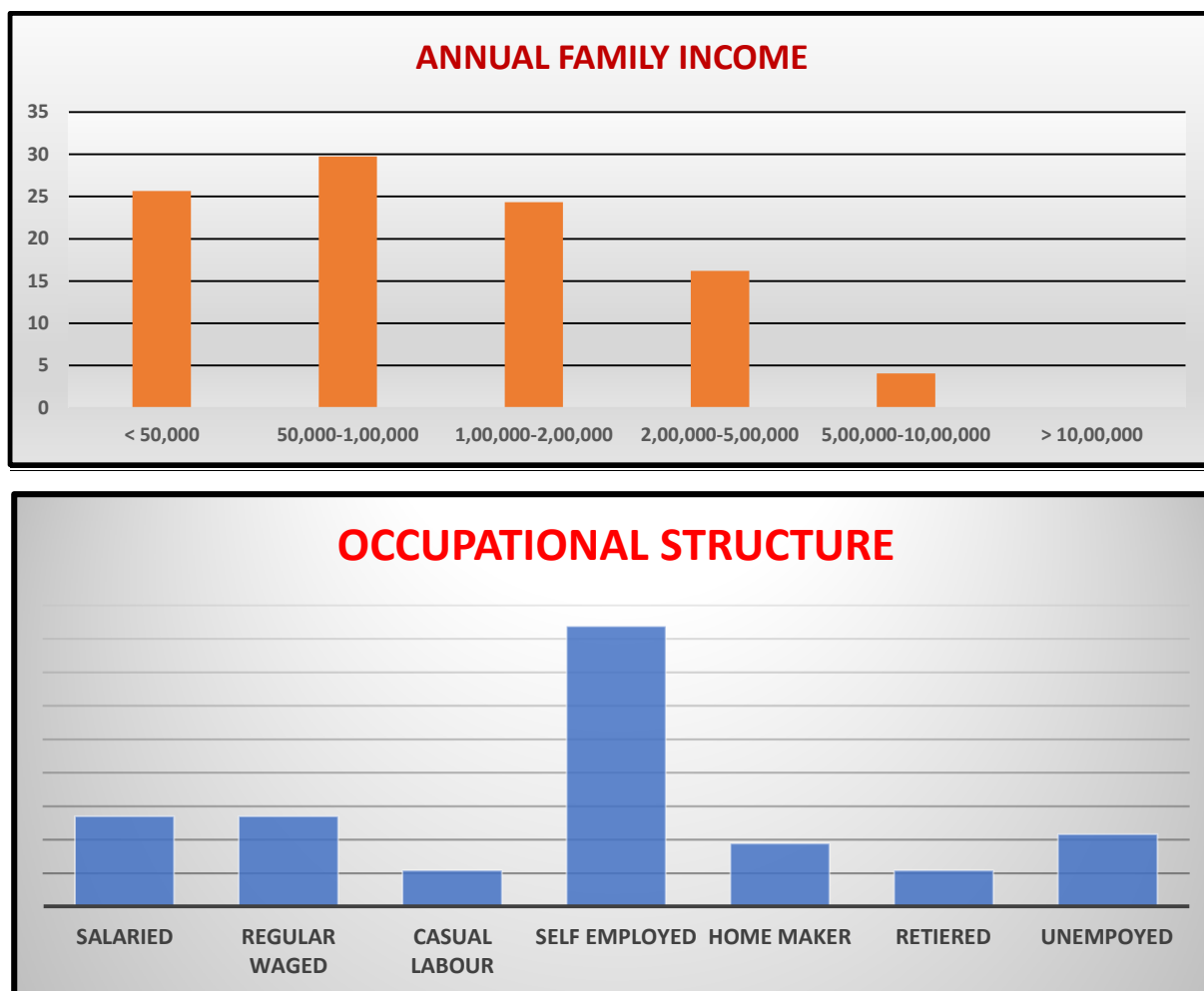


Figure No.: 10 & 11

Source: Field Survey, MAR-2022

### 3.4. RESIDENTIAL STATUS & TRANSPORT SYSTEM:

The great majority of Sikkim's population is rural, living in scattered hamlets and villages. Gangtok is Sikkim's largest settlement. Other notable towns include Singtam, Rangpo, Jorethang, Naya Bazar, Mangan, Gyalshing, and Namchi. The survey on the selected areas depicts that, almost half of the population of the city resides in their own home (52%). The people residing near to the heart of the market are using their houses as shop cum residents which is almost 67% of the total houses. Most of the shops are located beside the main roads and the houses found far from the main road are generally the residential houses. Almost all the buildings in the study area are pucca buildings mostly made up of concrete and heavy construction materials and are of more than two storied (Fig.-12).



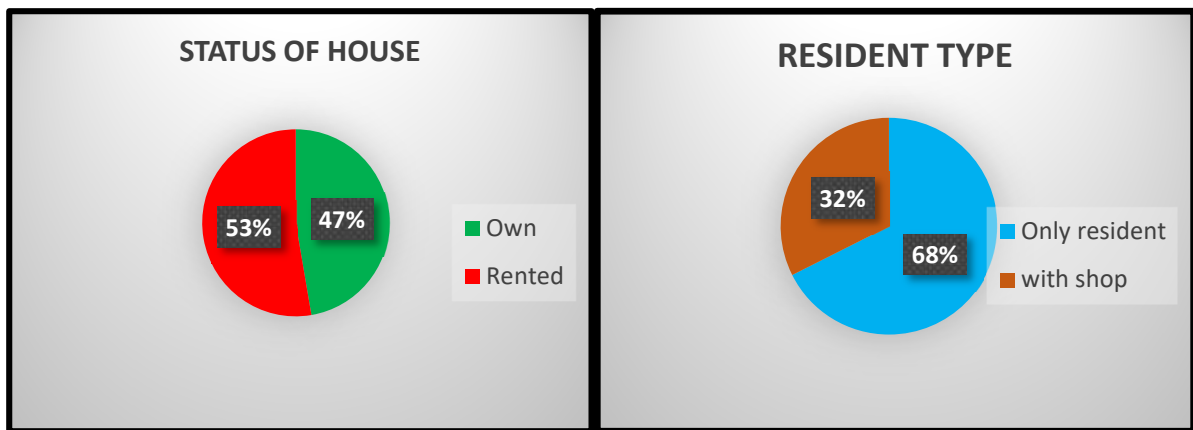


Figure No.: 12

Source: Field Survey, MAR-2022

Being an urban capital region, almost all the roads of Gangtok city are metaled in nature. On the basis of the survey, it is shown that about 30% roads are far from home which is mainly main roads. It is also worth mentioning that more than 60% roads are still metaled approach roads. There are only two major modes of transportation that are motorbike and car (Fig.: 13). A large number of cars is used for tourism business purpose. And the road transport and communication of the area is well organized. Though Gangtok is the Capital city of Sikkim, but there is no airport or railway communication due to mountainous landscape. The nearest airport is Bagdogra which is about 100 km away from Gangtok.

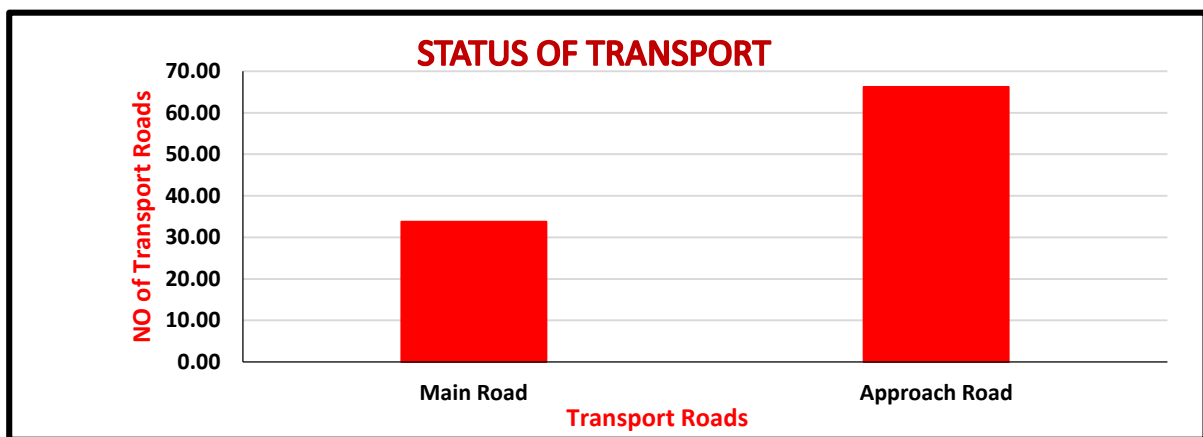


Figure No.: 13

Source: Field Survey, MAR-2022

### 3.4. CULTURAL SET UP:

Bordered by four sides with China occupied Tibet in the North and North East, Bhutan in the East, Nepal in West and the Indian State West Bengal, different ethnic cultures and communities are found here in Gangtok People found here are generally known as Nepalese, Bhutia, Tibetan, or Lepcha.

**Language and religion:** The local people in Gangtok generally speak Nepali. Apart from this, they even speak Hindi, English, and other languages (fig-14). Though the main language of

Gangtok city is Nepali but in the study area the mostly speaking language is Hindi (Fig-14). People of different religions are found here like Hindus, Buddhists, Christians, and Muslims.

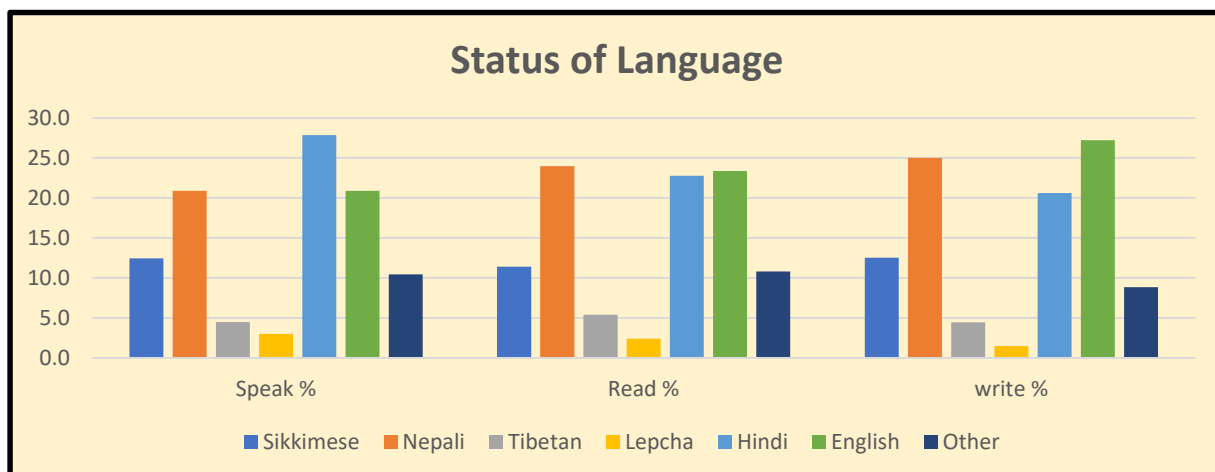


Figure No.: 14

Source: Field Survey, MAR-2022

**Fair and Festival:** The major religious festivals of Gnagtok are Diwali, Christmas, Dusshera, Holi etc. Maghe Sankranti, Ram Navami are some of the important Nepal festivals Chotrul Duchen, Buddha Jayanti, the birthday of the Dalai Lama, Loosong, Bhumchu, Saga Dawa, Lhabab Duechen and Drupka Teshi are some other festivals (Fig-15).

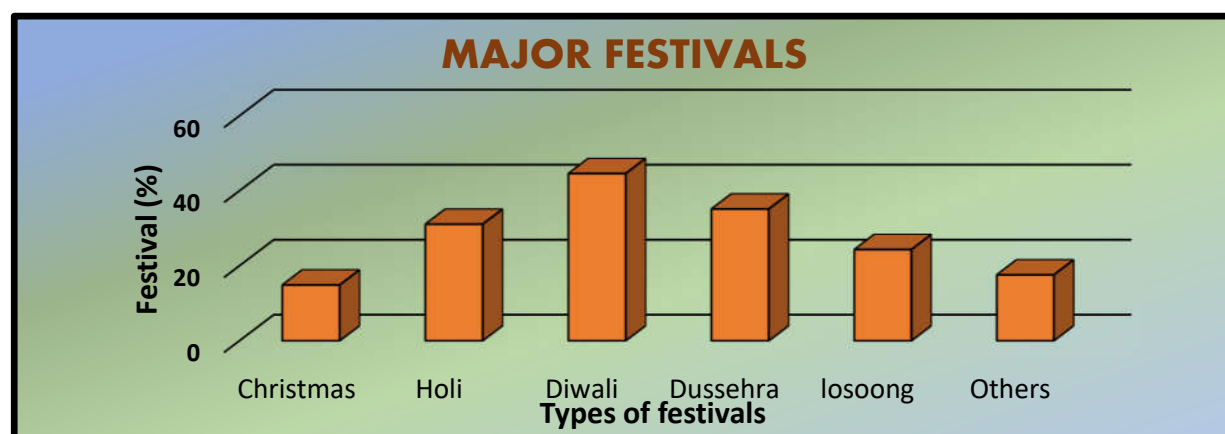


Figure No.: 15

Source: Field Survey, MAR-2022

**Food:** A popular food in Gangtok is momo. A form of noodle called thukpa served in a soup form is also popular here. Other noodle-based foods such as the chowmen, thanthuk, fakthu, gyathuk and wonton are also eaten here. Traditional Sikkimese cuisine includes shah-phaley and Gack-ko soup. Churpee, a kind of hard cheese made from cow's or yak's milk is also popular among the people.

### 3.6. WATER SUPPLY, SANITATION AND WASTE DISPOSAL:

**Water Supply:** Urban households in the area under study are supplied by the central water system maintained and operated by the Public Health and Engineering Department (PHED). The main source of PHED water supply is the Rateychu River located about 16 km from the

city, at an altitude of 2,621 m (8,599 ft). Its water treatment plant is located at Selep. In terms of urban water supply, the study area experiences three major sources of water of which, about 70% is served by Gangtok Municipal Corporation followed by spring water (13%) and tanks (13%). Only 4% of water supply is from other sources (Fig.- 16).

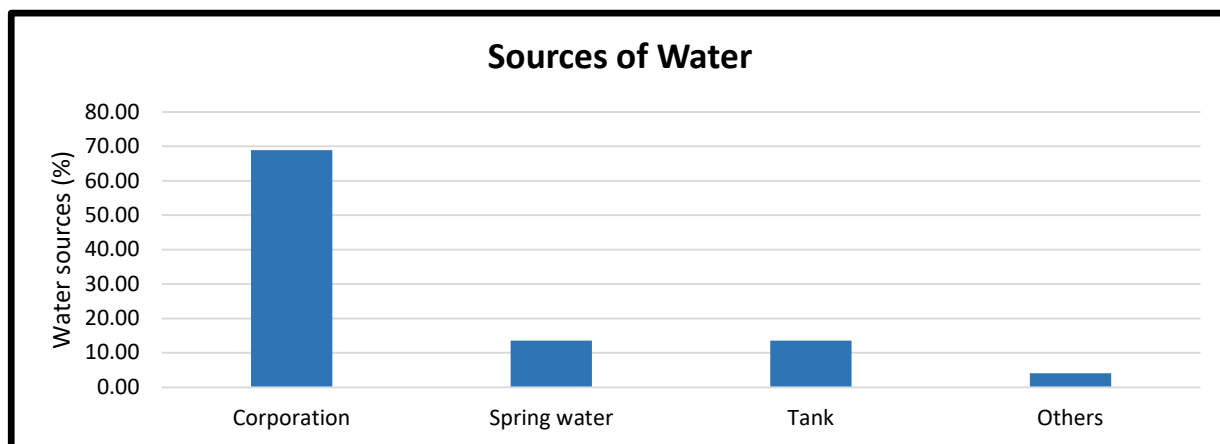


Figure No.: 16

Source: Field Survey, MAR-2022

**Sanitation:** The small northeastern hill state of Sikkim is the cleanest in India, according to the National Sample Survey Office (NSSO). From the household survey, it is clear that, almost all inhabitants in Gangtok have latrines with high sanitation and hygiene standards. About 100% of people in area under study use household or community toilets (while 98.2% of households have sanitary toilets). The people of Gangtok are very aware of the sanitation and healthcare of themselves. About 60% of the household use own sanitary toilets where public toilet covers only 18% of the households. Only 1.4% is bound to have open defecation (Fig- 17).

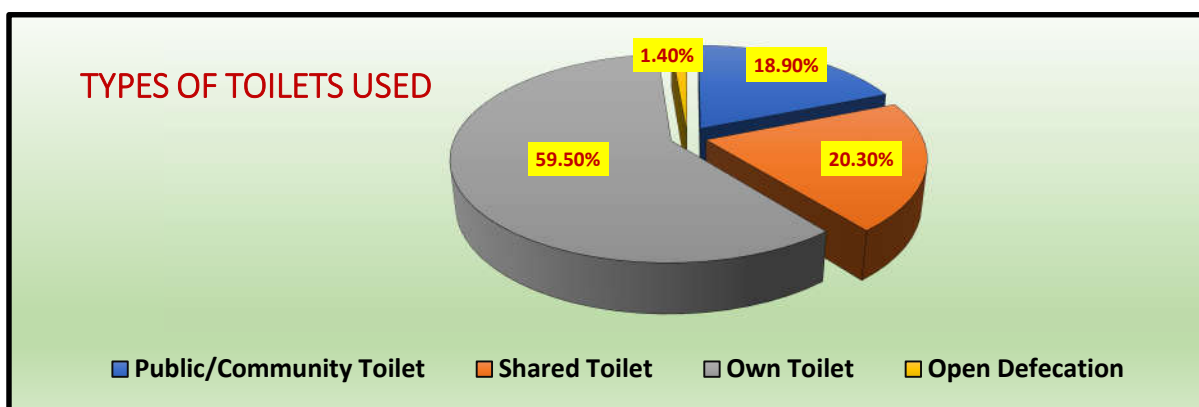


Figure No.: 17

Source: Field Survey, MAR-2022

**Waste Disposal:** The densely populated urban area of Gangtok does not have a combined drainage system to drain out the storm water and waste water from the buildings. The estimated solid waste generated in Gangtok city is approximately 45 tonnes. Only around 40% of this is collected by UDHD, while the remainder is indiscriminately thrown into Jhora, streets and valleys. The collected waste is disposed in a dump located about 20 km from the city.



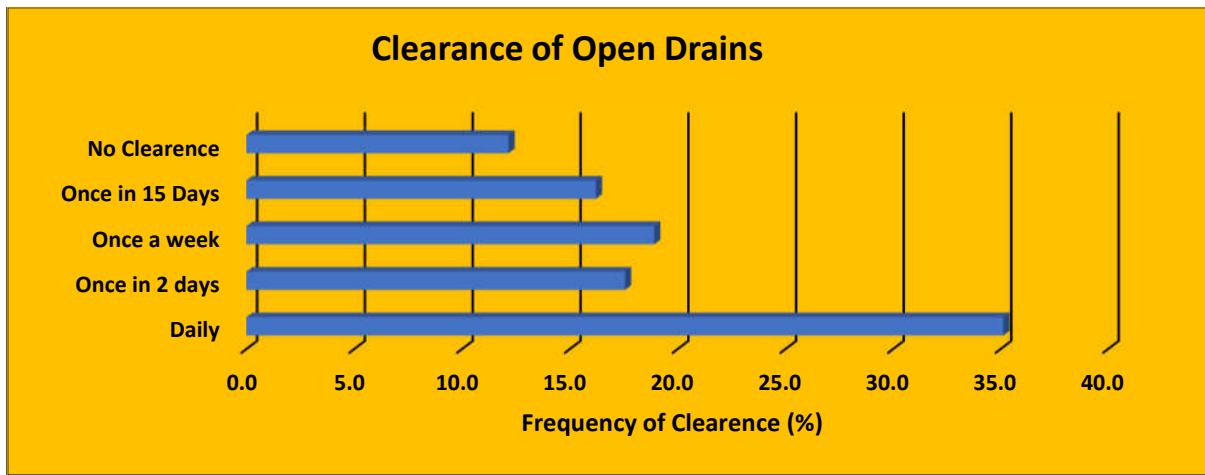


Figure No.: 18

Source: Field Survey, MAR-2022

There is no waste collection from inaccessible areas where vehicles cannot reach, nor does any system of collection of waste exist in the adjoining rural areas. The city is under a statewide ban on the use of polythene bags. Though the main waste drains are cleaned daily but the frequency of clarence of the waste drains decreases with the distance from the heart of the city (Fig.- 18).

### 3.7. TOURISM INDUSTRY AND MEDIA EXPOSURE:

**Tourism:** Gangtok has an amazing view of mount Kanchenjunga, the third highest mountain peak in the world. The stusy area is abundant in natural beauty and has various natural attractions such as the Tsomgo Lake, Ban Jhakri falls, Tashi viewpoint and more. The area is notable for its biodiversity, including alpine and soothing subtropical climates. According to tourism department records, as many as 3.08 lakh domestic travelers visited the Gangtok between October last year and March 2022, with January being the most profitable month for various stakeholders of the sector at 98,456 visitors. Almost 70% of the people of the area under study is benefited with the tourism industry.

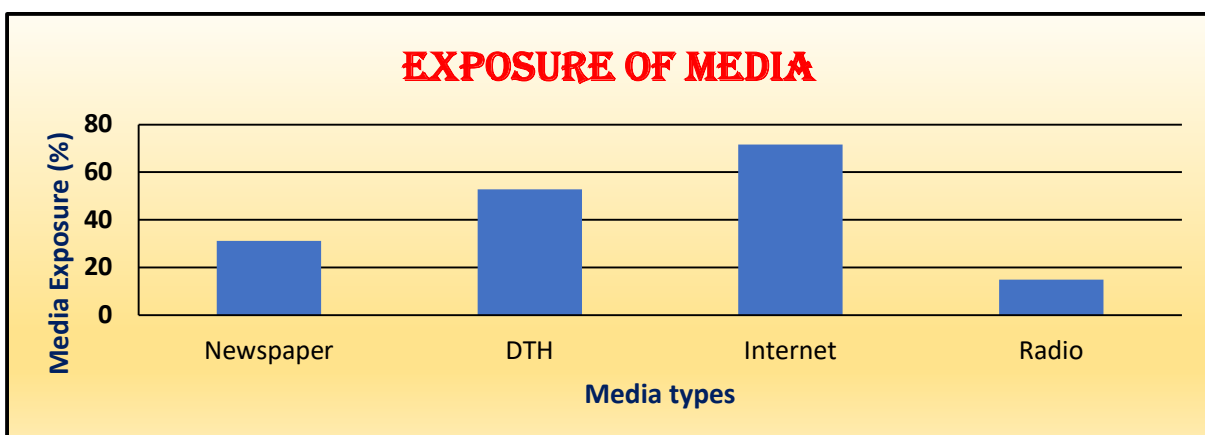


Figure No.: 19

Source: Field Survey, MAR-2022

Media Exposure: Being the capital city of Sikkim, Gangtok has the highest exposure of media to the people. About 70% of the people use mobile phones. Though the print media (newspaper

or magazines) are not so popular, but use of cable TV and radio is very notable (Fig.-19). Education level being high, the people of the study area are aware of the current happenings at their surroundings.

### 3.8. URBAN ENVIRONMENTAL ISSUES

Gangtok is a rapidly growing hill city dependent on a fragile environment. It is the primary city of a predominantly rural state where nearly half the population are in Government service and there is virtually no industry. Gangtok the capital city of Sikkim, otherwise known for plastic and litter-free city with disciplined traffic, where lane-driving is the cultural norm is facing traffic congestion, just like other metropolitan cities.

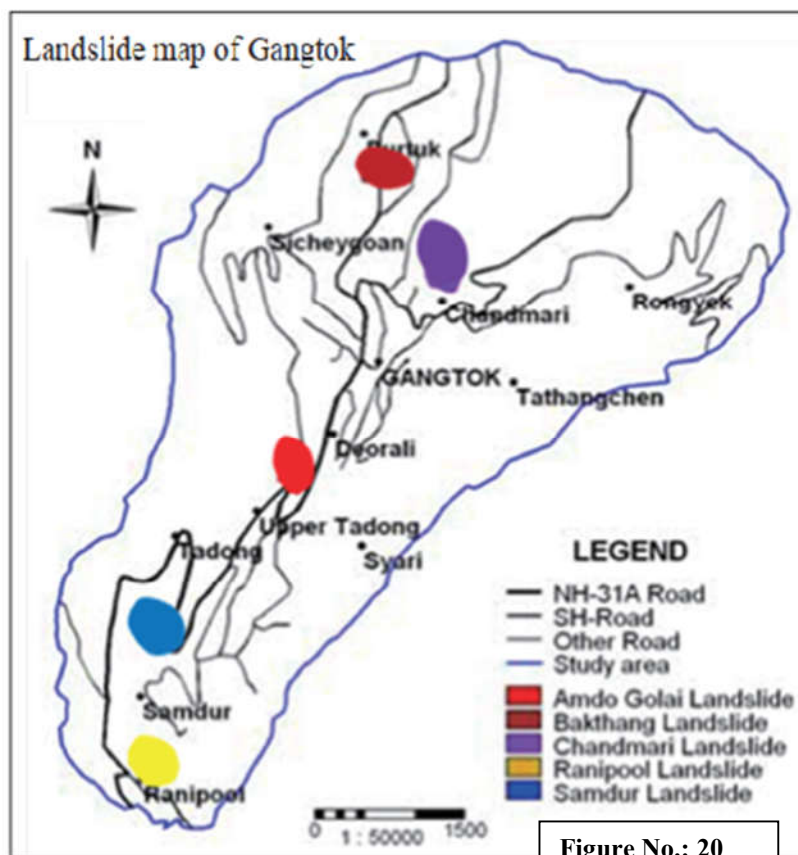


Figure No.: 20

#### a) Instability of Slope:

Landslides and other mass movements are serious geo-environmental hazards in the Himalayas. Massive landslides killing tens of thousands of people with catastrophic damages have occurred in the Eastern Himalayan State of Sikkim including the surroundings of Gangtok city (Fig.: 20). It is believed that the intense rainfall in the region not only contributes to rapid erosion and

weathering of the rock mass, but also increases the groundwater level that leads to reduction in the stability of natural slopes. Inadequate drainage management accentuates the high landslide risk and has caused building collapses and casualties. Steep slopes are overloaded with multi-story buildings.

**b) Fog, Smog and Heavy Rains:** Fog smog and rain are three major climatic issues of Gangtok city. Generally, a hill station is always exhibiting fog and less visibility with possibility of sudden rain. In recent times, due to huge population of both residential and tourists and rapid urban growth added extra pollutants to the atmosphere. Smog is a product of polluted air. The visibility of Gangtok city is declined at huge rate in last decade. Due to rapid urban expansion, the road network is also expanded and the sewage system is getting narrower day by day. As a

result, a sudden heavy rain is not only creating the problem of inundation but increases the chance of landslide too.

**c) Depletion of Natural Resources:** Gangtok plays a dual role of the capital city for the state as well as the major tourist hub. There is no doubt that the population, urbanization and tourism will keep on growing in Gangtok and the demand for land and other natural resource will keep on increasing without which development is not possible. The ecological concerns do not allow the city to grow and the still lingering legacy is creating its own pressure on the city. One needs to comprehend the problem of legacy (capital city) and ecology.

**d) Accessibility Issues:** Gangtok is one of the rapid growing urban centers of North-Eastern India. Though, Gangtok is the Capital city of Sikkim, but there is no railway or air communication in Gangtok. The nearest airport is Bagdogra and nearest railway station is New Jalpaiguri, both are more than 100 km away from the city. So, there is only road transport is available to access the Gangtok city for both local or approach communication. The accessibility to Gangtok therefore hectic and time consuming.

**e) Water Supply and Power-Cut:** The quality, quantity and reliability of the water supply has been identified as a serious problem for all inhabitants of Gangtok city. Water is supplied via a gravity-fed system and distributed through the PHED (piped supply - 70%), RDD (piped supply and standpipes - 15%) and springs (individual collection - 15%). Only 37% of consumers receive 24-hour supply; unaccounted for water is running at 80% due to the large number of unauthorized connections and massive physical losses; water contamination is widespread.

**f) Haphazard City Planning and Road Traffic:** The only road connectivity to Gangtok is NH10, which forms the artery of the road network in the city. The major problems are traffic congestion, lack of parking space, lack of public transport and inadequate footpaths which cause vehicle and public conflicts. This is especially critical for Gangtok, which, as a mountain city, has inherent constraints of space. The city is now considering alternative, non-road modes of transport like cable cars to ease public mobility.

**g) Waste Disposal and Sewage Problems:** Sewerage connections of Gangtok city are inadequate, reaching less than 20 percent of the population; dumping and insanitary disposal of solid waste is widespread. The sewerage system extends to less than half the current urban area, with no coverage on the western face of the Gangtok ridge. There are high levels of exfiltration and pipeline failures are commonplace. Sewage contaminates most of the natural drains (jhoras), making it difficult to operate the sewage treatment plant because of low throughput. The urban areas are the breeding ground of garbage. The solid wastes mainly the

plastic materials which are coming from different sources of urban activities are creating problems both sewage burden and ethnic pollution too. Though the Govt. is trying to manage the solid wastes wisely, but the effort is unable to the actual need.

**h) Pollution:** Air pollution is a global public health emergency. Currently 602,665 people in Sikkim are breathing toxic air that does not meet WHO's clean air guidelines. Gangtok experiencing the worst air pollution in Sikkim, where PM2.5 is forecasted to be 20.2 µg/m3. Except air pollution, noise and land pollution is also increasing day by day. Though the Sikkim Govt. is very concern about the pollution, but rapid population growth and urbanization somehow offering challenges of environmental degradation to the Sikkim Government.

In addition to the above major problems, the city of Gangtok is facing some minor problems too, like problems of Law and Order, increasing car numbers, tourism congestion, increasing the cost of daily used products due to high demand etc.

An opinion survey was taken on the people of Word No. 11, 12, 13 & 14 of Gangtok city. The opinions are mixed (both positive and negative) in nature and they put forward their angry and anxiety on both Gangtok Tourism Authority and the Government.

### 3.8.1 Responses from The Respondents

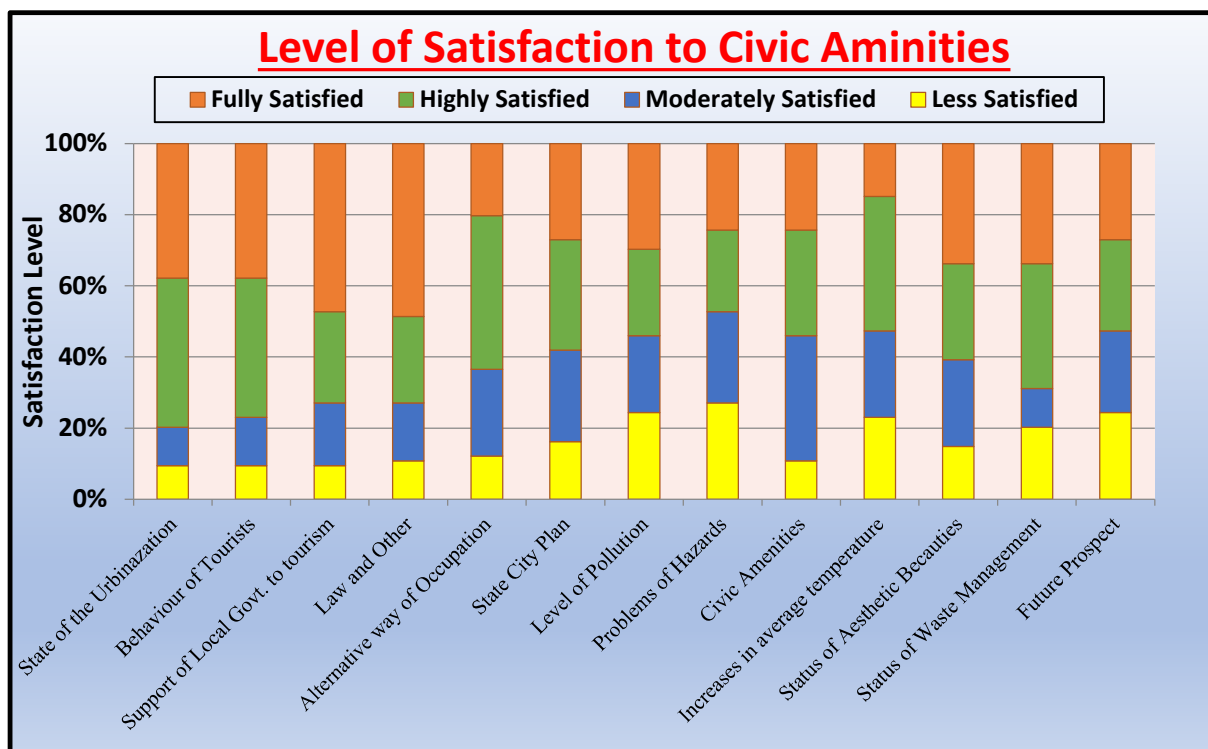


Figure No.: 21

Source: Field Survey, MAR-2022



The opinion survey was taken mainly on State of the urbanization, behaviour of tourists, support of local govt. to tourism, law and order, alternative way of occupation, state city plan, level of pollution, status of waste management, civic amenities, status of aesthetic beauties and future prospect of Gangtok City. Number of Sample respondent was 74 with different age-sex, caste, and educational categories (Fig.: 21).

According to the respondents, they are quite satisfied with the **State of the Urbinzation**. About 38% of the respondent are fully satisfied with the dam followed by 42% is highly satisfied. About 10% of the people expressed their disagree on the status Urbanisation.

In terms of **Behaviour of Tourists** and **Support of Local Govt. to tourism** the respondents are quite satisfied. In both the cases more than 70% people are stated their opinion in favour of the present tourism environment. Only 10% people are found having complain against the present tourism environment.

In question of Law and Order, **Alternative way of Occupation, State City Plan, Level of Pollution** and **Status of Waste Management** there are mixed responses of the respondents. Actually, most of them are not aware of the role of the Government in waste management and city plan. They are also not agreed to change their occupation rather to be engaged in tourism industry.

The respondents are aware of the **Civic Amenities, Status of Aesthetic Beauties** and **Future Prospect** of the city. About 60% of the respondent stated their high satisfaction in favour of the role of Govt. regarding civic amenities. Though they have some arguments regarding Civic Amenities, Status of Aesthetic Beauties but a king size of the respondents are hopeful for future

### 3.8.2 Rating of Major Problems

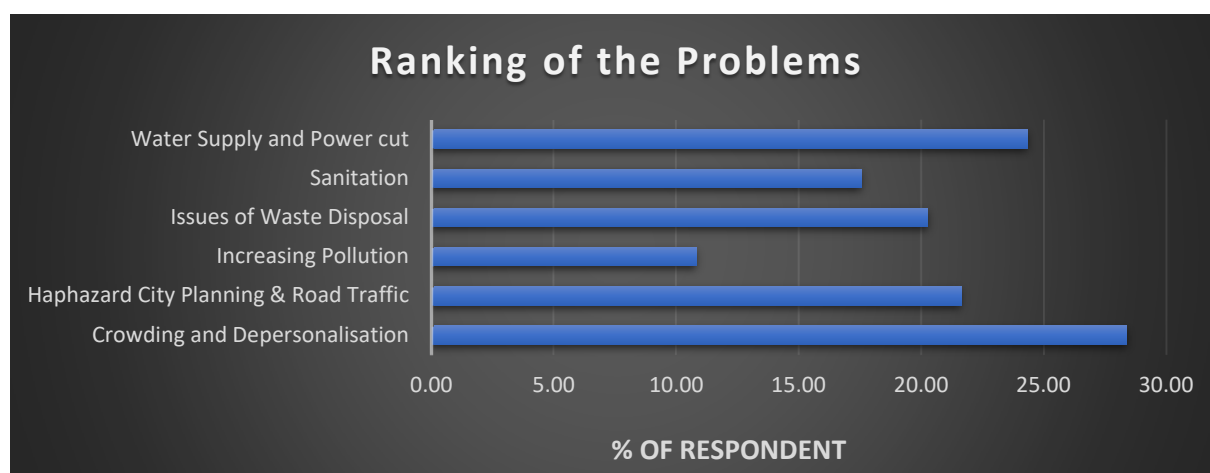


Figure No.: 22

Source: Field Survey, MAR-2022

There are many urban environmental problems in Gangtok city like other hill stations. Through pilot survey, we have identified seven major problems in the study area viz., Land slide & Road blocks, Crowding and Depersonalization, Haphazard City Planning & Road Traffic, Increasing Pollution, Issues of Waste Disposal, Sanitation; and Water Supply and Power cut. On the basis of those urban environmental problems the respondents are asked to rank the problems as per their effectiveness (Fig.: 22).

According to the opinion of the respondents, the most striking problem of Gangtok city is crowding and congestion. The respondents added that, the huge population pressure is the source of all urban environmental problems. The second most affecting problem is landslide. Frequent landslides are not only the cause of road blocks but also fatal to human lives and loss of property. Haphazard city planning and road traffic ranks third according to the responses of the urban inhabitants. Most interestingly, most of the respondents think that the pollution level of Gangtok city is not so problematic and therefore it ranks the last.



# Chapter-4: FINDINGS AND CONCLUSION

## 5.1 MAJOR FINDINGS

The major findings of the present study are as follows:

- The poor are engaged in Low Return Economic Activities like cultivation of rice or vegetables where space is available. Due to their poor educational levels, they have limited skills to avail of income earning opportunities.
- Overall education level is high but the people are not quite aware of the environment and ecology.
- All the development in recent times are mainly urban facility and tourism oriented. The ecological concern is almost negligible from the Govt. end.
- Large amount of building materials has used for the extensive construction works and problems like their transportation and disposal negatively affects the entire local ecological balance.
- Construction of heavy roads in cost of the indigenous trees leads to heightened problems of temperature increase.
- Heavy road traffic in most congested and busy roads are usual picture of Gangtok city.
- There is fog and smog in almost all year round.
- Deforestation and construction work on uphill hill and foot hills, leads to increased risks of soil erosion and landslides.

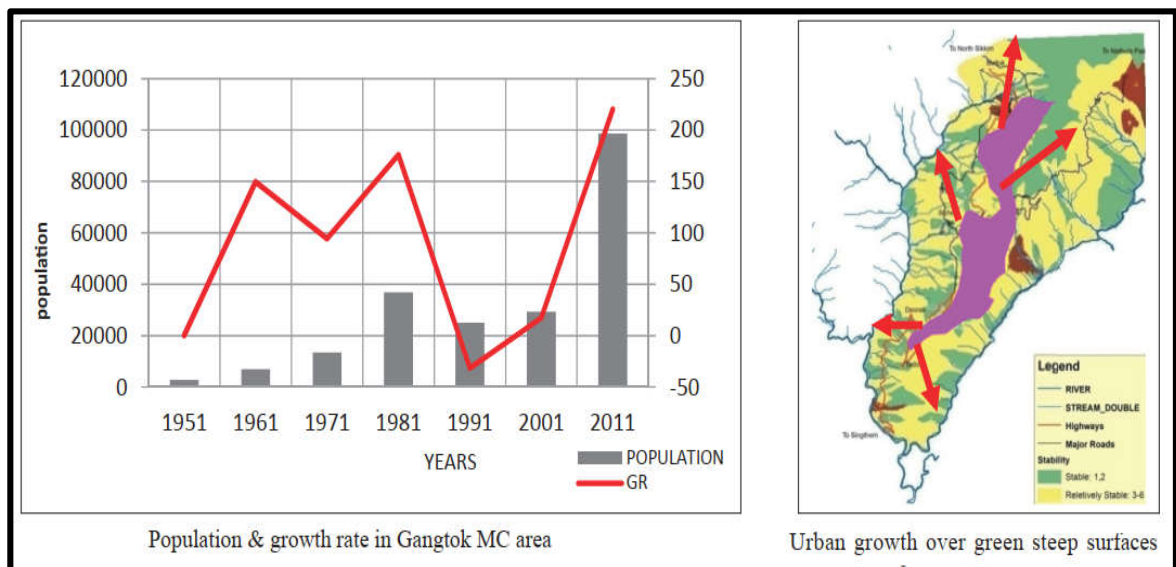


Figure No.: 17

Source: JNNURM Office, Gangtok

- Settlements are usually located on steep, unstable and landslide prone slopes, thus increasing the vulnerability of the poor people in terms of health, natural hazards and safety.
- A sizable part of the terrace cultivatable areas is replaced by settlement areas which ultimately enhanced the chance of soil erosion and landslides (Fig.: 17).
- Gangtok municipality has been planting thousands of trees of alien species in the up hills. But those species are proved to be damaging to entire local natural ecology, as it exhausts ground water and soil nutrition.
- Access to Piped Water Supply is low. Most of the poor rely on springs for water. The local people facing scarcity of drinking and water for domestic use and frequent power cut, mainly in the peak tourism seasons.

## 5.2 SUGGESTIONS FOR ALLEVIATIONS OF THE PROBLEMS

The following are the humble suggestions for sustainable tourism development in the study area:

- Local communities particularly the indigenous people, women, and minority groups should be encouraged and expected to involve in the planning, development, and control of tourism with the support of government and the stakeholders.
- Particular rules to be formed that all the tourists, organizations, and individuals should respect the culture, the economy, and the way of life, the environment and political structures in the destination area.
- All stakeholders of tourism should be aware of the need to develop more sustainable forms of tourism through the proper education of sustainability issues amongst host communities and tourists themselves.
- Research should be undertaken throughout all stages of tourism development and should monitor impacts, to solve problems and to allow local people and others to respond to changes and to take advantages of opportunities.
- It is the right time of the Government, after reviewing the growing tourist arrivals and the socio-economic benefits of the tourism phenomenon, accord it the status of a priority sector. The Government should also ensure more resource allocation for the overall development of this sector.
- Ecological offset to be established through appropriate conservation programmers and improvement of other infrastructures as stated above at the earliest.



- Road Widening Schemes and one way traffic policy to be taken in most congested and busy roads.
- An integrated HRD system to be developed with both public and private sector to meet the requirements of the tourism industry in the area under study.

### 5.3 CONCLUSION

Finally, it may be concluded that Urban Sprawling has been main issues these days in each and every city of any countries. So does in the capital city Gangtok in Sikkim where the urban expansion is in a rapid rate which may cause the city to face many problems. Since the city population is increasing which results the deforestation and encroachment of a land. The adverse effects of rapid population increase and unplanned urban sprawl may be managed through implementation of some programmes related to rain-water harvesting, eco-friendly development and introduction of community-based development schemes.



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# FIELD PHOTOGRAPHS



**Plate-1: The Survey Group**



**Plate-2: The Study Area**



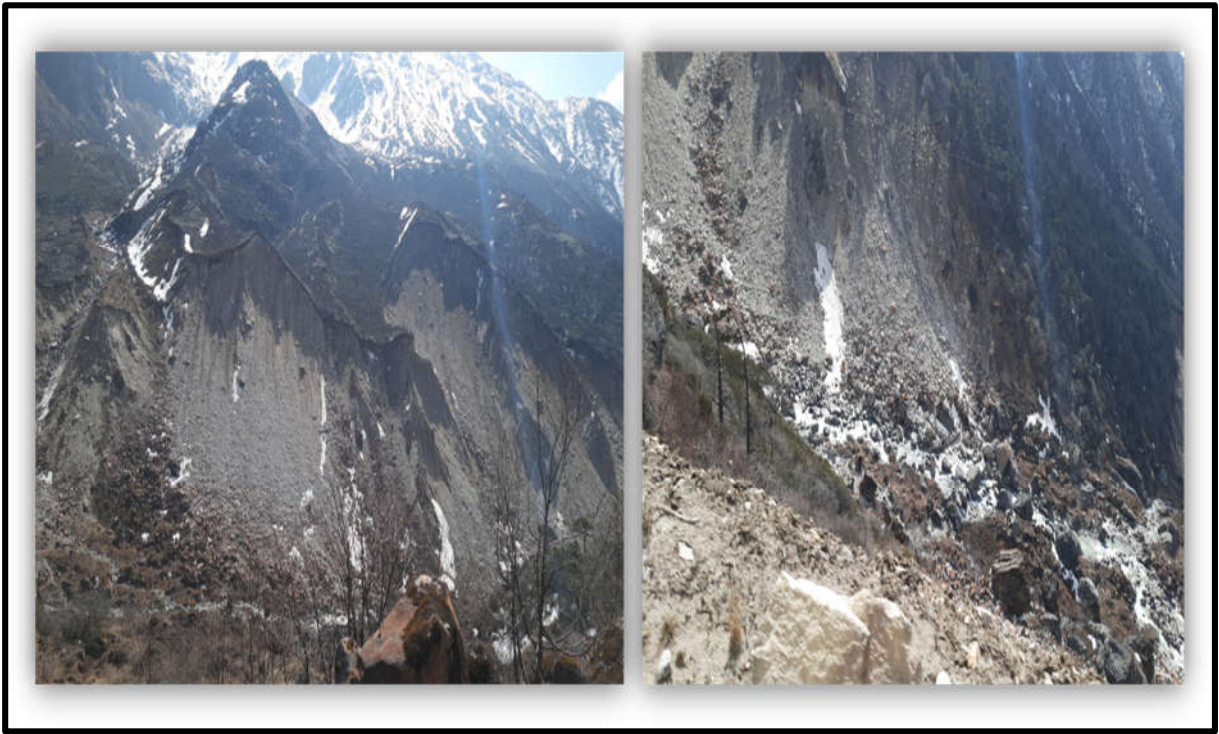


**Plate-3: Seven Sisters Falls**



**Plate-4: Land use and Landscapes**





**Plate-5: Landscape & Soil Types**



**Plate-6: Vegetation Types (Alpine Flowers & Bushes)**





**Plate-7: House Types**



**Plate-8: Wooden Houses, a typical House type of Hill Areas**





**Plate-9: Glimpses of Door-to-Door Survey**



**Plate-11: Levelling Survey**

## APPENDIX

**Table No.- 1:**

<b>AGE GROUPS</b>		
<b>Age Groups (Years)</b>	<b>No. of Persons</b>	<b>%</b>
< 20	6	8.11
20-40	42	56.76
40-60	21	28.38
> 60	5	6.76
<b>Total</b>	<b>74</b>	<b>100</b>

Table-2		
<b>RACIAL GROUPS</b>		
<b>Race</b>	<b>No. of Persons</b>	<b>%</b>
Sikkimese	15	20.27
Nepali	14	18.92
Bhutia	8	10.81
Bengalee	6	8.11
Punjabi	2	2.70
Bihari	11	14.86
Others	18	24.32
<b>Total</b>	<b>74</b>	<b>100</b>

Table-3		
<b>RELIGIOUS GROUPS</b>		
<b>Religion</b>	<b>No. of Persons</b>	<b>%</b>
Hindu	41	55.41
Buddhist	16	21.62
Muslim	5	6.76
Christian	6	8.11
Others	6	8.11
<b>Total</b>	<b>74</b>	<b>100</b>

Table-4		
<b>FAMILY STRUCRURE</b>		
<b>No. of Members</b>	<b>No. of Family</b>	<b>%</b>
< 3	9	18.92
3-6	51	100
> 6	14	
<b>Total</b>	<b>74</b>	

Source: Field Survey, MAR-2022

Table-5		
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<b>OCCUPATIONAL SECTORS</b>		
<b>Occupation Status</b>	<b>No. of Persons</b>	<b>%</b>
Primary Sector	15	20.27027027
Secondary Sector	39	52.7027027
Tertiary Sector	20	27.02702703
<b>Total</b>	<b>74</b>	<b>100</b>

Table-6		
<b>OCCUPATIONAL STRUCTURE</b>		
<b>Occupation Types</b>	<b>No. of Persons</b>	<b>%</b>
Salaried	10	13.51
Regular Waged	10	13.51
Casual Labour	4	5.41
Self Employed	31	41.89
Home Maker	7	9.46
Retiered	4	5.41
Unempoyed	8	10.81
<b>Total</b>	<b>74</b>	<b>100</b>

Table-7		
<b>ANNUAL FAMILY INCOME</b>		
<b>Income Groups (Rs.)</b>	<b>No. of Persons</b>	<b>%</b>
< 50,000	19	25.68
50,000-1,00,000	22	29.73
1,00,000-2,00,000	18	24.32
2,00,000-5,00,000	12	16.22
5,00,000-10,00,000	3	4.05
> 10,00,000	0	0
<b>Total</b>	<b>74</b>	<b>100</b>

Table-8		
<b>RESIDENT TYPE</b>		
<b>Resident Type</b>	<b>No.</b>	<b>%</b>
Only resident	50	67.57
with shop	24	32.43
<b>Total</b>	<b>74</b>	<b>100</b>

Source: Field Survey, MAR-2022

Table-9		
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EDUCATIONAL STRUCTURE		
Highest Qualification	No. of Persons	%
Below Secondary	18	24.32432432
Upto Secondary	22	29.72972973
Upto HS Level	11	14.86486486
Graduate Level	15	20.27027027
Above Graduate	8	10.81081081
<b>Total</b>	<b>74</b>	

Table-10					
LITERACY STRUCTURE					
Minor/Adult	Male	Male (%)	Female	Female (%)	AVG (%)
Minor	48	90.56	27	87.1	88.8
Adult	123	74.5	106	80.3	77.4
<b>Total</b>	<b>171</b>	<b>82.6</b>	<b>133</b>	<b>83.7</b>	<b>83.2</b>

Source: Field Survey, MAR-2022

Table No. 11							
Language					Percentage		
Language Known	Speak	Read	write	Total	Speak %	Read %	write %
Sikkimese	25	19	17	61	12.4	11.4	12.5
Nepali	42	40	34	116	20.9	24.0	25.0
Tibetan	9	9	6	24	4.5	5.4	4.4
Lepcha	6	4	2	12	3.0	2.4	1.5
Hindi	56	38	28	122	27.9	22.8	20.6
English	42	39	37	118	20.9	23.4	27.2
Other	21	18	12	51	10.4	10.8	8.8
Total	201	167	136	504	100	100	100

Table No. 12		
Sources of drinking water	No. of Houses	%
Corporation	51	68.92
Spring water	10	13.51
Tank	10	13.51
Others	3	4.05
<b>Total</b>	<b>74</b>	<b>100</b>

Source: Field Survey, MAR-2022

Table-13			Table- 14		
ARRANGEMENT OF GARBAGE DISPOSAL			CLEARANCE OF OPEN DRAINS		
Arrangements	No. of Houses	%	Frequency of clearance	No. of Houses	%
Municipal Staff	50	67.57	Daily	26	35.1
Municipal Contractor	16	21.62	Once in 2 days	13	17.6
Residents themselves	2	2.70	Once a week	14	18.9
Others	4	5.41	Once in 15 Days	12	16.2
No arrangements	2	2.70	Not Clearance	9	12.2
<b>Total</b>	<b>74</b>	<b>100</b>	<b>Total</b>	<b>74</b>	

Source: Field Survey, MAR-2022

Table- 15					
RATING OF LEVEL OF SATISFACTION					
SL. No.	Attributes	Level of Satisfaction (%)			
		1	2	3	4
		Less Satisfied	Moderately Satisfied	Highly Satisfied	Fully Satisfied
A	State of the Urbinazation	9.46	10.81	41.89	37.84
B	Behaviour of Tourists	9.46	13.51	39.19	37.84
C	Support of Local Govt. to tourism	9.46	17.57	25.68	47.30
D	Law and Order	10.81	16.22	24.32	48.65
E	Alternative way of Occupation	12.16	24.32	43.24	20.27
F	State City Plan	16.22	25.68	31.08	27.03
G	Level of Pollution	24.32	21.62	24.32	29.73
H	Problems of Hazards	27.03	25.68	22.97	24.32
I	Civic Amenities	10.81	35.14	29.73	24.32
J	Increases in average temperature	22.97	24.32	37.84	14.86
K	Status of Aesthetic Beauties	14.86	24.32	27.03	33.78
L	Status of Waste Management	20.27	10.81	35.14	33.78
M	Future Prospect	24.32	22.97	25.68	27.03
<b>Total</b>		<b>16.32</b>	<b>21.00</b>	<b>31.39</b>	<b>31.29</b>

Source: Field Survey, MAR-2022

Attributes	Table-16													
	RATING OF MAJOR PROBLEMS													
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Land slide & road blocks	13	17.57	8	10.81	9	12.16	5	6.76	5	6.76	13	17.57	21	28.38
Crowding and Depersonalisation	2	2.70	6	8.11	8	10.81	13	17.57	14	18.92	15	20.27	16	21.62
Haphazard City Planning & Road Traffic	3	4.05	3	4.05	12	16.22	14	18.92	15	20.27	19	25.68	8	10.81
Increasing Pollution	4	5.41	5	6.76	10	13.51	14	18.92	11	14.86	15	20.27	15	20.27
Issues of Waste Disposal	1	1.35	7	9.46	12	16.22	10	13.51	13	17.57	18	24.32	13	17.57
Sanitation	1	1.35	3	4.05	10	13.51	12	16.22	14	18.92	16	21.62	18	24.32
Water Supply and Power cut	2	2.70	8	10.81	8	10.81	12	16.22	10	13.51	15	20.27	19	25.68

Source: Field Survey, MAR-2022