2018-2019
2020-2021

LEH LIVEABILITY REPORT

Author : Konchok Tashi (Urban planner)
Co-Author : Dachen Lamo (urban planner)

Design By : Skalzang Otsal (Graphic Designer)

LEH
LIVEABILITY
REPORT

LAHDC LEH

MCL
Municipal
committee of Leh

LIVEABLE
LEH

LEDeG

BORDA

INTRODUCTION

Leh

Leh town is the administrative headquarter of Leh district. A Class 2 town, it comprises of 13 wards with a total population of 30,870 as per Census 2011. The municipal area measures 17.2 sq. km. It is an important tourism destination and the educational, political and economic centre of the district.

Leh town is the nerve-centre of Leh district not only because it is the district headquarter but also because it is its only urban centre. It provides all major services including administration, health, education, trade, commerce, industrial growth, transport, communication and a host of other services essential for the functioning of an urban community.

It has been experiencing rapid population growth over last decade. It has also attracted a large floating population in the form of defence personnel. In addition, Leh town is the most urbansed region in Ladakh and attracts migrants from all over the region.

Urbanisation in Leh

Leh's full-time resident population was estimated at 35,807 in 2018 and the total population, including floating population, is estimated at 65,927. The chart below shows that in the 1990s, Ladakhis moved to Leh town in search of better education services, health services and livelihood opportunities. By 2011, the population reached 30,870, representing 34% of the district's population. Since 2008, tourism has fuelled the town's growth, and population is likely to cross 43,000 in 2021 and reach 55,000 by 2031.

This growth has also expanded the physical limits of Leh town, and 'townships' have emerged along the town's periphery. While India's urban population grew about 2.1 times between 1991 and 2018 (217 million to 460 million), Leh's population has grown 3.4 times. The resident population drops in the winter by 15-20% as many residents leave for warmer locations.
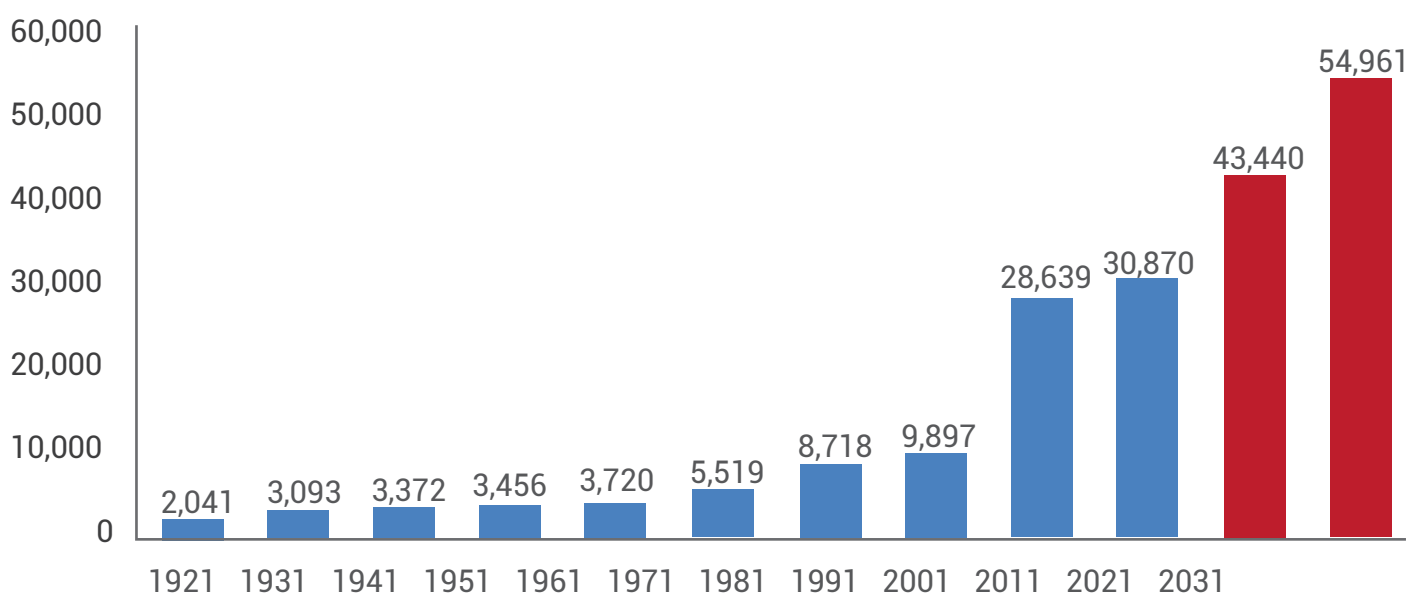

Figure 1 Decadal growth of population
Source - Ladakh autonomous hill development council, Detailed project on augmentation and reorganisation of water supply of Leh town

Problems

The town faces different types of problems including traffic congestion, high influx of tourists, pollution, inefficient public transport, unsafe and unattractive streets, inaccessible and limited pedestrian infrastructure, unemployment, inefficient ULB governance, lack of higher education facilities, inefficient water supply and waste management. The number of tourists visiting Leh has grown from 54,346 in 2007 to about 277,255 in 2017.

The hospitality industry (hotels, guesthouses and restaurants) and tourism industry (tours, treks, adventure sports, vehicle rentals etc) have grown sharply to serve these tourists. Today, there are over 267 hotels and 702 guesthouses in Leh district with a total of about 15,103 beds and over 662 tour businesses in the town.

Urbanisation and growing tourism have had the following impacts on Leh town.

Construction and infrastructure boom: This comprises of construction of homes and hotels, and transformation of homes to guesthouses, road construction/widening and development of new infrastructure including water distribution network, sewerage system, scientific solid waste landfill etc.

Strain on natural resources and civic services: The growing population uses more water and food, is causing traffic along with air and noise pollution, generating more garbage, putting a strain on natural resources (mainly water) and thinly-staffed government and municipal departments who are ill-equipped to deal with such hyper-growth.

Weak monitoring or construction norms: Land use and compliance with permits as the municipality, PHE and other departments are overstretched with limited bandwidth and capabilities

Pollution of water sources: Pollution of water sources especially groundwater on which the town is heavily dependent and is becoming a major concern for residents.

Growing seasonal migrant worker population: An estimated 50,000 migrant workers arrive in Leh during the summer months from Bihar, UP, Kashmir, Nepal and other locations. Their primary professions include shopkeepers, security and hotel staff, cooks and servers at restaurants, drivers and tour guides, and construction workers

Parameters that needs focus

Leh needs to focus on many parameters starting from improving governance, its economy, public transport, walkability, public spaces, water and waste collection and recycling also providing facilities and shelter to its floating population.

CHAPTER 2
WHAT IS LIVABILITY

What is livability

Liveability is an assessment of the experience of living in a place. Liveability is broadly defined as a set of opportunities that allow people to improve their quality of life, standard of living, and general well-being in a specific locality (kaal, 2011).

Liveable cities are safe, socially cohesive and inclusive, and environmentally sustainable. They have affordable housing that is linked through good public transport, walking and cycling infrastructure to employment, education, shops and services, public open spaces and have social, cultural and recreational opportunities.

A liveable town has a higher standard of living or quality of life with good environmental quality and good educational and health facilities.

Importance of liveability

Liveability is emerging as an important concept and a branding tool in urban planning. It plays a vital role in shaping a town's economics and competitiveness among urban areas. It increases the wellbeing and quality of life of the people, it is concerned with optimising performance and integrity of human life (kashef, 2016). It also plays an important role in improving the character of an urban area, the health of communities, its economy, increases social inclusion, environmental and social sustainability. The process of planning for healthy, liveable urban spaces will also help nations achieve the UN's

Sustainable Development Goals (Arundel, 2017). It has become a marketable strategy for policy making to attract tourism, investments and labour.

Leh town's policies and developmental interventions are limited to the core area. As a result the outer suburbs are getting worse and residents in the suburbs are excluded from cultural, services and economic opportunities. The liveability study must include every corner of the town and perhaps give extra attention to the suburbs.

Measuring liveability

The liveability of a town is measured by several factors relating to quality of life, people's view about liveability change depending on its age, cultural background, income, lifestyle choices, values and beliefs. This can be measured in two ways: subjective factors and objective factors. Objective factors include climate, environment quality, infrastructure, safety and stability, access to healthcare and education. Subjective factors include things that are personal, emotional and spiritual or things that cannot be measured with numbers.

The liveability of cities around the world are reviewed by different organisations each year. These are mostly in terms of objective factors and ranked in order from the most to the least liveable. Organisations and companies such as Economist Intelligence Unit (EIU), Mercer, and OECD produce regular reports. OECD also incorporates some subjective factors in their surveys.

Liveability Index

The liveability index is a set of indicators to assess the liveability standards in cities. It measures the quality of life as determined by a comprehensive set of parameters.

Parameters such as indicators from the social, environmental, physical and economic sectors are interlinked with each other. They are assessed to rank an urban area as most or least liveable. Liveability index uses people and place as two aspects of liveability. Most liveability indicators typically refer only to the physical place along with the average profile of residents at a point in time.

On 23 June, 2017, Urban Development Ministry launched 'City Liveability Index' with a set of 'Liveability Standards in Cities' to calculate a Liveability Index and rate cities. It is a first-of-its-kind initiative to measure the quality of life in 116 major urban areas including capital cities and those with population over a million.

The urban areas are evaluated on a comprehensive set of 79 indicators (57 Core Indicators and 22 Supporting Indicators) to capture the extent and quality of infrastructure including availability of roads, education and healthcare, mobility, employment opportunities, emergency response, grievance redressal, pollution, availability of open, green spaces, and culture.

Based on the performance of cities against various core and supporting indicators, various 'Category Sub-Indexes' and a composite 'City Liveability Index' are developed for each city.
t
While the Core Indicators are considered as being essential measures of liveability of cities, the Supporting Indicators supplement the Core Indicators by adding value to them and are organised in 15 categories. Weights are assigned to Category Indexes during the calculation of the City Liveability Index (MOUD, Liveability standards in cities , 2017).

These 79 indicators are grouped into four main groups known as pillars of comprehensive development that are; Institutional, Social, Economic and Physical (MOUD, Liveability standards in cities , 2017).

INSTITUTIONAL

This focuses governance through indicators such as percentage of services available online, users of such services, tax collected as percentage of tax billed, extent of cost recovery in water supply services, capital spending as percentage of total expenditure and percentage of population covered under ward committees/area sabhas.

SOCIAL

This includes:

Identity and culture indicators: Restoration and reuse of historic buildings, percentage of ecologically-important areas covered through projects for restoration, hotel occupancy and percentage of budget allocated towards cultural/ sports activities.

Education: indicators include percentage of school-aged population enrolled in schools, female school-aged population enrolled in schools, student-teacher ratio, schools with access to digital education, students completing primary education.

Health: Indicators include hospital beds per 10,000 population, healthcare professionals per 10,000 population, average response time in case of health emergencies, period prevalence of water-borne diseases and vector-borne diseases.

Safety and Security: Number of streets, public places, and junctions covered through surveillance systems, number of recorded crimes per lakh population, extent of crimes recorded against women, children and elderly per year, transport-related fatality per lakh population

ECONOMIC

Economy and employment: Indicators include Increase in collection of VAT/GST, professional tax and increase in issuance of construction permits, unemployment rate and percentage of vendors registered and provided formal spaces.

PHYSICAL

Housing and Inclusiveness – slums households covered through formal/ affordable housing through basic services.

Housing and inclusiveness: Slums covered through formal/affordable housing through basic services. Public open spaces: Indicators include per capita availability of green spaces, public and recreational places

Mixed land use and compactness: Share of mixed land use area in overall town land use and net density.

Power supply:-Indicators include percentage of the town's population with authorised electrical service, average number of electrical interruptions per customer per year, percentage of total energy derived from renewable sources and total energy consumption per capita.

Transportation and mobility: Indicators include geographical coverage of public transport, mode share of public transport, percentage of road network with dedicated bicycle tracks, mode share of non-motorised transport, availability of paid-parking space and percentage coverage of footpaths wider than 1.2m.

Water supply: Indicators include household-level coverage of direct water supply connections, per capita supply of water, quality of water supplied and level of non-revenue water.

Wastewater management: Indicators include coverage of toilets, sewerage network and/or seepage collection efficiency of sewerage network, extent of reuse and recycling of wastewater.

Solid waste management: Indicators include household-level coverage and efficiency of municipal solid waste collection, extent of municipal solid waste recovered through reuse

Reduced pollution: Indicators include pollution measures such as concentration of SO_2, NO_2, $PM10$ – air Pollution, level of noise pollution and quality of surface water in public water bodies.
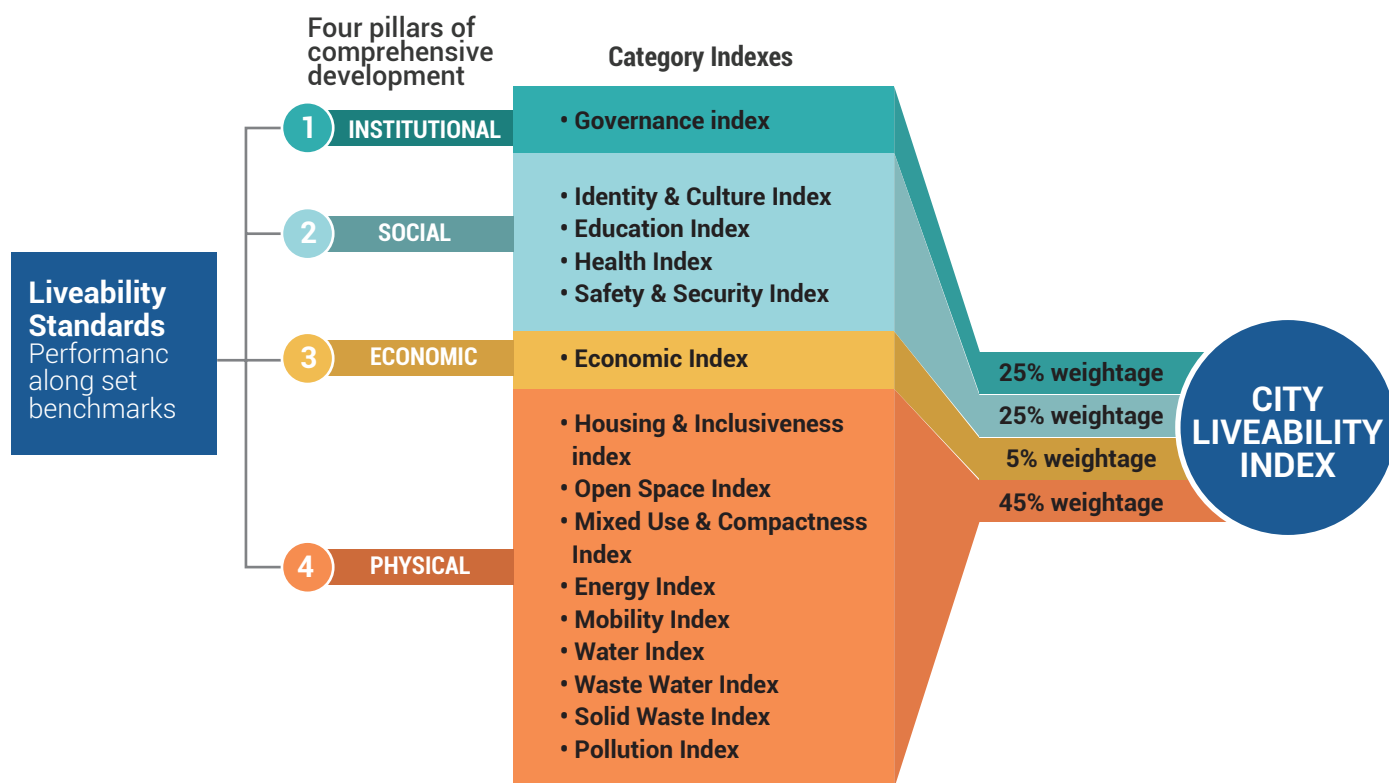

Figure 2: The model to compute the liveability index

CHAPTER 3
TOWN CHARACTERISTICS

Geographical setting

Leh town is located in the Trans Himalayas at an altitude of 3,310m above mean sea level in the south and 3,915m amsl in the north. The average slope is 10.1 degrees with a north to south aspect. Ward 11/ Snemoling and Ward 12/Skampari are located in areas with a steep slope as compared to the rest of the town.
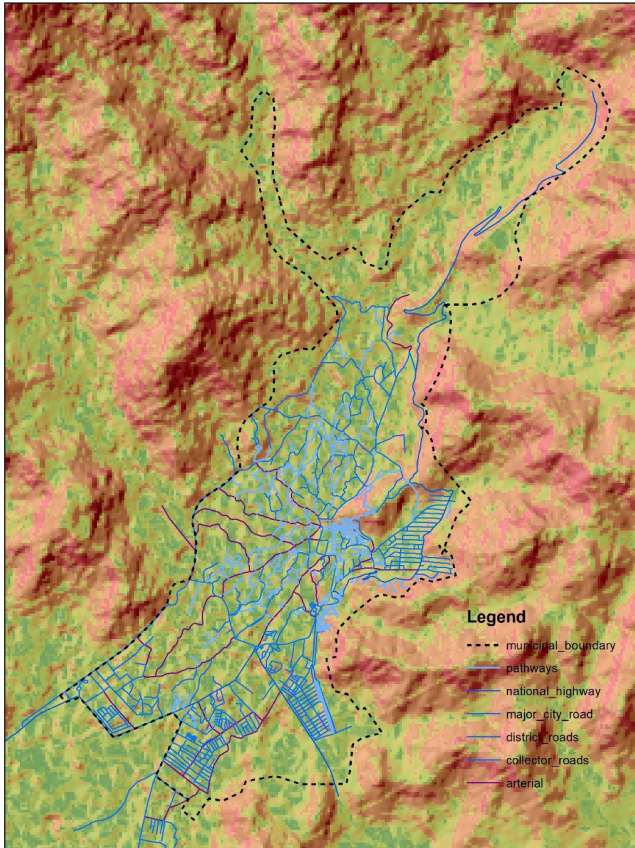
Settlement pattern

The town has five different types of settlement patterns where development has taken place based on availability of developable land in the mountainous terrain. The street pattern also emerged accordingly.

a) Areas with agriculture fields
Around 53% of land use is under agriculture. The northwestern part of the town is dominated by agricultural fields. This part of the town also hosts the maximum number of hotels and guest houses and serves as a major tourist area. Structures and houses are scattered among agricultural fields and population density in this area is lower than other areas.

b) Planned area
The Housing Colony area is somewhat planned though this is limited to the gridiron structure. No

infrastructure or facilities exist in this area. It has narrow streets, dense population, and lacks any form of pedestrian infrastructure.

c) Hill settlements
Snemoling or Ward 11 is located on the western face of a mountain and accessibility to this area is limited with no provisions for infrastructure or basic facilities such as water. Though this area has the highest net residential area, it receives little attention from ULB.

d) High-density Organic settlements
The core town or the old town area and areas surrounding it are the oldest and organically developed neighbourhoods. It is connected by a maze of narrow, winding paths. This part of the town is only accessible on foot.

e) Areas settled around the highway
The southern part of the town has developed around the main road or highway. All major commercial areas and important facilities are located along the road and in residential areas around it.
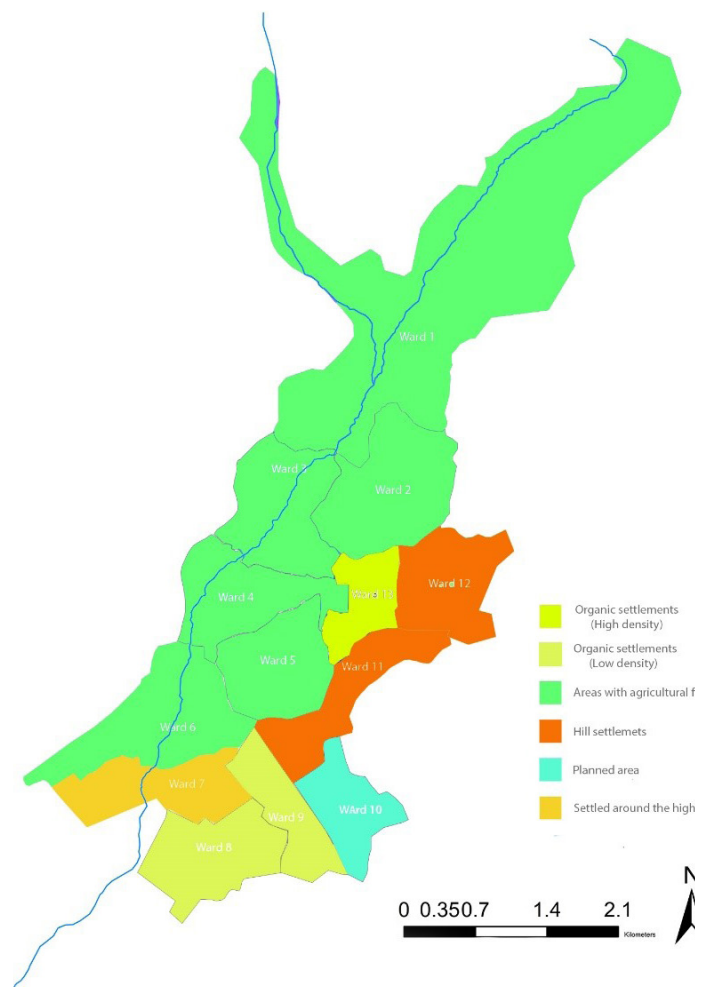
Ward level characteristics

• To understand the town's characteristics, It is divided according to seven uses or functions:

• **Urban centers**
They are the major commercial centres with densely developed neighbourhoods. They act as the town centre with diverse land uses, employment opportunities and major economic transactions take place in it.
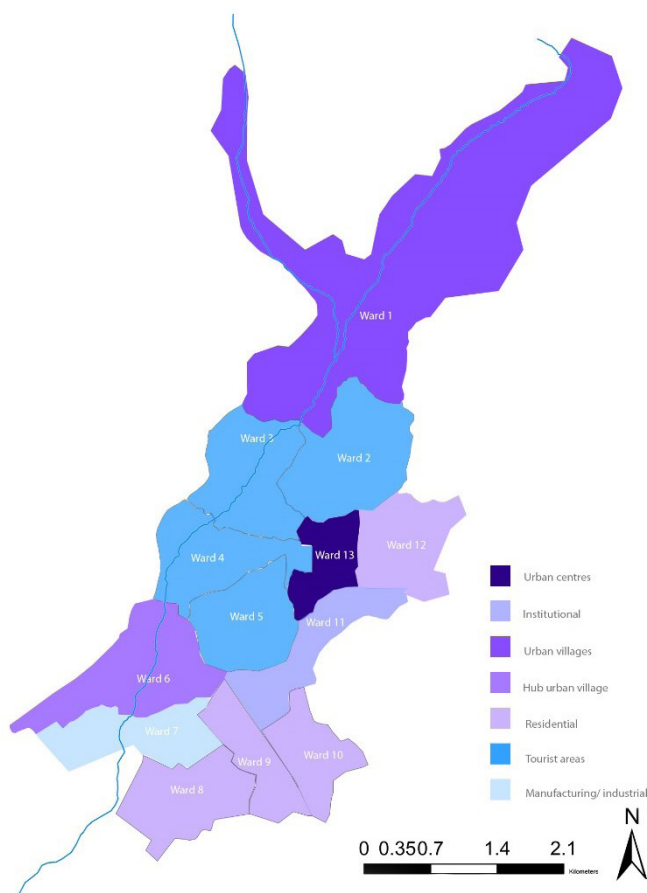
• **Hub urban villages**
These areas offer a balance of housing and employment but are generally less densely developed than urban centres. Hub Urban Villages provide a mix of goods, services, and employment for their residents and surrounding neighbourhoods.

• **Residential**
These are the area with predominantly residential land use and this is where 70% of the town resides.

• **Urban villages**
These are the areas with agricultural activities. Ward no 1 or Gonpa-Gangles show these characteristics.

• **Tourist areas**
Hotels and guest houses are concentrated in this areas. Commercial places are oriented towards tourist needs and primarily dependent on them.

• **Institutional**
This area has major government and semi-government institutions.

• **Manufacturing/ servicing**
These are the areas with major small-scale industrial units, workshops, car repair and servicing shops.

Demography

Population of the town

The population of the town changes seasonally. In summers, it shoots up to 65,927 due to tourists and migrants (labourers and villagers). In winters, it reduces to 35,807 (local residents).

The total population is dependent on several factors:

Residents – The current resident population is 35,807 in Leh municipal area.
In 1921, the town had 2,401 residents and it has grown to 30,870 in 2011 (Census 2011). The current population is 35,807 but it is difficult to get a precise estimate due to significant rural-urban migration within Leh district, especially from nearby villages, in the summer.

Residents of Leh town

Year	Persons
1921	2,401
1931	3,083
1941	3,372
1951	3,546
1961	3,720
1971	5,519
1981	8,718
1991	9,897
2001	28,639
2011	30,870
2018E	35,200
2027E	41,526
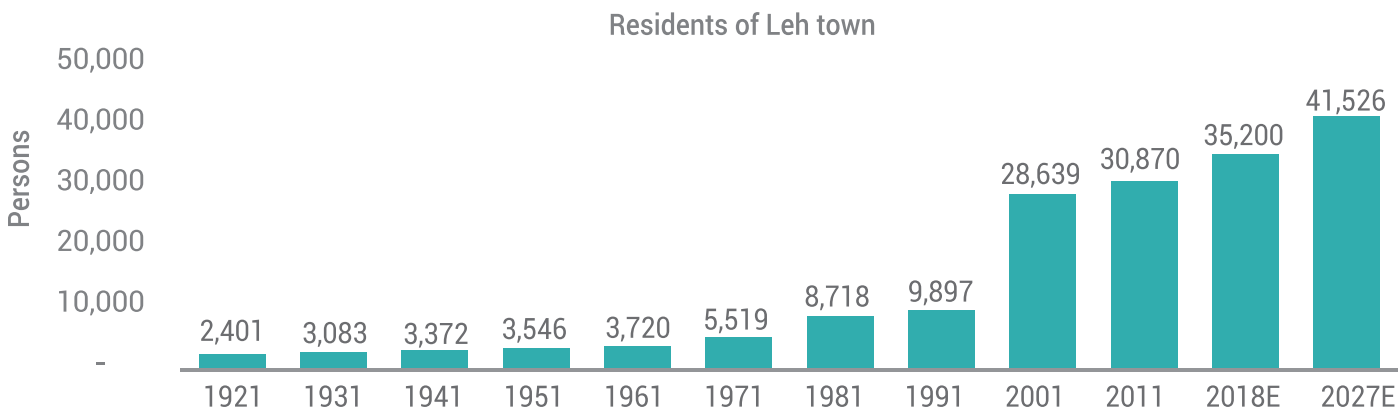
Figure 3 Population Growth of Leh Town, Census of India

Note: The sharp jump in population from 1991 to 2001 is partly due to expansion of administrative boundaries of the town .

Net residential Density

The net residential density of the town is 135pph. Ward 11 or Snemoling has the highest density of people as it is located on a hill with limited residential area. It is followed by Ward 13 or Leh core area. Ward 1 is sparsely settled and has the lowest population density.

Map 1 Net Residential density
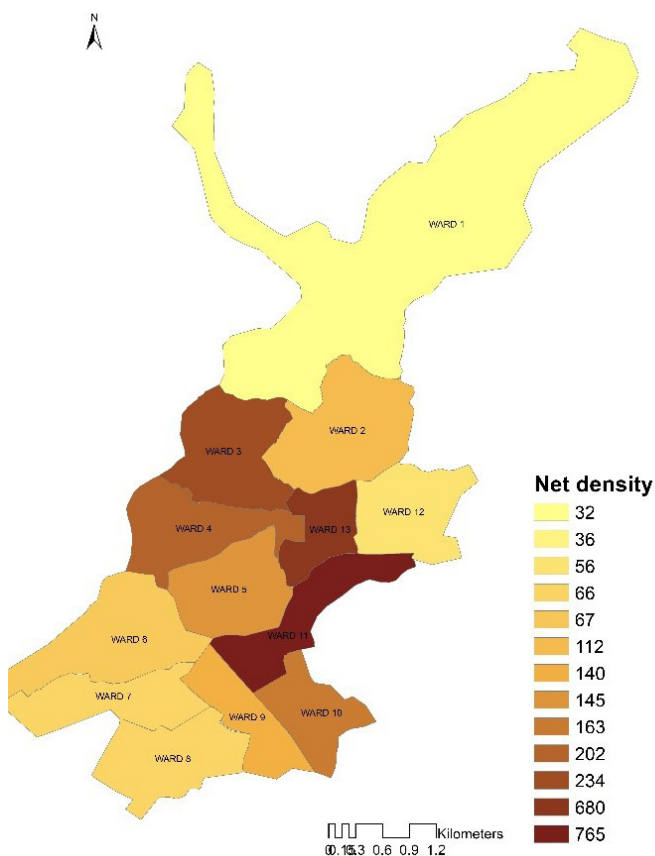
Almost 70% of tourist population is concentrated in three wards specifically in Ward 3 (Changspa), Ward 4 (Tukcha), Warn 5 (Sheynam) and Ward 13 (Leh Main Market). These wards have the highest number of hotels and guesthouses.

According to the Tourism Department, Leh, 277,255 tourists visited Leh in 2017 and around 322,000 visited in 2018 (Figure 2). In contrast, 54,346 tourists visited in 2007—a six-fold growth in 11 years at an annualised growth rate of 18%.
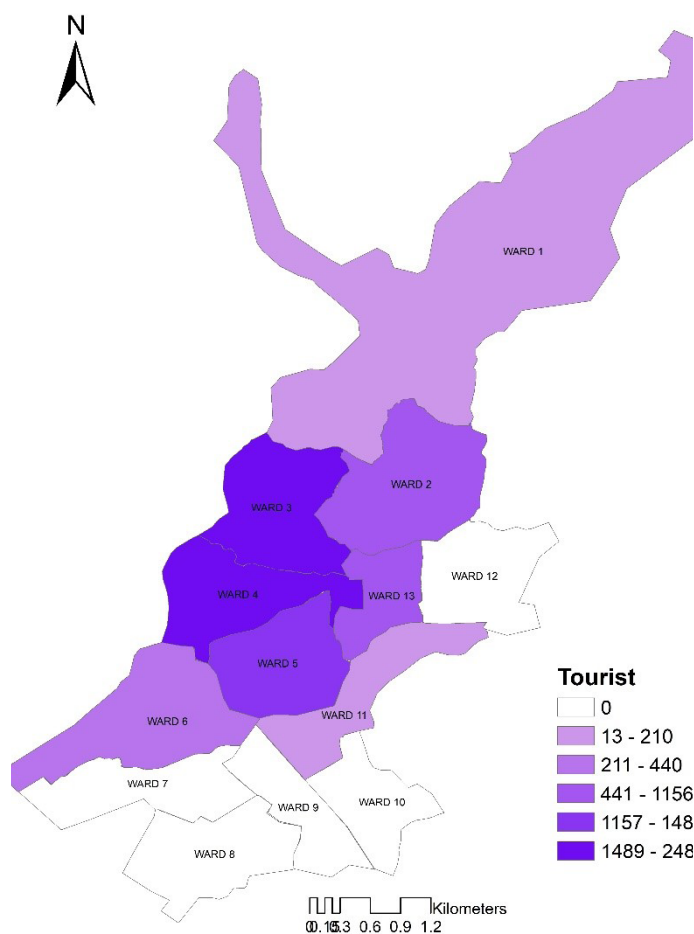
Tourism

Since Ladakh was opened for tourists in 1974. Many areas have been opened for tourism. Leh town has emerged as a major tourist destination and hub for tourist traffic. Despite the adverse weather conditions in the winter months from September to April, when the tourist traffic is at its minimum, a sizeable number of tourists are always present in Leh with the town serving as a base. It therefore needs civic amenities. About 294,710 tourists visited Leh between May and September. On an average they stay for seven days in Leh Town, which accounts to around 11,460 tourists at a time. (= 294,710 visitors × 7 days per visitor/150 days of tourist season).

Total tourists visiting Leh
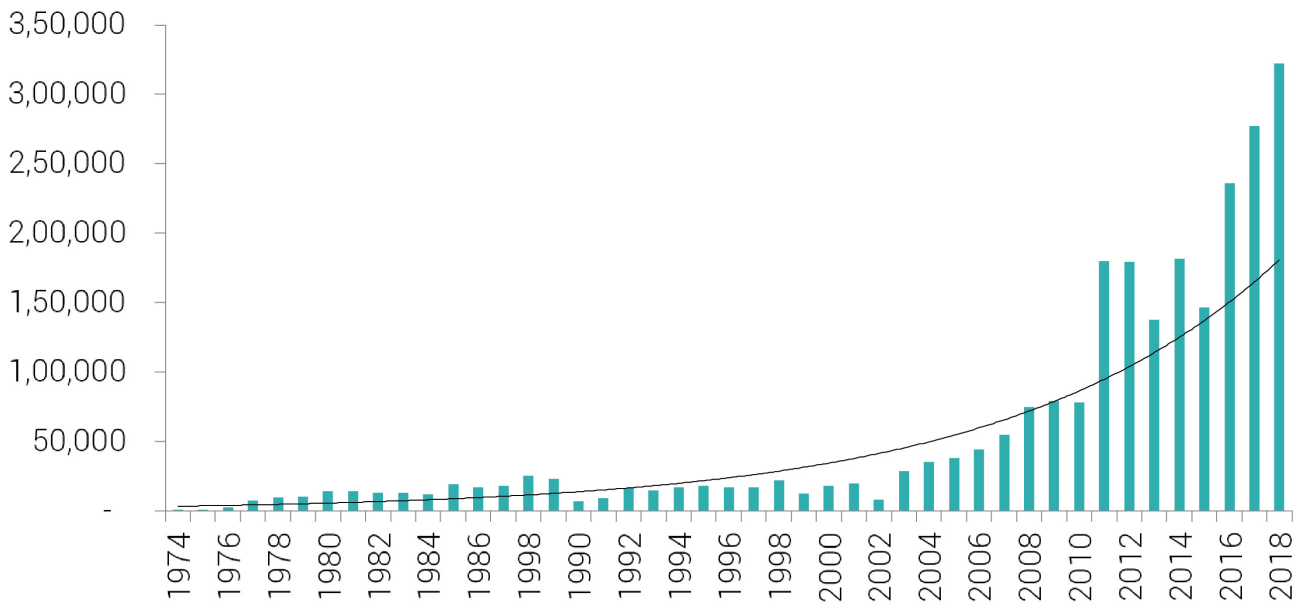
Figure 4 Tourist visiting Leh town, Tourism Department, J&K

Migrant population

These are migrants from Nepal, Bihar, Uttar Pradesh and other areas. This is fuelled by occupational shifts from the primary sector to the secondary and tertiary sectors and the presence of defence establishments. All of these exert a load on civic amenities along with residents.

There are two main types of migrants; migrant labourers and intra-regional migrants. Labourers are concentrated in areas with lower rents such as Sampari or Ward 12.
Many villagers reside in Leh town for employment and education or due to a shift from primary to tertiary activities. This migrant population is distributed along the eastern and southern part of the town.

Apart from this population, about 20,000 to 25,000 army personnel are stationed in Leh or in transit from other parts of Leh and Kargil districts on any given day. Even though Municipal Committee, Leh (MC, Leh) is not responsible for facilities or infrastructure provision to the armed forces, they still extract large amounts of groundwater while also contributing to traffic and pollution.
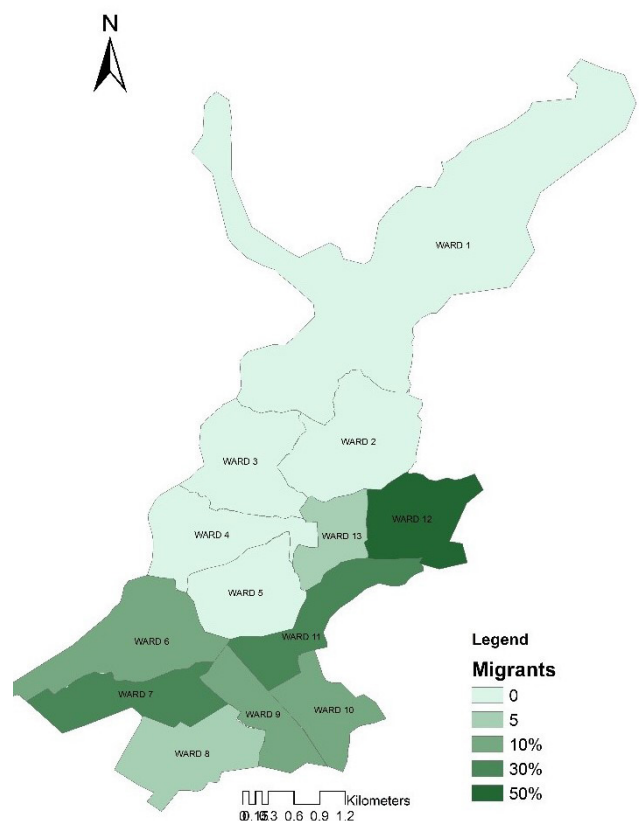
CHAPTER 4
INSTITUTIONAL

Governance

- **Percentage of citizens using online services (Core)**

  - Only 16.6% citizens are using online services provided by the ULB. As of now, there are only two services online (birth and death registration, building permits) out of 12 types of citizen services provided by the ULB.

  - For efficient governance and promotion of e-governance, certain citizen services should be provided online such as taxes (property tax), user charges (water and power), challans and fines (traffic violations), service connections, tenders, grievance management, tickets and passes (public transport, cultural events etc.) and disclosure of documents.

- **Tax collected as percentage of tax billed (Core)**

  - As of now, the town does not collect property tax and the ULB does not calculate tax demand.

  - Such taxes are vital for the functioning of services. Citizens should be encouraged to pay property tax. The town can achieve the benchmark of 90% from the current 0%.

  - The town or the ULB needs to implement smart solution to improve the efficiency of systems to issue regular and timely demand notices, and facilitate ease of payment (online) thereby improving the collection of property tax.

- **Extent of cost recovery (O&M) in water supply services (Core)**

  - Currently, only 5.78% of operation and maintenance cost are being recovered, O&M cost for providing water supply per year is Rs 1.65 crore and total collection of user charges in a year is Rs 9.54 lakh.

  - The town should install water meters to measure user charges and the revenue generated will make the water supply system self-sufficient. The town can then achieve the goal of 100% from current 5.78%.

  - The O&M cost can be reduced by implementing monitoring systems such as SCADA, use of smart meters coupled with the adoption of telescopic and volume-based tariffs, and efficient billing and collection system.

- **Capital spending as percentage of total expenditure (Core)**

  - The town is capable of reinvesting 16.71% of its revenue into capital (infrastructure and assets) after taking care of annual establishment and O&M costs. The total capital expenditure in 2018-2019 is Rs 98.88 lakh and the total expenditure (capital and revenue) is Rs 5.92 crore.

  - The current state of capital spending suggests that the town is not proactive in improving its services and facilities.

- **Percentage of population covered under Ward Committees/ Area Sabhas (Core)**

  - As of now almost 46.80% i.e. half of the town's population is covered under ward committees. The total population of the town is 65,927 but only 30,860 are covered under ward committees as Leh town receives a large number of tourists and migrant labourers. In addition, Leh is the administrative, commercial, and educational hub of the district and lots of villager from across the region migrate to the town but are not registered with the ULB.

  - The participation of citizens in matters of governance, planning and development is critical for ensuring inclusive and participatory growth of towns.

- **Percentage of services integrated through Command Centre (Supporting)**

  - Leh town does not have an integrated command centre for services and no services are currently integrated.

  - Integration of service is needed for better data management and horizontal integration, leading to overall efficiency in services provision and optimal use of resources.

  - Leh town needs to integrate various services like water supply, sewerage, waste management, e-governance, sewerage, transport, solid waste management, surveillance system, lighting, emergency responses, health and education, wireless connectivity through a single operation or command and control centres.

- **Average delay in grievance redressal (Core)**

  - The ULB takes almost five days to address a complaint or issue. It performs well against the benchmark of between seven to 30 days. However, there is no formal online or offline system to register complaints and citizens have to talk with officials in person.

  - Leh town needs a formal online complaint or grievance redressal platform with a committed grievance redressal timeline of less than three days.

The total governance score is 63.6 (The total governance score = average score for core indicators × 0.7 + average score for supporting standards × 0.3).

Various indicators such as integration of services, online services, grievance redressal, capital spending and O&M cost recovery of services need more focus.

The Institutional index score is 15.9 as the institution pillar is given a weightage of 25%.

GOVERNANCE

Governance

Parameters	Score
Population under municipal wards	46.8
Capital spending	16.71
Cost recovery (O&M) water supply	5.78
Tax Collection	0
Grievance redressal	5
Online service users	5.78
Integrated service	0
Online citizen services	16.6
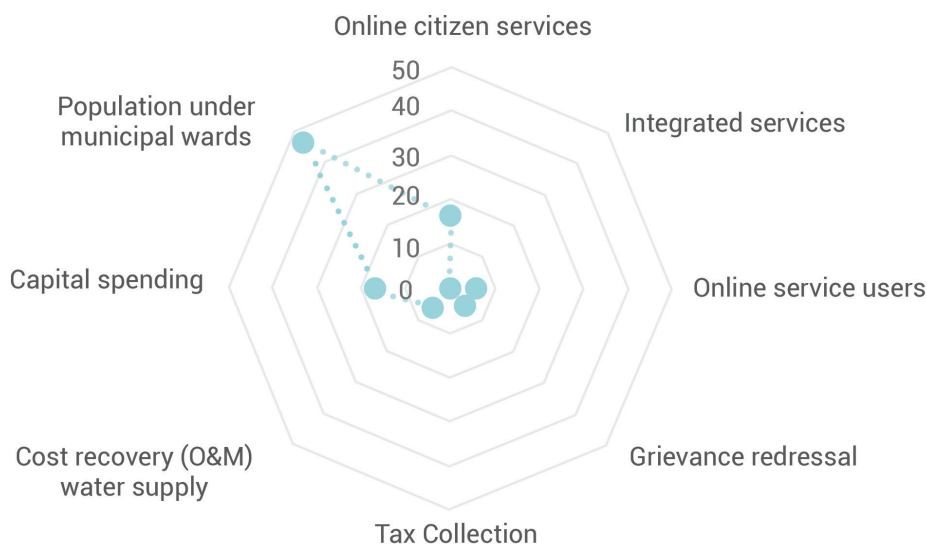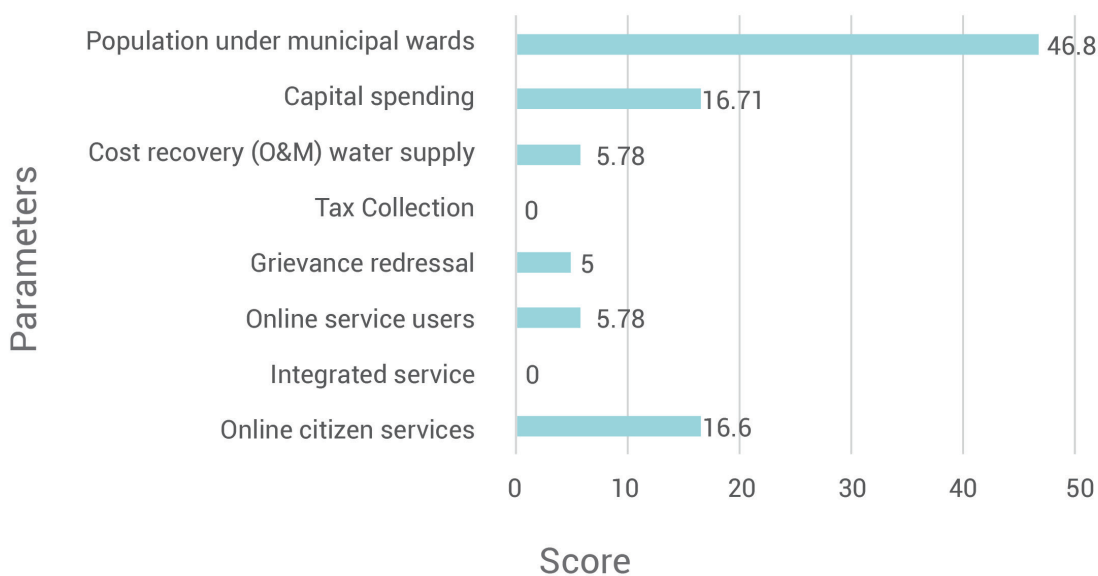
CHAPTER 5
SOCIAL

Identity & Culture

- **Restoration and reuse of historic buildings (Core)**

  - Leh town has been the central hub for this region for several centuries. Even today, there are many historic buildings in the oldest settlement of Leh Old Town. This it is one of the best examples of traditional Himalayan architecture. This area is currently being restored and is a popular tourist destination. Around 44.79% of historical buildings have been restored and are being used as offices, cafes, and art studios. There are almost 96 historical buildings and sites, 43 of them have been restored by Leh Old Town Initiative, Tibet Heritage Fund, Archaeological Survey of India and various NGOs.
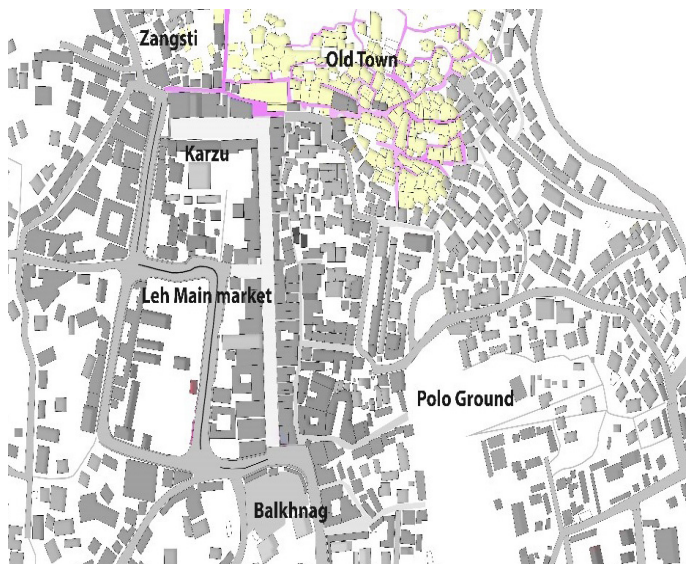
  - This area needs to be notified as a heritage area with suitable norms and bye-laws to conserve its essence. The ULB should undertake listing of buildings, sites, precincts of historical significance for conservation and restrict concrete buildings around them.

- **Percentage of ecologically important areas covered through projects for restoration (Core)**

  - Leh has many ecologically-important areas such as wetlands, natural springs and streams, which are being neglected.

  - Wetlands of Chubi and Chutey Rantak are now being replaced with hotels and guest houses with old trees being cleared to create space for commercial establishments.

  - Wetlands of Skara are drying up due to over-extraction of ground-water and the spring is polluted due to open sewer lines from the army's General Hospital located above the wetlands.
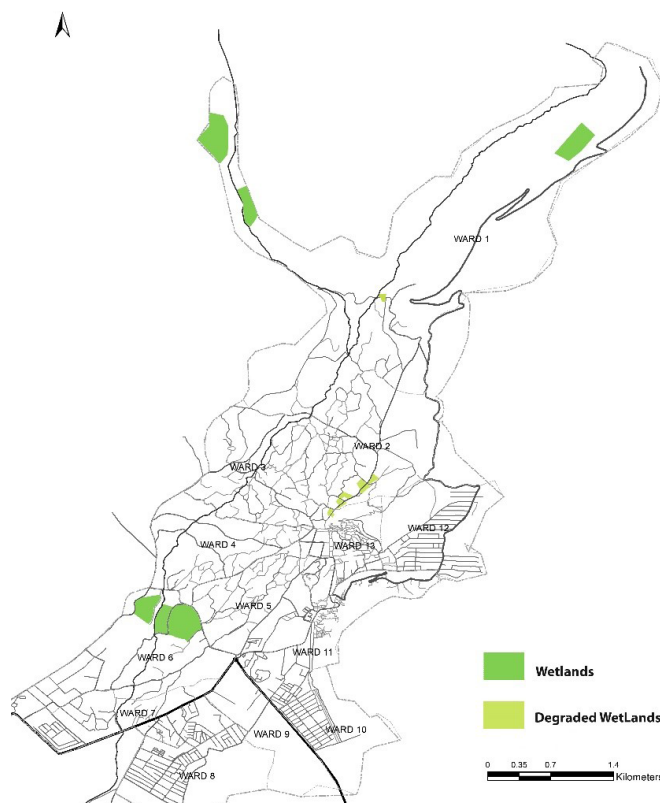
- **Hotel Occupancy (Core)**

  - The town receives tourists in summer months from May to October. Hotel occupancy in these months is almost 90 to 95%. Very few tourists visit Leh in colder months and hotel occupancy in these months are very low. The average annual hotel occupancy rate for Leh town is 52.4%.

 - The town needs to promote winter tourism or cultural tourism and make concerted efforts to conserve and market local heritage and ecological assets (eco-tourism) and explore opportunities to promote local identify and culture.

- **Percentage of budget allocated towards cultural/sports activities (Supporting)**

  - The town invested 13.6% or Rs 94.8 lakh of its budget in cultural and sports activities in 2018, which is a fair share. The ULB encourages cultural and sports activities, which is important to make the town a vibrant place.

- **Number of cultural/sports events hosted by city authority (Supporting)**

- In 2018 around 16 activities such as School Olympics, Ladakh Festival, Earth Day etc were celebrated. This includes activities that are actively funded by the ULB while others are facilitated through permissions and provision of land/facilities. This includes cultural activities such as music and dance performances, art exhibitions, literary events, film screening and festivals.

- **The identity and culture category scored 26.98 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3). The main issues are neglected ecologically-important areas and degrading wetlands.**
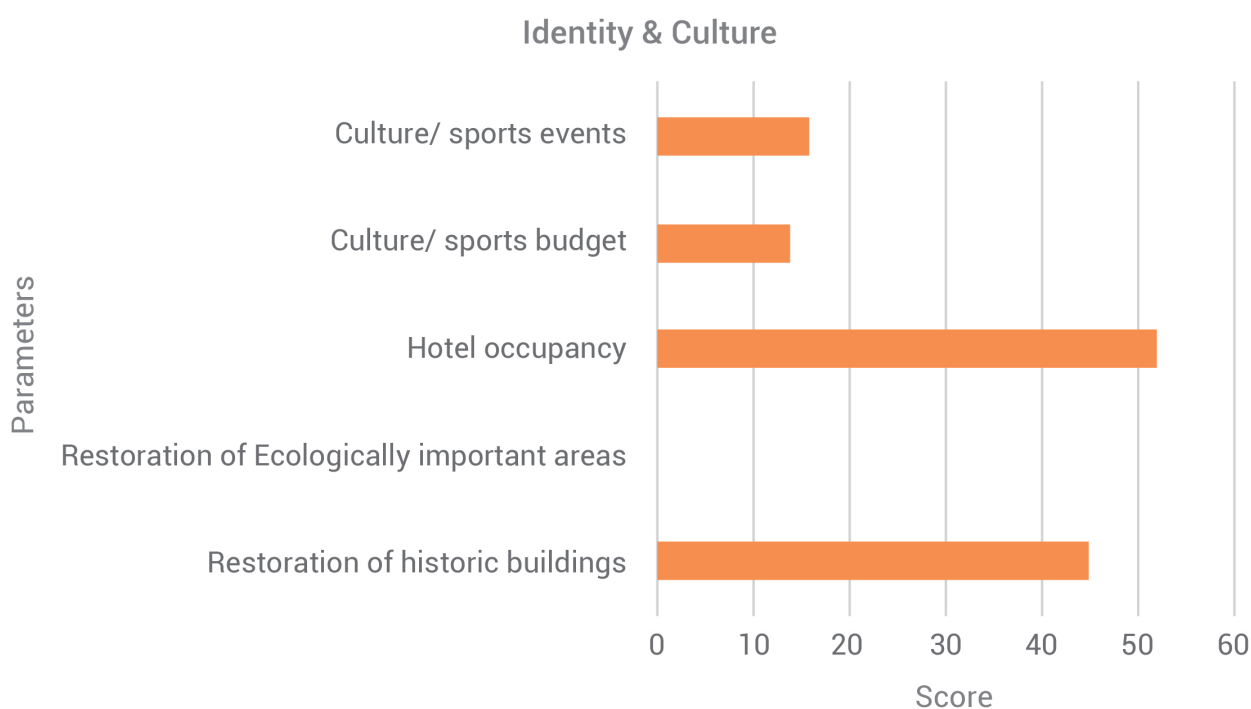
Identity & Culture

Education

- **Percentage of school-aged population enrolled in schools (Core)**

  - Out of total of 4,727 school-going population in the age group of 6 to 14 years, almost 4,613 are enrolled in schools i.e. 97.5% near or inside the municipal area. The rest are enrolled in schools of cities outside Ladakh.

- **Percentage of female school-aged population enrolled in schools (Core)**

  - The Town is one of the best in the country in terms of providing educational opportunities for girls. The ratio of girls in schools are higher than boys and Leh has 99% of female school-aged population enrolled in schools i.e. 2,883 school-aged females are in schools.

- **Primary education student-teacher ratio (Core)**

  - Only 133 teachers are present in the schools of Leh for 2,127 primary students i.e. 58.87%, or one teacher for every 70 students, which is much lower than the benchmark of one teacher for 30 students prescribed under the Right of Children to Free and Compulsory Education Act, 2009. This indicates that students lack individual attention and support in the primary grades. This is very important to achieve SDG goal 4.C and 4.C and requires a substantial increase in the number of qualified teachers in primary schools.

- **Percentage of schools with access to digital education (Supporting)**

  - Only 38.09% schools have access to digital education. This includes almost all private schools and a few government schools. Eight

schools out of 21 schools have access to such facilities with digital educational content. Such facilities reduce the dependence on the quality of teachers while also improving learning outcomes through the use of innovative audio-visual pedagogy and access to online knowledge repositories. It is important for schools to not only focus on installing digital infrastructure but also focus on connecting to robust digital learning networks such as the National Knowledge Network developed by Government of India. Leh should aim to achieve 100% access to digital education and fulfil SDG 4.A and 4.A1.

Percentage of students completing primary education (Core)

- All i.e. 100% of primary school-aged students complete primary education. These students belong to a school cohort that has reached each successive grade of primary education without failing or moving to another jurisdiction. Survival rate, particularly at primary level, is considered as a prerequisite for sustainable literacy, and indicates the holding power and efficiency of the primary education system.

Percentage of students completing secondary education (Supporting)

- Only 41.4 of students belonging to secondary school cohort i.e. 1,497 of 3,613 school-aged children, complete secondary education from schools in and around Leh town. Many of them enrol in schools in other cities outside Ladakh in search of higher quality education. Secondary education in Leh needs to improve by introducing more choices along with upgrading the quality of education by investing more resources in existing government schools.

Status of education in Leh town is good, with an overall index score of 74 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3) Leh needs to focus in improving teacher student ratio, and secondary education system.

Education

Horizontal bar chart titled "Education" with x-axis labeled "Score" (0 to 120) and y-axis labeled "Parameters":
- Students completing secondary education: ~41
- Students completing primary education: ~100
- Access to digital education: ~38
- Students-teacher ratio: ~58
- School enrollment (female): ~99
- School enrollment: ~97
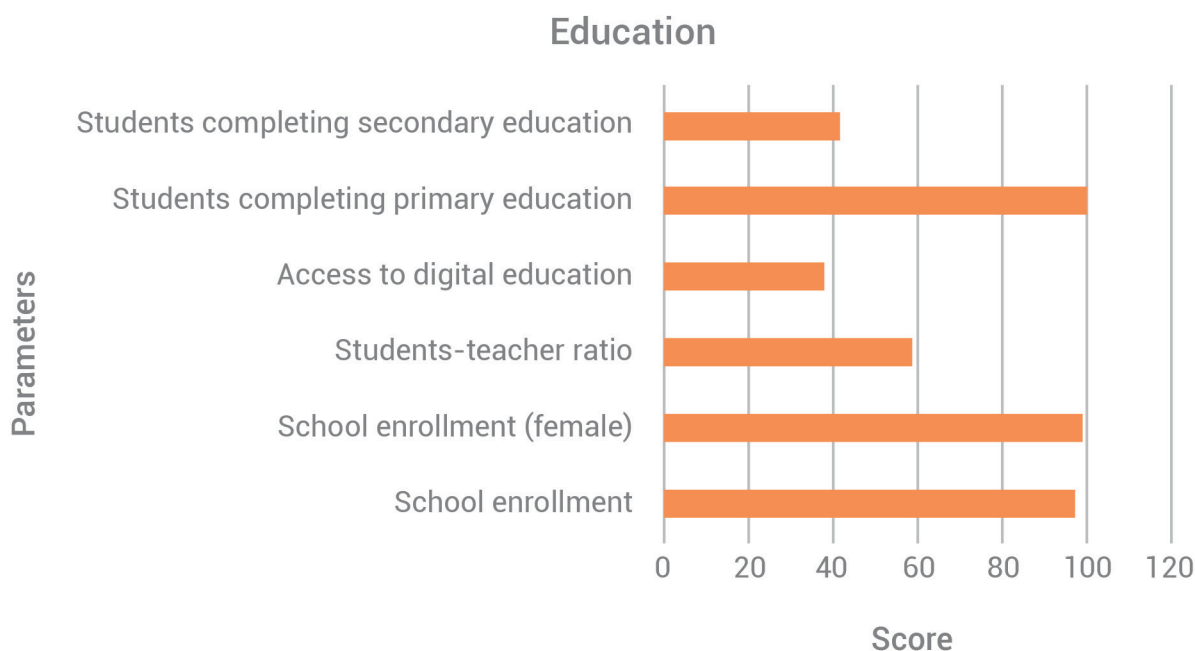
Health

- **Number of in-patient hospital beds per 10,000 population (Core)**

  - Leh has 38 inpatient hospital beds per 10,000 population. This is better than the benchmark of 25 beds per 10,000 population set by the WHO. Leh town has just one major hospital with 250 beds, which also caters to the needs of the rest of the district. Leh town thus needs additional hospitals to achieve SDG 3.8 i.e. universal health, essential health care services and access to safe, effective, quality and affordable essential medicines.

- **Healthcare professionals per 10,000 population (Supporting)**

  - Leh has only 16.9 healthcare professionals per 10,000 population. This is wel below the benchmark of 23 per 10,000 population set by the WHO. This denotes the availability of health workers in the town (health worker density) that caters to the needs of citizens. This includes various qualified human resources for healthcare including doctors and nurses.

  - Leh needs to substantially increase health financing, recruitment and retention of healthcare workforce to achieve SDG 3.C..

- **Average response time in case of health emergencies (Supporting)**

  - Emergency services in Leh take an average of 23 minutes to respond to health emergencies.

Leh must improve its emergency medical services to respond to a distress call in less than eight minutes (Report of the Working Group on Emergency Care in India, Ministry of Road Transport and Highways) for better preparedness and response to emergency calls.

- **Period prevalence of water borne diseases (Core)**

  - In 2018, there were 64 cases water-borne diseases i.e. 0.9% of the total population. The diseases include cholera, typhoid, jaundice etc, which indicates poor quality drinking water in certain areas.

- **Period prevalence of vector borne diseases (Core)**

  - In 2018, there were 12 cases of vector-borne diseases i.e. 0.1% of the total population. The current status of vector-borne diseases is much better than the rest of the country.

- **Status of healthcare in Leh town needs improvement. It has an overall index score of just 15 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3). Leh needs to focus on improving in-patient beds and increasing the number of healthcare professionals.**
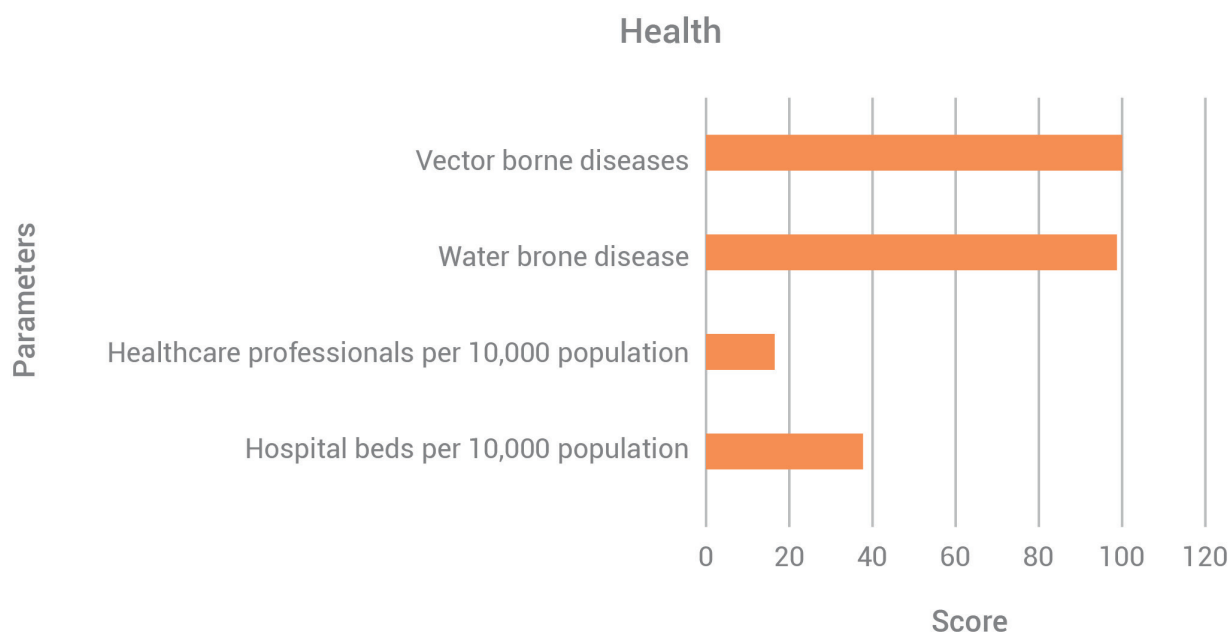
Health

Safety and security

- **Number of streets, public places, junctions covered through surveillance systems (Core)**

  - Only 3.22% i.e. two streets out of 62 major streets are covered by CCTV surveillance systems. Leh should aim to achieve 100% coverage to meet SDG 16.1 (reduce all forms of violence and related death rates everywhere). Such systems provide real-time monitoring of instances of crime or accidents and faster responses in emerging situations. Such surveillance systems can help improve security and incidence management. It can also help provide real-time information from traffic junctions about pedestrian and vehicular flow to monitor road accidents.

- **Number of recorded crimes per lakh population (Core)**

  - Leh has 297.29 crimes per lakh population as it recorded 196 cases of crime. Leh needs to lower this number through the use of effective surveillance in public spaces, better SOS and crime registration systems, and police response mechanisms. In addition, it also needs to improve planning and programming of public spaces, illumination of streets, and collaborate with local communities to improve safety.

- **Extent of crimes recorded against women, children and elderly per year (Core)**

  - In 2018 only one case was recorded i.e. 0.51% of crimes recorded against women, children and elderly per year.

- **Transport-related fatality per lakh population (Supporting)**

  - Leh transport network is not very safe with 47.02 fatalities per lakh population. There were 31 cases of transport-related fatalities in 2018 excluding minor traffic-related accidents. Leh needs to shift from its current vehicle-oriented designs and policies to pedestrian oriented planning, which are safer and will help reduce the number of traffic-related fatalities.

- **Overall status of safety and security in Leh town is good, with an overall index score of 84.1 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3). This is mainly due to low crime rates but Leh needs to improve safety of its transport network and increase the coverage of its surveillance systems.**

• Social index

The index of social pillar is 12.5 as the social pillar is given a weightage of 25%. The current status of education facilities and safety/security performed better than other two indictors of identity /culture and health.

More focus is needed in certain areas or parameters such as conserving ecologically important areas, improving student-teacher ratio, improve access to digital education, recruitment of more healthcare professionals, increase the number of beds in hospitals, and instal new CCTV surveillance systems in the streets.

SOCIAL
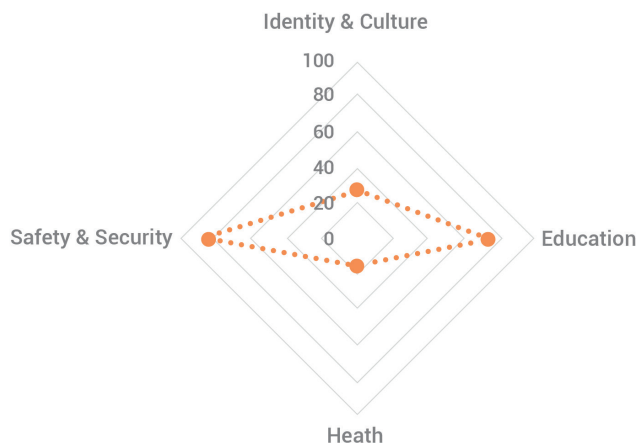
CHAPTER 6
ECONOMIC

Economy and employment

- **Increase in VAT/GST collection (Core)**

  - Leh recorded an increase of 7.14 % in GST collection in 2017- 2018. This indicates the productivity and competitiveness of the town and is a proxy for improvements in trade ad services in the town.

- **Increase in collection of professional tax (Core)**

  - No one pays professional tax in Leh Town as Ladakhis are exempt from paying income an professional tax under section 10 (21) of Income-Tax Act, 1961.

- **Increase in issuance of construction permits (Core)**

  - There was an increase of 12.6% in the number of construction permits issued in Leh town. Construction permits are issued by the Municipal Committee after complying with certain norms. The increase in number of construction permits issued indicates improvements in the construction/real estate sector in the town.

- **Unemployment rate (Core)**

  - Unemployment is a serious issue in Leh as 203 per 1,000 persons in the town are unemployed. The unemployment rate of a town denotes the proportion of work force that is not engaged in gainful employment or economic activity.

- **Percentage of vendors registered and provided formal spaces (Supporting)**

  - Leh town has 133 vendors of which 81 or 60.90% have been provided with formal spaces at six locations. Different types of vendors include vegetable sellers, cobblers, dry fruit sellers, Tibetan refugees, and street food vendors. Most of them (dry fruit sellers, Tibetan refugees) are registered and have been provided space near Balkhang chowk, near SBI Leh, near cooperative bank, etc.

  - In order to achieve the benchmark of 100% Leh town should implement inclusive strategies to protect livelihoods of street vendors by integrating such activities with public places (including streets) in line with Street Vendors Act, 2014.

  - Leh town should promote development-oriented policies to support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalisation and growth of micro, small and medium-sized enterprises, including through access to financial services. This will help achieve the targets of SDG 8.3..

Economic status of Leh town needs further improvement and it has an overall index score of 56.7 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3). The economic index is 2.8 as economic pillar is weighted at 5%.

ECONOMY
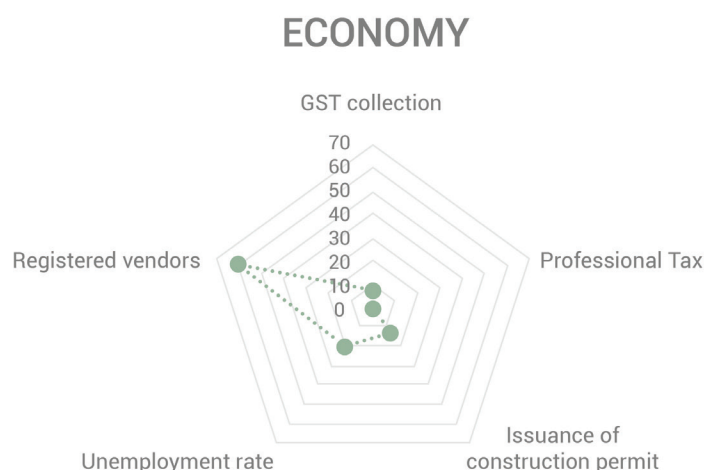
CHAPTER 7
PHYSICAL

Housing and Inclusiveness

- **Percentage of slum/EWS households covered through formal/affordable housing (Core)**

  50.92% of EWS households i.e. 110 households have been benefited from EWS housing schemes like Rajiv Awaz Yojna (RAY) and Pradan Mantri Awaz Yojna (PMAY), especially in Leh Old Town where old heritage buildings were labelled as slums and reconstruct as cement buildings.

- **Percentage of slum areas covered through basic services (Core)**

  - Leh have no notified slums though there are still some areas that lack basic services such as sanitation or water.

- Status of housing and inclusiveness in Leh town is fairly good with a category index score of 17.8 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3). Though Leh does not have any notified slums, it needs to shift its housing strategy from group housing to meeting the housing demand as there is limited land in the municipal area and expensive. Furthermore, migration rate to Leh from rural areas is still increasing and the town lacks a system of providing housing to them. Leh should prioritise housing especially low and middle-income housing.

Economy
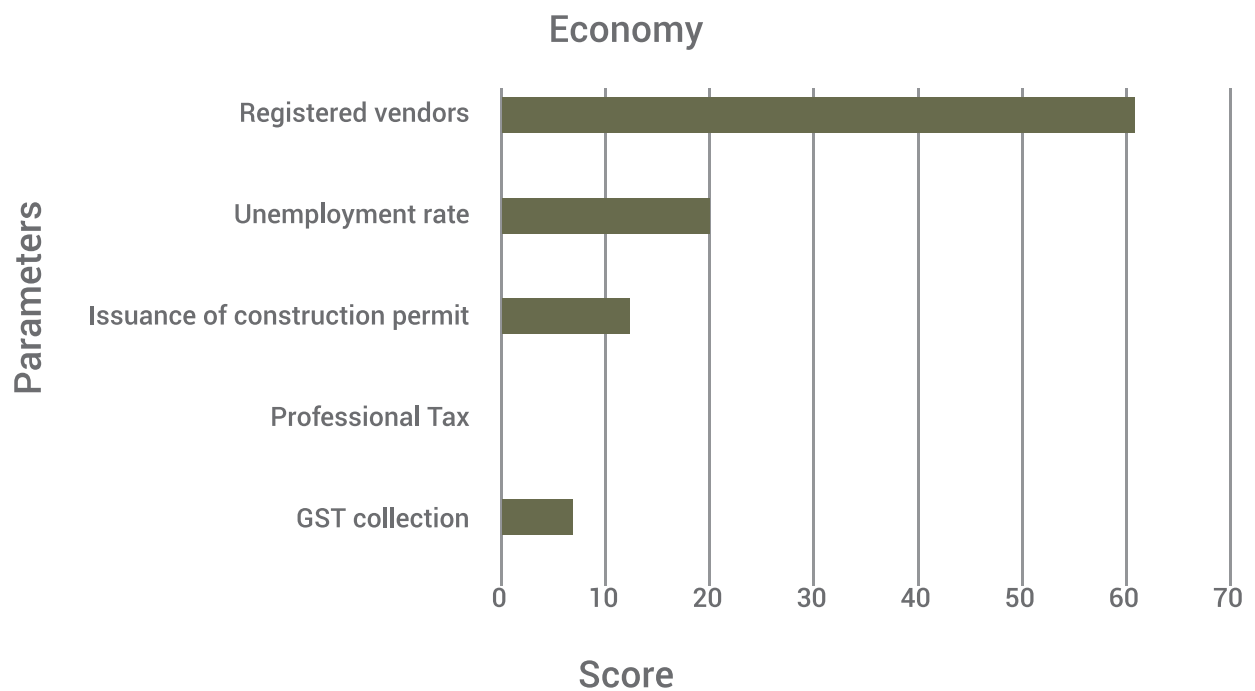
Public open spaces

- **Per capita availability of green spaces (Core)**

  - Leh has 2.20 sq m per capita green space, which includes parks in main market and housing colony and grasslands/wetlands at Skara (Skarey Spang), Gonpa, Gangles and Chubi. Per capita green space indicates the extent to which urban greens and open spaces such as recreational spaces, organised greens and common spaces like flood plains, forest cover, vacant lands etc. are available in the town leading to a better urban environment. Leh needs more green spaces, especially along Leh's stream to achieve the benchmark of 12 sq. m per capita (URDPFI guidelines) and achieve the SDG target of 11.7 sq m by 2030. In addition, Leh town must ensure universal access to safe, inclusive and accessible, green and public spaces especially to women and children, the elderly and differently-abled persons.

  - Per capita availability of public and recreational places (Core)

  - There is 4.78 sq. m per capita public and recreational place available for recreation, social interaction and active physical activities, Such spaces can include playgrounds, sports complexes, parks, neighbourhood parks and tot-lots, zoological/botanical gardens, multi-use open spaces and maidans for cultural events, publicly accessible waterfront areas, promenades, and public squares. A town needs almost 15 sq. m per capita public space, for which Leh needs new policies such as developing markets as pedestrian-friendly public places, developing promenades along the river and neighbourhood-level social spaces.

  - There are very few public spaces in the town and limited green spaces. Leh scored 2.4 on the public open space category index. It needs to increase green spaces, recreational and social spaces by adopting new policies to develop markets as pedestrian-friendly public places, developing promenades along the river and neighbourhood-level social spaces.

Green Spaces

Legend:
- Wetlands
- Parks

Public Open Spaces

Legend
- flexible_spaces
- winter sports facilities
- Children park
- sports facilities
- public square
- courtyards
- natural_spaces
- market_places
- parks
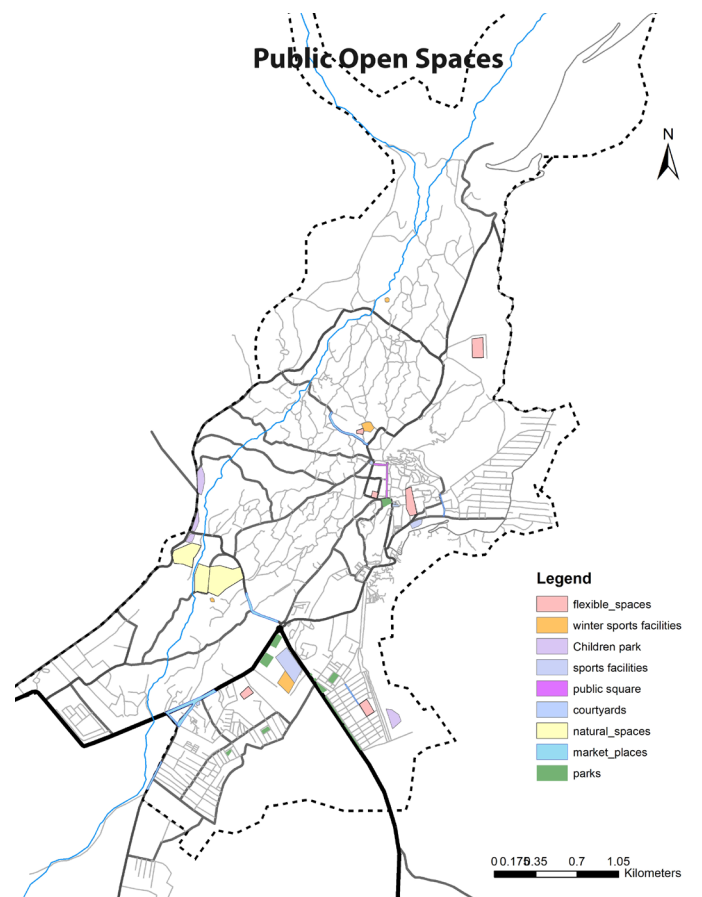
Mixed land use and compactness

⚬ **Share of mixed land use area in overall urban land use (Core)**

• Leh has 34.4 hectares or 2% of the total town area of mixed land use. Leh town has grown organically with predominantly residential areas and agriculture on fertile lands with access to water. There are commercial establishments along the streets and main arterial roads with residential and commercial use at different level.
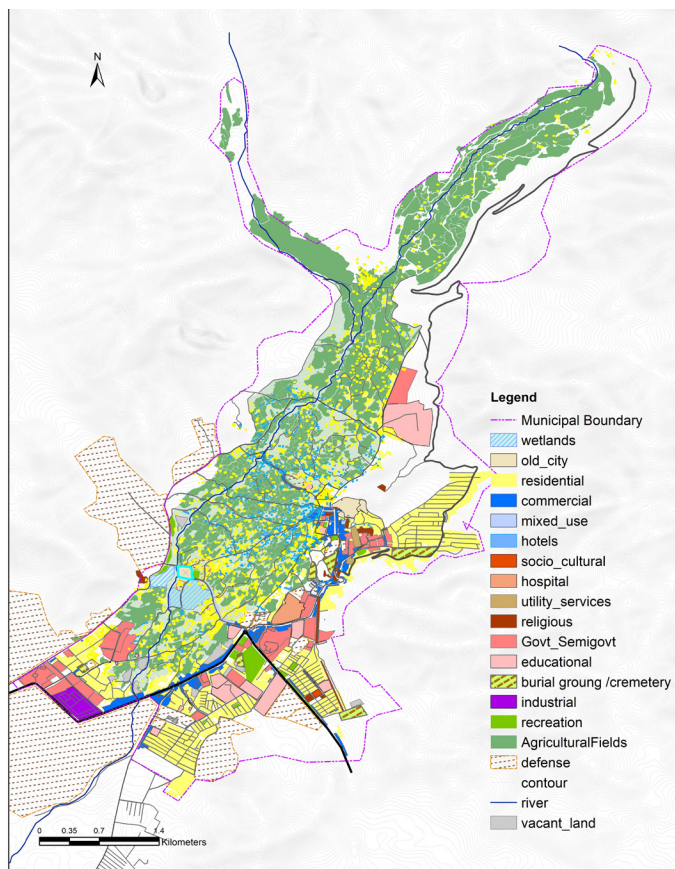
• Mixed land use refers to residential, commercial and non-polluting industrial activity/ service industry planned in close proximity to each other as an integrated mix. This is an important departure from the emphasis of modern planning on functional separation leading to unsustainable land use patterns.

⚬ **Net density (Core)**

• The net density of Leh town is 488 persons per hectare. Leh has 135 hectares of residential area. However, the distribution of population density and residential spaces differs in different municipal wards. This denotes the intensity of development in the town. Higher net densities coupled with mixed land use areas can result in a compact development pattern, potentially forming walkable and inviting activity centres and neighbourhoods.

• Leh's land use mix and density category index score is 171.5. It needs to promote more mixed uses, which will be an important step towards shifting away from a vehicle-dominated environment by reducing the number of trips and making each journey shorter and walkable..
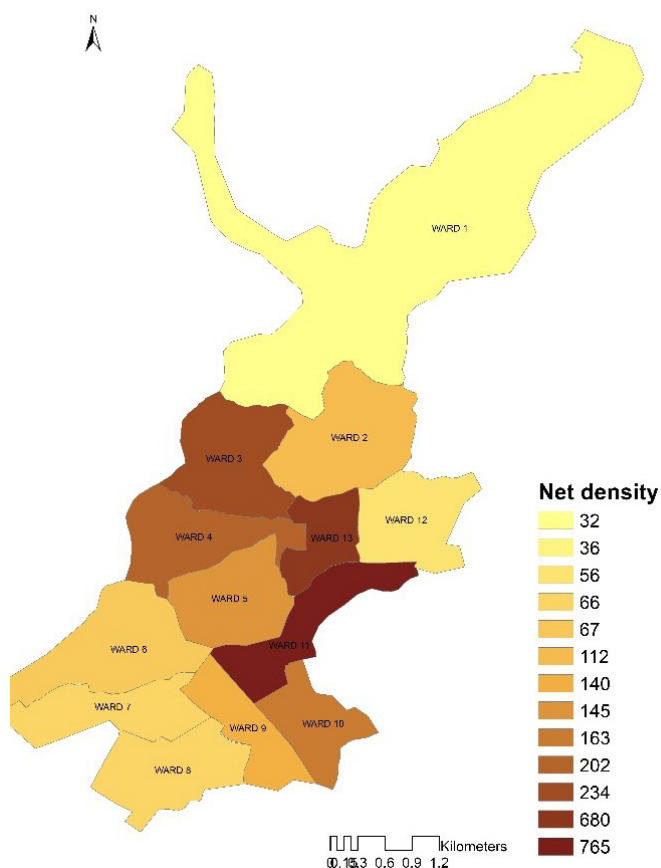
Power supply

- **Percentage of the town's population with authorised electrical service (Core)**

  - Almost 100% of the town's population has authorised electrical service. An authorised electric connection is mandatory for any commercial establishment and industrial business. However, Leh does not have any associated services such as timely grievance redressal or complaint registration.

- **Percentage of electrical connections covered through smart meters (Supporting)**

  - None of the electrical connections is covered through smart meters in Leh. It is very important to install smart meters and achieve 100% coverage as it leads to better monitoring and reduction in losses. Smart metering is an essential component of a smart grid and supplies the required meter data and event information to the utility's IT system including its outage management system. This allows better management of power outages and restoration, and can improve reliability of supply in the long-term.

- **Average number of electrical interruptions per customer per year (Core)**

  - Electricity in Leh town is not reliable, especially in the winters. Leh has almost 0.07% or 1,068 hours of electric interruptions per customer per year. This data is computed using the System Average Interruption Frequency Index (SAIFI) defined as the average number of sustained interruptions (outages that last more than five minutes) per consumer during the year.

- **Average length of electrical interruptions per customer per year (Supporting)**

  - The average length of electrical interruptions per customer per year is 2.24 hours in Leh town.

- **Percentage of total energy derived from renewable sources (Core)**

  - Leh derives 100% of its energy from non-conventional sources or renewable sources. The only source of electricity for Leh town is Alchi hydro-electric Project. Leh town

should also promote installation of renewable energy systems in public buildings and public spaces as well as individual households and community spaces.

- **Energy consumption per unit – water supply and sewerage (Supporting)**

  - The total energy consumption for supplying water in Leh town is 1,525 kWh per million litres mainly for lifting water from the Indus through a series of high-capacity pumps, which consume a lot of energy. The town needs to adopt energy saving options to reduce energy consumption on water supply services through interventions such as use of energy-efficient pumps for water and wastewater systems.

- **Energy consumption per unit - street lighting (Supporting)**

  - The streetlights in Leh consume 0.04 kWh per light and there are around 650 streetlights (mostly LED), which consume 30.5 kWh of electricity. Though the ULB has adopted energy-saving options, it needs to invest in low-cost lighting systems such as retrofitting LED lights on existing electric poles instead of installing new poles along with decentralised lighting systems.

- **Percentage of new and redeveloped buildings following green building norms (Supporting)**

  - None of the buildings in Leh town follow green building norms such as GRIHA, LEEDS or equivalent green ratings. Around 80% of a town should ideally be following green building norms, which will help Leh achieve SDG 7.3 i.e. double the global rate of improvement in energy efficiency, SDG 11.3 i.e. sustainable human settlement planning and SDG 12.2 i.e. achieving the sustainable management and efficient use of natural resources

- **Total energy consumption per capita (Core)**

  - Total energy consumption in Leh 19.9 kWh per capita, which increases in the winter due to heating needs.

  - Status of power supply in Leh town is good with a category index score of 130 (Category index = average score for core indicators × 0.7 + average score for supporting standards

× 0.3). This is largely due to the 100% coverage of authorised electrical connection but the town needs to install smart meters and promote energy efficient services and buildings.
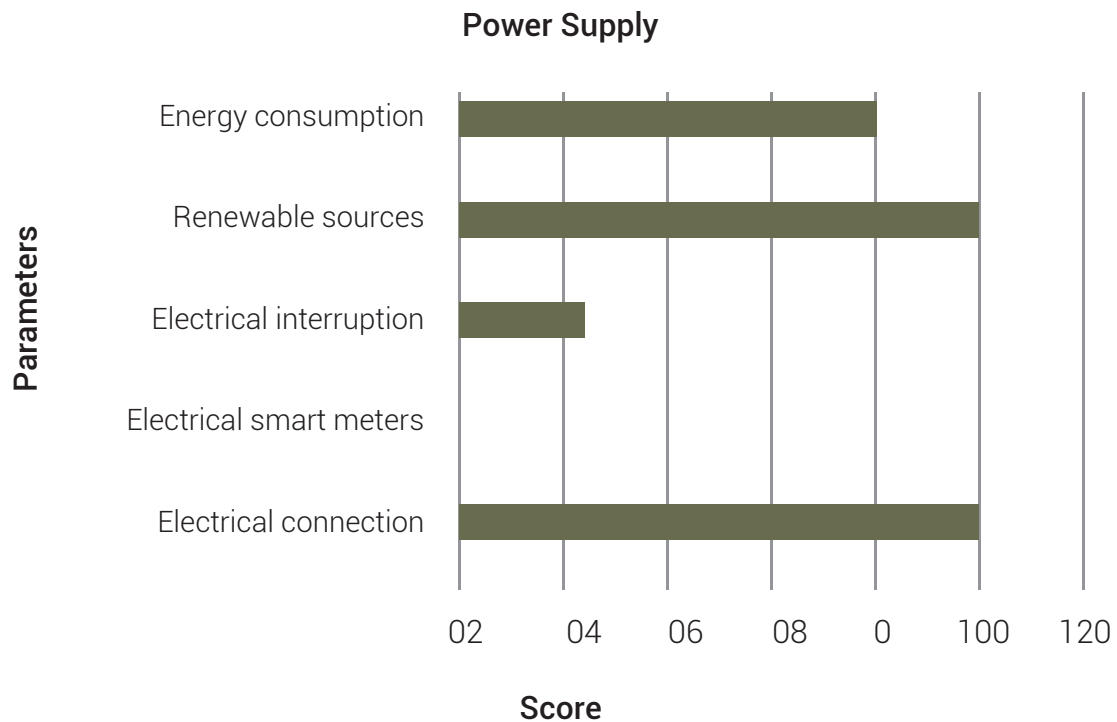
Power Supply

Transportation and Mobility

- **Geographical coverage of public transport (Core)**

- Public transport only covers the southern part of the town or 50% of its area and the geographical coverage of public transport is .34 km per square metre, which makes public transport routes inefficient. Leh needs new bus routes, specifically in the western and northern parts of the town and should aim for more than 1 km per square metre (Service Level Benchmarks for Urban Transport, MoUD) while providing access to a safe, affordable, accessible and sustainable transport system.

- **Availability of public transport (Supporting)**

- The public transport system in Leh is operated by the Mazda Union. They have a fleet size of 122 buses or 1.85 per 1,000 persons and these buses operate on two routes; one towards Choglamsar and one towards Skalzangling and Agling.

Geographical coverage of Public Transport

Public transport Network
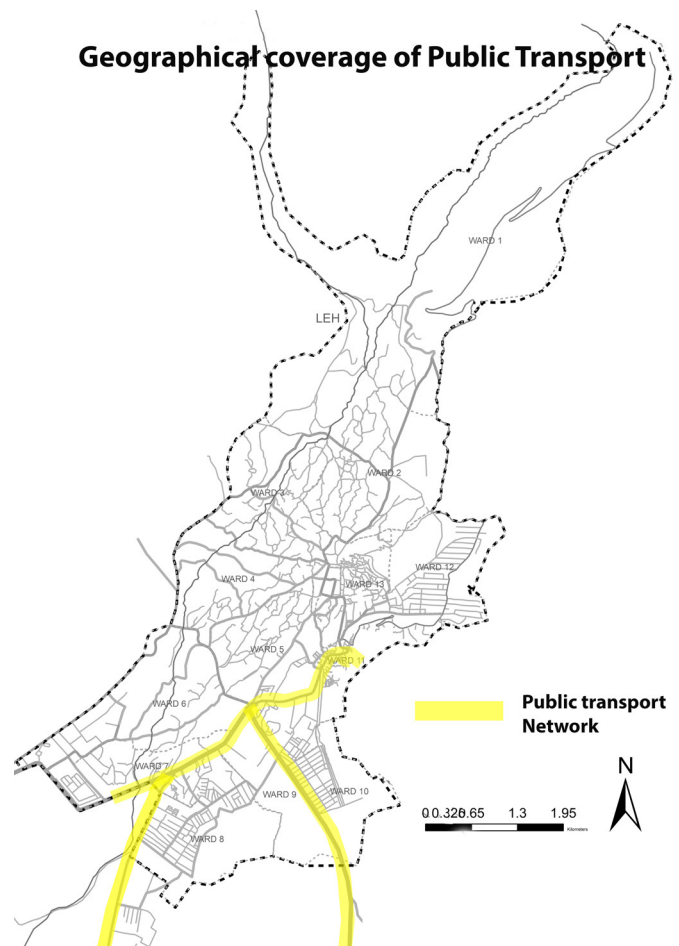
- **Mode share of public transport (Core)**

  - About 20% of all trips are made using public transport or town buses, which are the only mode of public transport. Ridership in these buses is high. A medium town like should have a mode share of 12%. Leh needs to improve the service quality, especially the bus stops and accessibility for the differently-abled and senior citizens.
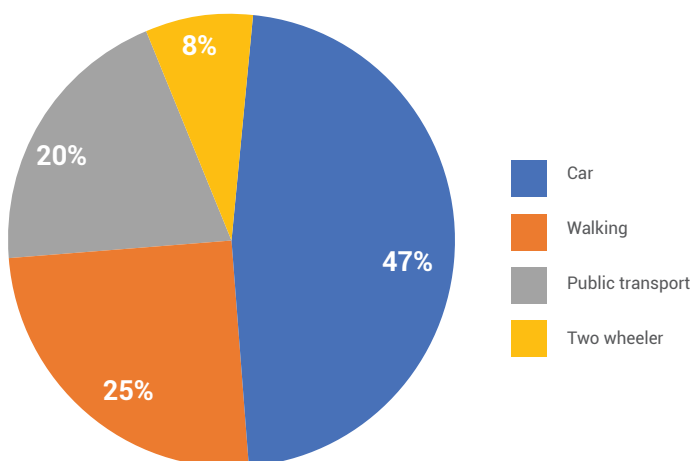
Figure 5 Mode Share of trips in Leh town Source- (Tashi, 2019)

- **Percentage of road network with dedicated bicycle tracks (Core)**

  - There are no dedicated bicycle tracks in Leh town and cycling is very unsafe on its streets. Leh needs to increase its cyclability by making streets safer for riders through adequate streetlights and dedicated NMT zone on highways. The town should aim to ensure that more 50% of its streets are cycle-friendly (Service Level Benchmarks for Urban Transport, MoUD).

- **Percentage of interchanges with bicycle parking facilities (Supporting)**

  - There are no bicycle parking facilities in Leh town. It must encourage cycling by providing adequate parking facilities at major transport interchanges (bus depots or stations). This will enable integration of non-motorised transport with the public transport network. More than 75% of transport interchanges should have bicycle parking facilities (Service Level Benchmarks for Urban Transport, MoUD).

- **Mode share of non-motorised transport (Core)**

  - Non-motorised transport share 25% of all the trips in town. Only walking trips have been considered as there are no other non-motorised transportation (NMT) in town. For a medium town like Leh, the mode share of NMT should be more than 67% (National Transport Development Policy Committee, 2013). It needs to improve its NMT share by improving walkability and cyclability in the Town.

- **Extent of signal synchronisation (Supporting)**

  - There are no traffic signals on the intersections in leh. In order to develop a pedestrian-friendly environment, Leh needs to install traffic signals on major intersections and synchronise them to facilitate smooth traffic flow.

- **Availability of Passenger Information System (Supporting)**

  - Leh does not have a Passenger Information System (PIS) at bus stops or bus stations. Leh needs to improve its public transport system with a PIS, which are the key communication link between transportation operators and passengers. They provide accurate information about arrival and departure etc. Such information is provided through digital displays and through loud speakers installed at relevant locations.

- **Availability of paid-parking spaces (Core)**

  - Only 17.3% of on street parking in Leh town are paid-parking spaces as there are only four paid-parking spaces out of 23 on-street parking spaces. The revenue generated from this is collected by Municipal Committee, Leh. The town needs to implement restrictions on free parking spaces for vehicles to discourage vehicle use. More than 75% (Service Level Benchmarks for Urban Transport, MoUD) of parking spaces should be paid-parking spaces

- **Percentage coverage of footpaths – wider than 1.2m (Core)**

  - Only 7.89% of total road network or 10.5 km of road have footpaths wider than 1.2m. Leh

scored very poorly in the global walkability index due to the lack of footpaths on its streets (Tashi, 2019). Leh should have at least 75% coverage of footpaths (Service Level Benchmarks for Urban Transport, MoUD).

- **Percentage of traffic intersections with pedestrian crossing facilities (Supporting)**

  - None of the intersections in Leh have pedestrian-crossing facilities. The road network in Leh is primarily pro-vehicular with little or no facilities for pedestrians. Leh needs to install table-top crossings, zebra crossings, pedestrian signals, grade separators etc. wherever required.

- **Extent to which universal accessibility is incorporated in public right-of-way (Supporting)**

  - Universal accessibility is almost non-existent in Leh town and none of the roads have any facility for the differently-abled, the elderly and children. Leh needs to include universal accessibility in every new project, footpath, crossing, public building etc.

- **Leh's transport and mobility category index score is 6.1 (average score for core indicators × 0.7 + average score for supporting standards × 0.3). Traffic and transportation needs a major improvement in the town, especially public transport, cyclability, walkability and universal accessibility.**
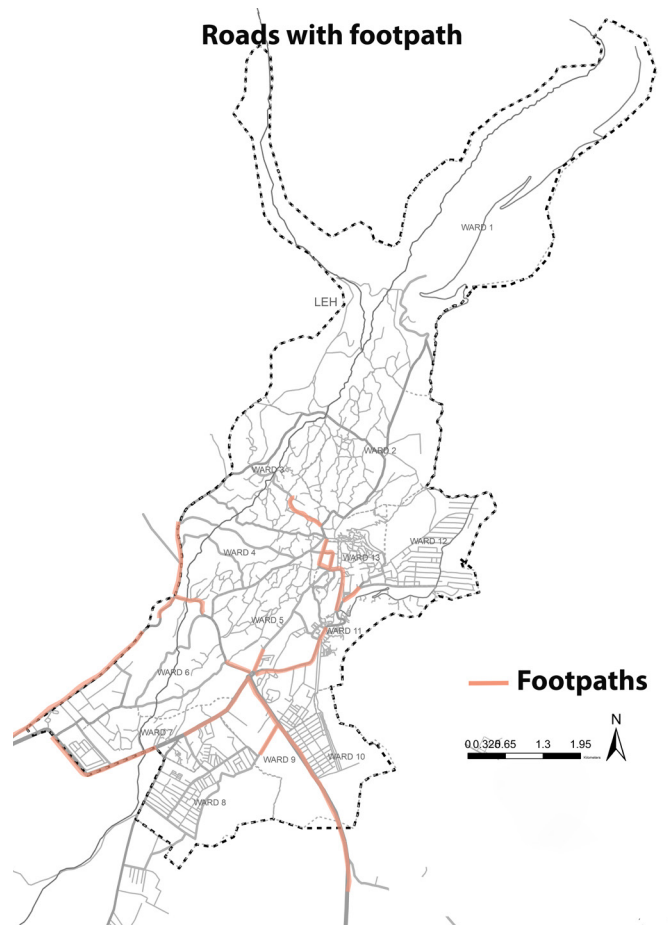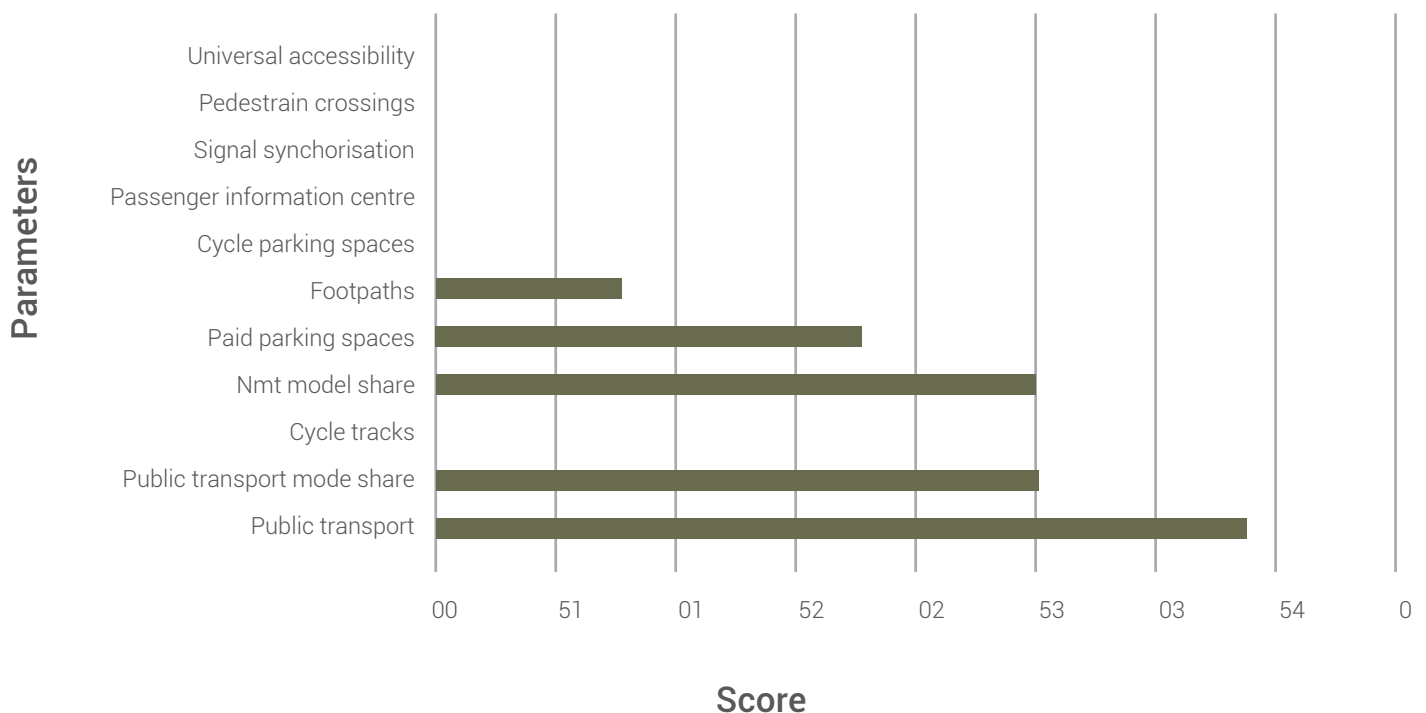
Roads with footpath

— **Footpaths**

Transport & Mobility

Parameters	Score

Parameters (top to bottom):
- Universal accessibility
- Pedestrain crossings
- Signal synchorisation
- Passenger information centre
- Cycle parking spaces
- Footpaths
- Paid parking spaces
- Nmt model share
- Cycle tracks
- Public transport mode share
- Public transport

Score axis: 00, 51, 01, 52, 02, 53, 03, 54, 0

Score

Assured Water Supply

Household-level coverage of direct water supply connections (Core)

- Only 10.4% or 833 households have direct water supply. Leh faces water management issues and remains over-dependent on ground water extraction. Leh will soon have a new 24×7 water system to improve water management in the town.

Per capita supply of water (Core)

- PHE supplies around 72 litres per capita per day but there is inequality in access to water as not everyone gets an equal quantity of water. Tourists and local residents get about 100 and 75 litres per capita per day (LPCD) respectively. Migrant labourers get as little as 25 to 35 LPCD, which is insufficient for personal health and hygiene.

Quality of water supplied (Core)

- Around 82% of samples tested for water quality meet or exceed specified potable water standards as per norms set by CPHEEO (Manual on Water Supply and Treatment, 1999). In Leh, approximately 92% of domestic water requirement for the town is sourced from underground sources; public tube wells in Leh, private tube wells and Indus river tube wells).

- Water quality from different government and private sources was collected from Leh and analysed by Consortium for DEWATS Dissemination (CDD) Society, Bengaluru on various parameters.

- A research study by Technical University of Munich (TUM) found that 90% of the 100 samples they collected from tube wells, hand pumps and small springs across middle and lower Leh had traces of E. coli bacteria and nitrates

Level of non-revenue water (Core)

- Most of the water supplied or 93.5% is non-revenue water. This denotes the quantity of water produced and supplied by the ULB, which does not earn any revenue. Percentage of non-revenue water should be less than 10% (Service Level Benchmarks, MoUD).

Percentage of water connections covered through meters (Supporting)

- None of the existing water connections have water meters. In the new project design, 100% of the households are expected to be connected with the new water supply scheme. In order to achieve SDG 6.4 by 2030, Leh needs to substantially increase water-use efficiency across all sectors, ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

Percentage of plots with rainwater harvesting facility (Supporting)

- There are no buildings and plots with a rainwater harvesting facility. It is very important to harvest rain water in Ladakh. The MoUD under the AMRUT Mission has recommended that all new developments/redevelopments with a minimum plot-size of 300 sq. m. and all commercial and public buildings should have rainwater harvesting facilities.

The category index score for water supply is 33.8. There are many issues in water supply and management. The per capita water supply is much less than standards, the quality is drinking water not poor, level of non-revenue water is high, and there are no water meter connections. These issues will be addressed under the new water project.

Parameters	Units	Acceptable limits (IS Standards)	Murtsey PHE Tubewell	PHE Indus Lift Choglamser	Chang Spa Spring	Private Tubewell, Hotel	Sankar Hand Pump	Chutey Rantak PSP	Gyalung spring Lamdon
Colour	–	Colourless	Colourless	Colourless	Colourless	Colourless	Light brown	Colourless	Colourless
Odour	–	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
Ph	–	6.5 – 8.5	6.8	7.7	7.1	7.1	7	7.4	7.1
Total Dissolved Solids	Mg/L	500	144	113	114	98	126	123	133
Turbidity	NTU	1	12	0.4	0.6	1	31	0.5	0.7
Nitrates as NO3	Mg/L	45	61	10	18	7	4	15	10
Chloride as Cl	Mg/L	250	58	10	14	9	6	14	10
Sulphate as SO4	Mg/L	200	90	36	12	13	9	41	16
Total hardness as CaCo3	Mg/L	200	500	320	220	180	200	310	280
Fluoride As F-	Mg/L	1	5	0.3	0.2	0.2	0.08	0.3	0.2
Magnesium as Mg	Mg/L	30	16.3	7.7	0.3	0.6	1.6	2.1	BDL
Manganese as Mn	Mg/L	0.1	0.03	0.01	BDL	BDL	0.1	0.02	0.02
Iron as Fe	Mg/L	0.3	0.01	0.02	0.01	0.09	1.5	0.01	0.02
Lead as Pb	Mg/L	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Zinc as Zn	Mg/L	5	0.02	0.17	0.22	0.8	3.1	0.05	0.07
Escherichia Coli	MPN/100ml	Nil/100 Ml	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Total Coliform Bacteria	MPN/100ml	Nil/100 Ml	NIL	NIL	NIL	NIL	NIL	NIL	NIL

Table 1 Water quality test results, january 2019,CDD

Waste water management

- **Coverage of toilets (Core)**

  - Almost 99% of households have a toilet on their premises. A few commercial business establishments and offices do not have toilets on their premises and this leads to open defecation in the market and institutional area. The construction of two all-weather public toilets has helped reduce open defecation.

- **Coverage of sewerage network (Core)**

  - Sewerage network is being constructed but it is not complete yet.

- **Collection efficiency of sewerage network (Core)**

  - Collection efficiency of sewerage is only 0.3% as waste water in Leh is collected and treated in the Faecal Sludge Treatment Plant in Leh, which collects black water from a few hotels as many hotels do not have proper septic tanks.

- **Extent of reuse and recycling of waste water (Core)**

  - About 3% of the treated water in Leh is being reused and recycled. The treated waste water can be used for horticultural purposes in parks and gardens, irrigation of farmlands on

the town's periphery, and/or supplied to power plants and industries.

- **Coverage of storm water drains (Core)**

  - Only 15% or 14 km out of 93km of roads (wider than 3.5) have storm water drains. Leh needs to see storm water as a resource instead of a nuisance and reuse it for other purposes.

- The category index score of waste water management is 16.3 (average score for core indicators × 0.7 + average score for supporting standards × 0.3). Leh needs to manage waste water properly and make plans to reuse and recycle water generated from sewerage treatment plants.

Parameters	Units	Acceptable limits (IS Standards)	Murtsey Area (handpump)	Changspa area	Sankar area (hotel)	Chutey Rantek area (spring)
Colour	–	Colourless				
Odour	–	Odourless				
Ph	–	6.5 – 8.5	7.0	7.0	7.0	7.0
Total Dissolved Solids	Mg/L	500	263	122	88	300
Turbidity	NTU	1	6.35	<1	1.67	<1
Nitrates as NO3	Mg/L	45	25.0	10.0	0.0	10.0
Chloride as Cl-	Mg/L	250	19.0	4.0	1	19.0
Sulfate as SO42-	Mg/L	200				
Total Hardness as Caco3	Mg/L	200	250	120	NA	250
Fluoride as F-	Mg/L	1				
Magnesium as Mg	Mg/L	30				
Manganese as Mn	Mg/L	0.1				
Iron as Fe	Mg/L	0.3				
Lead as Pb	Mg/L	0.01				
Zinc as Zn	Mg/L	5				
Escherichia Coli	MPN/100ml	Nil/100 Ml	0	0	0	1333
Total Coliform Bacteria	MPN/100ml	Nil/100 Ml				
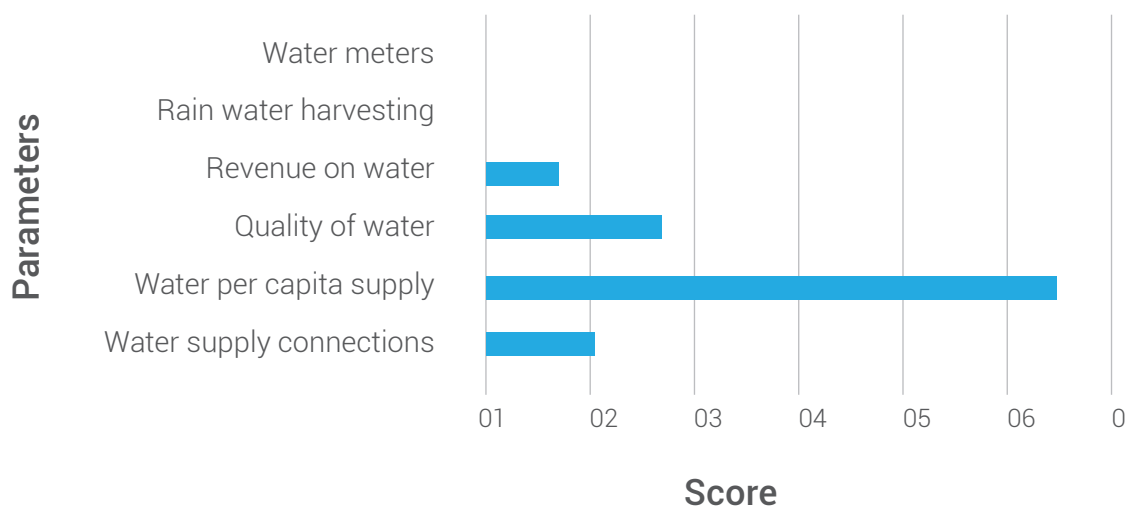
Water

Solid Waste Management

- **Household level coverage of municipal solid waste collection (Core)**

  - A total of 47.91% of households are covered by municipal solid waste collection facility. There is no system to collect waste from each doorstep. Solid waste is mostly collected at the neighbourhood and street level.

- **Efficiency of collection of municipal solid waste (Core)**

  - Leh have a collection efficiency of 84.2% of municipal solid waste.

- **Extent of municipal solid waste recovered through reuse (Core)**

  - None of the solid waste collected are recovered and reused in Leh municipal area. A new centralised segregation and recycling facility is being constructed near Leh town.

- **The category index score for solid waste management is 30.8 (average score for core indicators × 0.7 + average score for supporting standards × 0.3). The waste generated in Leh is now being dumped and burnt. A new system of segregation and recycling system is urgently needed.**

Reduced pollution

- **Concentration of SO2 - air pollution (Core)**

  - Mean concentration of sulphur dioxide (SO2) concentration over 24 hours in Leh town is 6.97 µg/m³, as per the standards for acceptable level of air pollutants (including SO2) specified in the National Air Quality Standards (2009) prescribed by the CPCB, SO2 levels should be lower than annual mean concentration of 50 µg/m3 OR mean concentration over 24 hours of 80 µg/m3 (Central Pollution Control Board)

- **Concentration of NO2 - air pollution (Core)**

  - Nitrogen Dioxide (NO2) is considered a critical urban air pollutant. The mean concentration of NO2 concration over 24 hours in Leh town is 18.16 µg/m³. According to standards for acceptable level of air pollutants (including NO2) specified in the National Air Quality Standards (2009) prescribed by the CPCB, NO2 levels should be lower than annual mean concentration of 40 µg/m3 OR mean concentration over 24 hours of 80 µg/m (Central Pollution Control Board)

- **Concentration of PM10 - air pollution (Core)**

  - Respirable Suspended Particulate Matter (size less than 10µm) or PM10 is considered as a critical urban air pollutant. Exposure to high levels of PM10 can cause respiratory and cardiovascular diseases. Mean concentration of PM 10 over 24 hours in Leh is 50.77 µg/m³, PM10 levels should be lower than an annual mean concentration of 60 µg/m3 OR mean concentration over 24 hours of 100 µg/m3 (Central Pollution Control Board)

- **Level of noise pollution (Core)**

  - Around 90% of noise samples taken from different locations meets acceptable noise levels. A total of 20 different sound samples were tested from various points in the town at different times of the day (industrial, commercial, residential and sensitive (silence) zones such as hospitals, educational institutions etc.)

Benchmark as per Noise Pollution (Regulation and Control) Rules, 2000

Category of area/ zone	Limits in dB/A L eq *	
	Day time	**Night time**
Industrial area	75	70
Commercial area	65	55
Residential area	55	55
Sensitive area (silence zone)	50	40

- **Quality of water in public surface water bodies (Core)**

  - Almost 11% of the surface water samples tested meets prescribed standards. The quality of water in public surface water bodies such as rivers, streams and ponds in the town is fairly polluted and it is critical for

maintaining the health of the overall water ecology associated with these surface water bodies.

- **The category index score for reduced pollution is 35.6 (average score for core indicators × 0.7 + average score for supporting standards × 0.3). The pollution levels are very low and the air is safe for breathing in Leh town. Noise pollutions is also under permissible standards except at Skalzangling street. Streams and rivers in Leh town need special attention as they are being used for discharge of grey water and waste water, Leh needs to revive its streams and ponds.**

- **Physical index**

The index of physical pillar is 49.3 as the social pillar is given a weightage of 45%. Status of waste management, water supply, solid waste management is poor in the town and more focus is needed to improve all physical indicators.

PHYSICAL
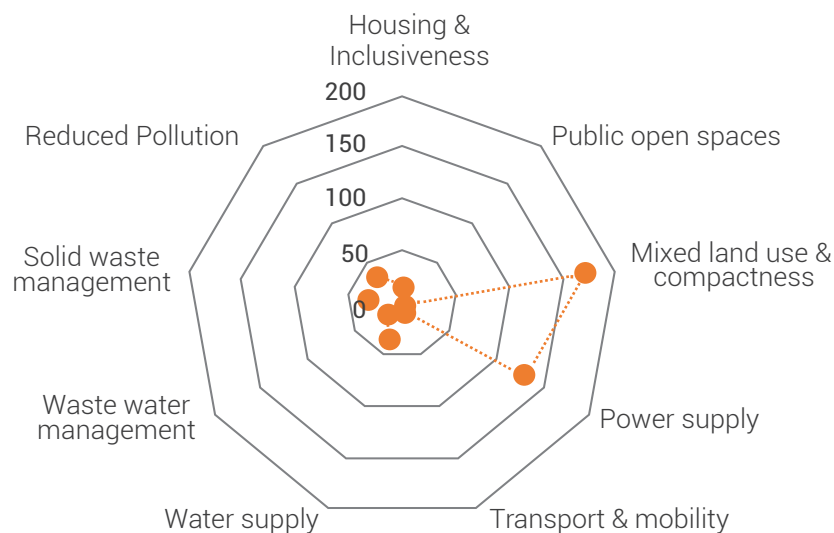
Liveability index of Leh town.

Pillar of Comprehensive Development	Category Index		Average value for each pillar	Weight adjustment	City Liveability Index
Institutional (25% weight)	Governance Index (A)	63.6	A 63.6	T=A×0.25 15.9	City Liveability Index = T+U+V+W
Social (25% weight	Identity and Culture Index (B)	26.98	R= B+C+D+E 4 R= 50.02	U=R×0.25 U= 12.5	Or 53.4
	Education Index (C)	74			
	Health Index (D)	15			
	Safety and Security Index (E)	84.1			
Economic (5% weight)	Economic Index (F)	56.7	F= 56.7	V=F×0.05 V= 2.8	
Physical (45% weight)	Housing and Inclusiveness Index (G)	17.8	S= G+H+J+K+L+ M+N+P+Q 9 S= 49.3	W=S×0.45 W= 22.2	
	Open Space Index (H)	2.4			
	Mixed Use and Compactness Index (J)	171.5			
	Energy Index (K)	130			
	Mobility Index (L)	6.1			
	Water Index (M)	33.8			
	Waste Water Index (N)	16.3			
	Solid Waste Index (P)	30.8			
	Pollution Index (Q)	35.6			

Table 3 Liveability index of Leh town

The liveability index of Leh town is 53. 4
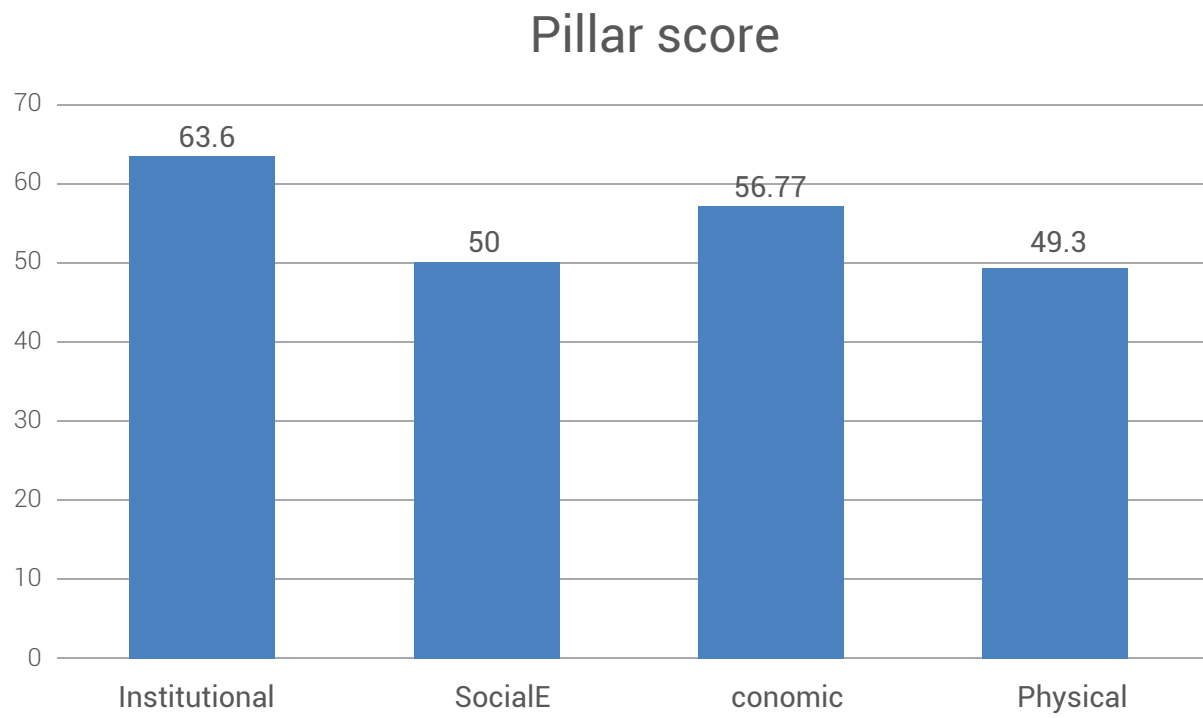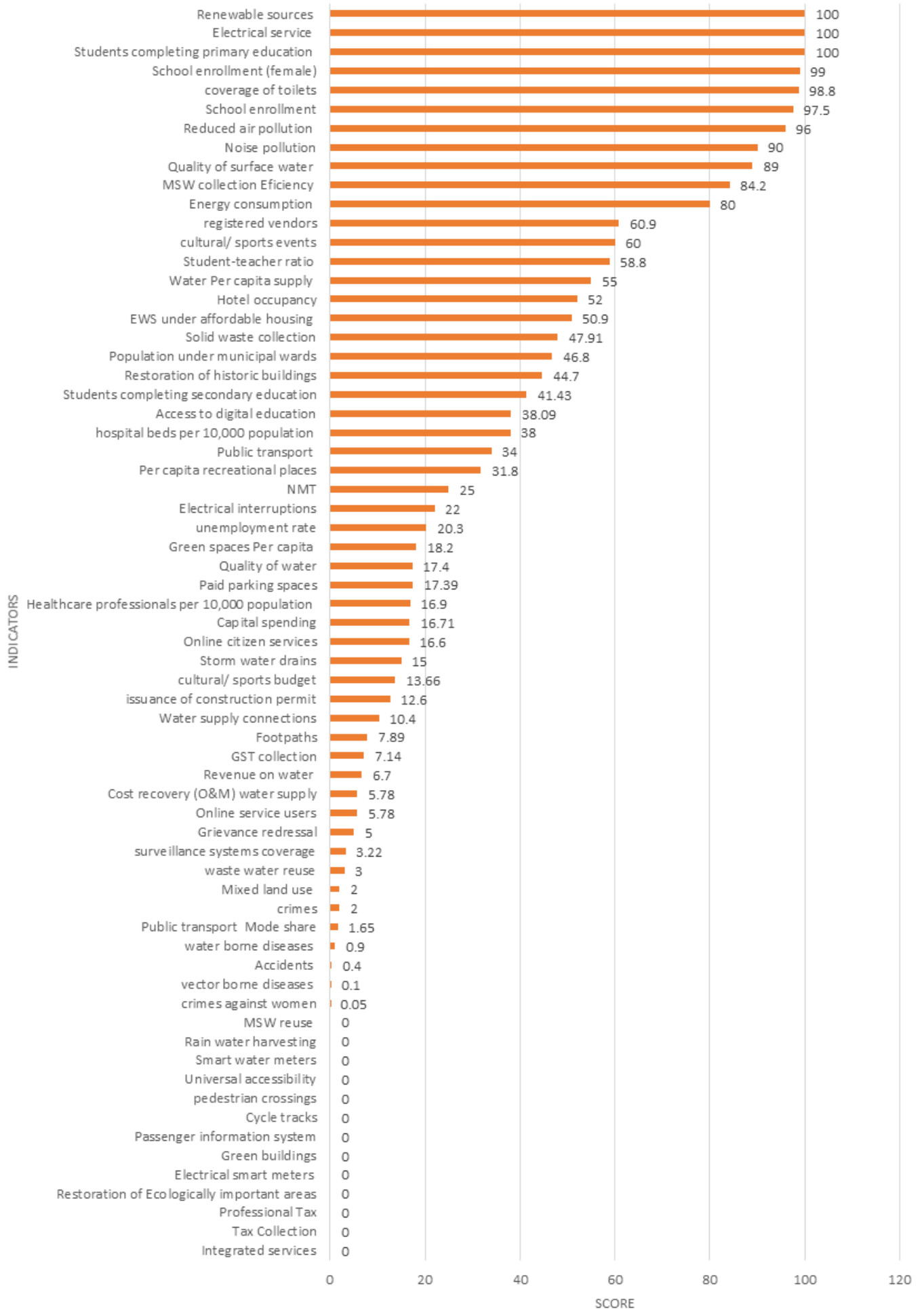
Pillar score

Figure 6 Pillar wise liveability score

The institutional pillar scored the highest and the physical pillar scored the lowest.

Status of liveability Parameters

Indicator	Score
Renewable sources	100
Electrical service	100
Students completing primary education	100
School enrollment (female)	99
coverage of toilets	98.8
School enrollment	97.5
Reduced air pollution	96
Noise pollution	90
Quality of surface water	89
MSW collection Eficiency	84.2
Energy consumption	80
registered vendors	60.9
cultural/ sports events	60
Student-teacher ratio	58.8
Water Per capita supply	55
Hotel occupancy	52
EWS under affordable housing	50.9
Solid waste collection	47.91
Population under municipal wards	46.8
Restoration of historic buildings	44.7
Students completing secondary education	41.43
Access to digital education	38.09
hospital beds per 10,000 population	38
Public transport	34
Per capita recreational places	31.8
NMT	25
Electrical interruptions	22
unemployment rate	20.3
Green spaces Per capita	18.2
Quality of water	17.4
Paid parking spaces	17.39
Healthcare professionals per 10,000 population	16.9
Capital spending	16.71
Online citizen services	16.6
Storm water drains	15
cultural/ sports budget	13.66
issuance of construction permit	12.6
Water supply connections	10.4
Footpaths	7.89
GST collection	7.14
Revenue on water	6.7
Cost recovery (O&M) water supply	5.78
Online service users	5.78
Grievance redressal	5
surveillance systems coverage	3.22
waste water reuse	3
Mixed land use	2
crimes	2
Public transport Mode share	1.65
water borne diseases	0.9
Accidents	0.4
vector borne diseases	0.1
crimes against women	0.05
MSW reuse	0
Rain water harvesting	0
Smart water meters	0
Universal accessibility	0
pedestrian crossings	0
Cycle tracks	0
Passenger information system	0
Green buildings	0
Electrical smart meters	0
Restoration of Ecologically important areas	0
Professional Tax	0
Tax Collection	0
Integrated services	0

INDICATORS

SCORE

LIVEABILITY INDEX ASSESSMENT 2020-2021

INSTITUTIONAL

Governance

- **Percentage of citizens using online services (Core)**

  - In the financial year of 2020-2021, 44.3 % of citizens are using online services, which was 16% in 2018-2019.

  - As of now, there are six online services (birth and death registration, building permits, vehicle registration, phone billing, electricity billing, grievance management) available out of 12 types of citizen services provided by ULB and other government organisations. Only two such services were available in 2018-2019.

  - Many online services are still missing such as taxes (property tax), user charges (water and power), challans and fines (traffic violations), service connections, tenders, tickets and passes (public transport, cultural events etc.) and disclosure of documents.

- **Tax collected as percentage of tax billed (Core)**

  - As of now, the town does not collect any property tax and so the ULB has not calculated tax demand.

- **Extent of cost recovery (O&M) in water supply services (Core)**

  - Currently only 5.9 % of operational and maintenance cost has been recovered. O&M cost for providing water supply per year is Rs 1.65 crore and total collection of user charges in a year is Rs 9.54 lakh (2018-2019), which has now increased to Rs 9.8 lakh.

  - The objective is to achieve the goal of 100% cost recovery from the current 5.9% to make water supply system self-sufficient.

- **Capital spending as percentage of total expenditure (Core)**

  - The total capital expenditure in the financial year 2020-2021 is Rs 94 lakh and the total expenditure (capital and revenue) is Rs 5.14 crore i.e. the capital expenditure is 18% of the total expenditure, whereas in 2018-2019 it was 16% of total expenditure.

  - The total expenditure as well as capital expenditure has decreased since 2018. The decrease in expenditure could be due to the COVID-19 pandemic in 2020- 2021.

- **Percentage of population covered under Ward Committees/Area Sabhas (Core)**

  - As of now almost 46.80% (same as 2018-2019), i.e. half of the town population is covered under Ward Committees. The total population of the town is 65,927 but only 30,860 are covered under Ward Committees as Leh town receives a large number of tourists and migrant labourers. Also, Leh is the administrative, commercial, and educational hub of the district and many people from rural Ladakh migrate to Leh town but are not registered with the ULB.

- **Percentage of services integrated through Command Centre (Supporting)**

  - Leh town does not have an integrated command centre for services. Thus, 0% of services are currently integrated.

- **Average delay in grievance redressal (Core)**

  - www.leh.in has a portal for grievance collection. The ULB takes almost three days to address a complaint or issue, which was five days in 2018-2019. It performs well against the benchmark (between seven to 30 days).

The total governance score is 117.6 (The total governance score = average score for core indicators × 0.7 + average score for supporting standards × 0.3) compared to the score 63.6 in 2018, which indicates a significant improvement in the urban governance.

Various indicators such as integration of services, online services, capital spending and O&M cost recovery of services require more focus.

The Institutional Index is 29.4 as institutional pillar is weighed at 25%.
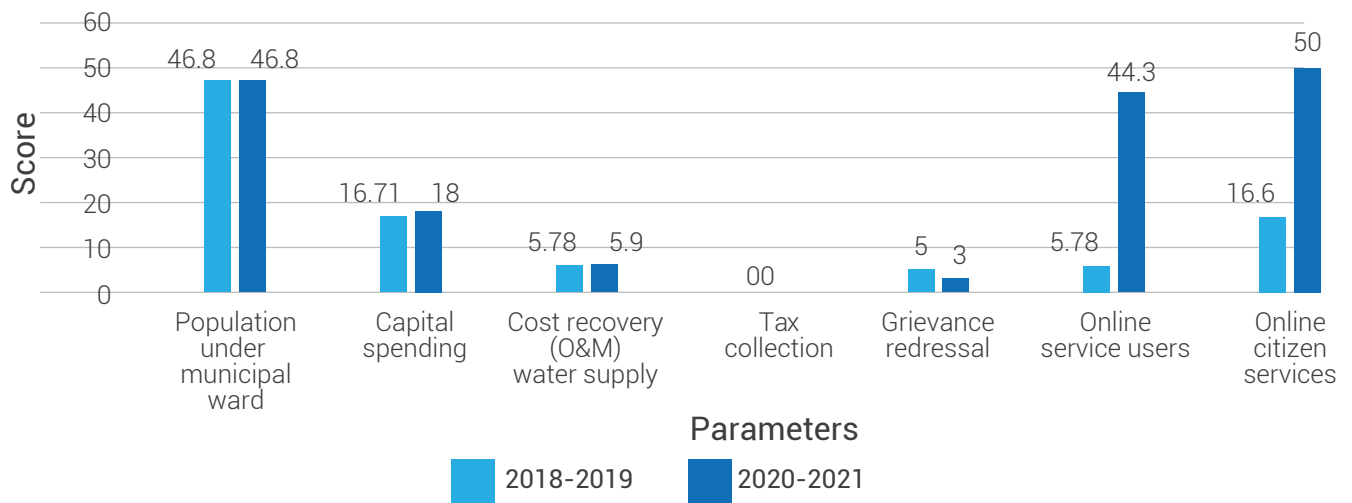
Governance score in two financial years

Figure 1: Governance index score in 2018 and 2020.
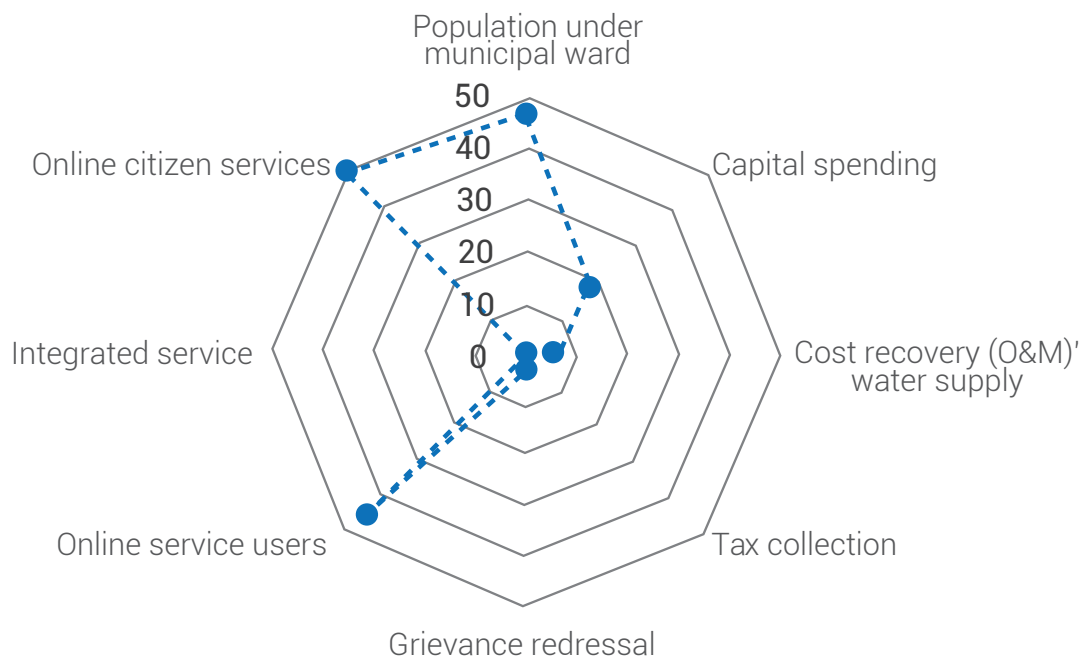
Institutional Pillar Performance

Figure 2: Institutional pillar performance, 2020.

SOCIAL

Identity and culture

- **Restoration and reuse of historic buildings (Core)**

  - Around 52% of historical buildings have been restored and used as offices, cafes, and art studios. There are almost 96 historical buildings and sites of which 50 have been restored. This number was 43 in 2018-2019. These buildings were restored by Leh Old Town Initiative, Tibet Heritage Fund, Archaeological Survey of India and other NGOs.

- **Percentage of ecologically-important areas covered through projects for restoration (Core)**

  - Leh has many ecologically-important areas such as wetlands, natural springs and streams. These were neglected earlier. The Liveable Leh Project has included these ecologically sensitive areas in its proposals and focused on conservation and alternative uses of these areas.

  - Wetlands of Skara are drying up due to over-extraction of ground water. The wetlands of Chutey Rantak and Chubi have been replaced with hotels and guest houses. Restrictions on construction and extraction of ground water in and around wetlands have been proposed through this project.

  - Almost 50% of ecologically sensitive areas have been proposed for conservation or restoration in the Liveable Leh Project.

- **Hotel Occupancy (Core)**

  - In 2018-2019, hotel occupancy from May to October was almost 90 to 95% with an average occupancy of 52%. However, in 2020, the town received a negligible number of tourists due to the COVID-19 pandemic. The average hotel occupancy in the whole year was 15%.

- **Percentage of budget allocated towards cultural/sports activities (Supporting)**

  - A negligible number of events were held in 2020 due to the COVID-19 pandemic. Instead, data from 2012 was used for comparison. In 2019, Rs 102.43 lakh were allocated to cultural and sport facilities and activities, i.e., 14.1 % of the total budget of the year, which is a fair share.

- **Number of cultural/sports events hosted by town authority (Supporting)**

  - In 2020, a negligible number of events were organised due to the COVID-19 pandemic. Around 18 events were organised by ULD online and offline. Activities such as Earth Day, Health Day etc. were held online whereas few events such as ice hockey tournaments, Ladakh Festival etc. were held offline with minimum gatherings.

The identity and culture category scored 32.1 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3), whereas in 2018 it was 26.8 indicating a fair improvement in cultural identity.

The town needs to focus on ecologically important areas and check the degradation of wetlands.
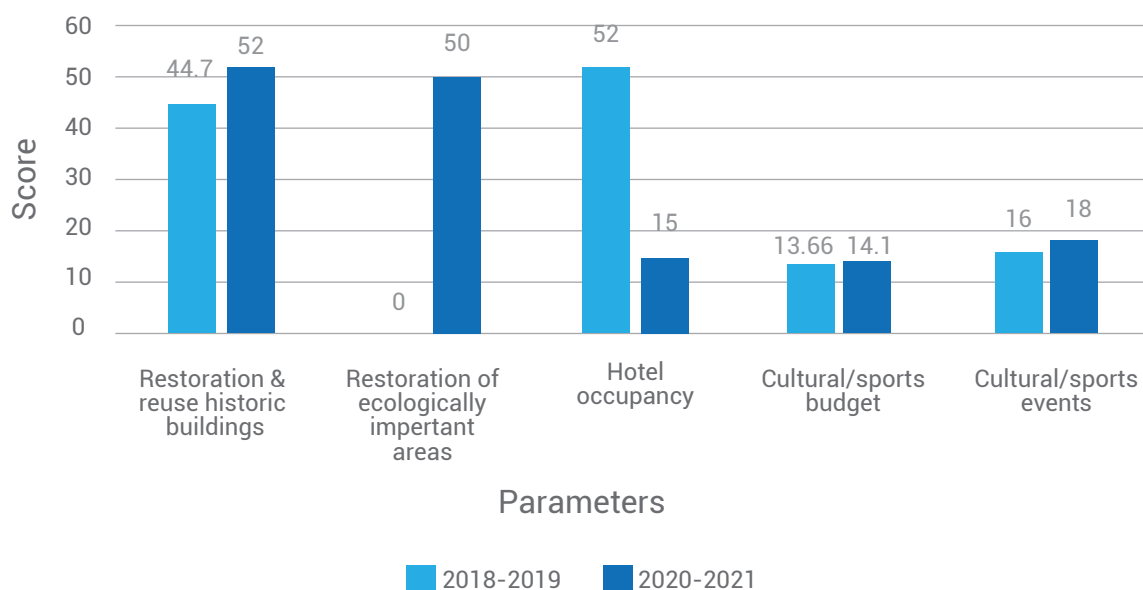
Identity & Culture Index Score

Figure 3: Identity and culture index score in 2018 and 2020.

Education

Note: It was difficult to get data on the education sector and the data for 2018-2019 was used. The Education sector was doing well in 2018 and needs more focus on student-teacher ratio and ensure that students complete secondary education.

- **Percentage of school-aged population enrolled in schools (Core)**

  - Out of total of 4,727 children in the age group of 6 to 14 years, nearly 4,613 are enrolled in schools i.e., 97.5% near or within the municipal area. The rest are enrolled in schools in other bigger cities of India.

- **Percentage of school-aged female population enrolled in schools (Core)**

  - Leh Town has one of the best performances in the country in terms of providing educational opportunity for girls. The ratio of girls in schools is higher than boys. Around 99% of the school-aged females population are enrolled in schools i.e. 2,883 school-aged females.

- **Primary education student-teacher ratio (Core)**

  - Only 133 teachers are present in the schools of Leh for 2,127 primary students i.e., 58.87%, or 1 teacher for every 70 students, which is much lower than the benchmark of 1 teacher for 30 students specified in the Right of children to Free and Compulsory Education Act, 2009. This implies that students lack

adequate attention and support in primary school. It is very important to meet SDGs 4.C and 4.C by substantially increasing the supply of qualified teachers and student-teacher ratio in primary schools.

- **Percentage of schools with access to digital education (Supporting)**

  - Only 38.09% schools have access to digital education. Almost all private schools and a few government schools i.e. 8 out of 21 schools have access to such facilities with digital educational content. Such facilities reduce the dependence on the quality of teachers while also improving learning outcomes by using innovative audio-visual pedagogy and providing access to vast online knowledge repositories. It is important for schools to not only focus on procuring digital infrastructure but also focus on connecting to robust digital learning networks such as the National Knowledge Network developed by Government of India. Leh should aim to achieve 100% coverage to improve its educational quality and meet SDGs 4.A and 4.A1.

- **Percentage of students completing primary education (Core)**

  - All primary school aged students i.e., 100% of the students complete primary education. These students belong to a school cohort that has reached each successive grade of primary education without failing or moving to another jurisdiction. Survival rate, particularly at primary level, is regarded to be a prerequisite for sustainable literacy, and indicates the holding power and efficiency of the primary education system.

- **Percentage of students completing secondary education (Supporting)**

  - Only 41.4% of students belonging to secondary school cohort i.e., 1,497 of 3,613 school-aged children complete secondary education from schools in and around Leh town as most of them are enrolled in schools in cities outside Ladakh as they aspire for better education. Secondary education in Leh needs to improve by introducing more choices and focus on quality of education, especially by investing more resources in existing government schools.

Status of education in Leh town is good with an overall index score of 74 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3). Leh needs to focus on improving teacher-student ratio and its secondary education system.
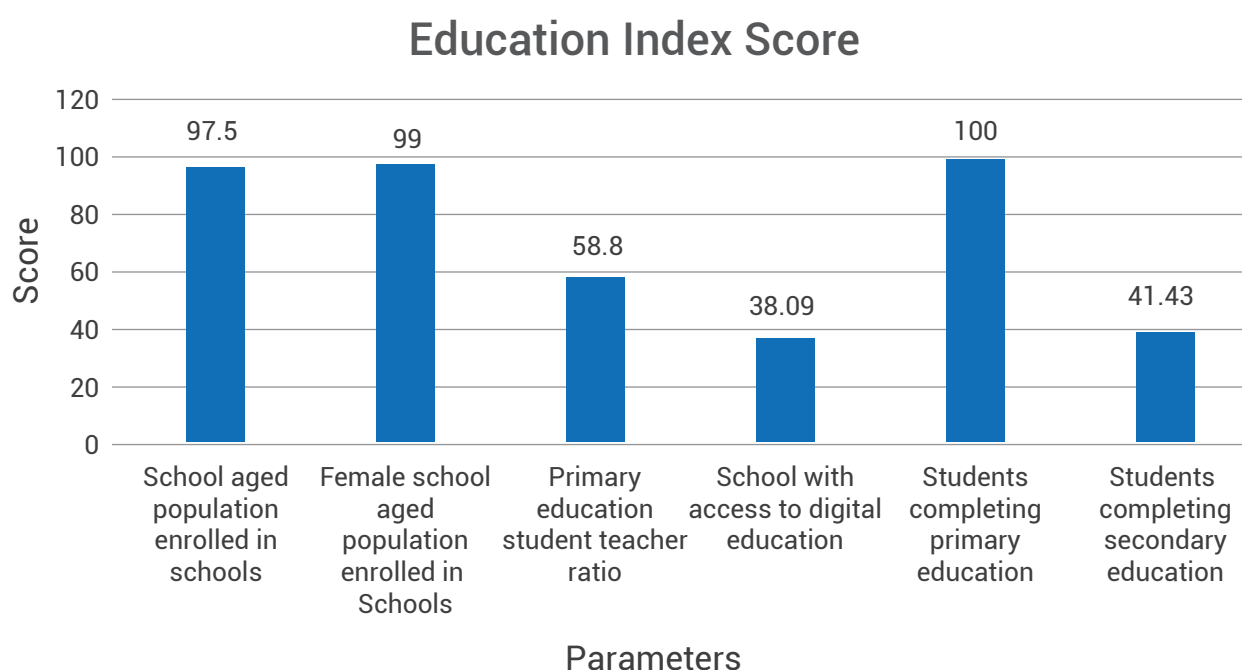
Education Index Score

Figure 4. Education index score in 2018.

Health

- **Number of in-patient hospital beds per 10,000 population (Core)**

  - Currently, Leh has 42 in-patient hospital beds per 10,000 population. This exceeds the benchmark of 25 beds per 10,000 population set by the WHO. Leh town has just one major hospital with 250 beds, which also serves the whole district. In this regard, the number of beds in relation to the population it serves is inadequate. In 2018-2019, Leh had 38 in-patient hospitals beds per 10,000 population.

- **Healthcare professionals per 10,000 population (Supporting)**

  - Leh have only 29 healthcare professionals per 10,000 population, which compares well against the benchmark of 23 per 10,000 population set by the WHO. In 2018 ,it was 16.9, which is much less than the benchmark. This implies that the availability of healthcare professional in the town (health worker density) has improved.

- **Period prevalence of water borne diseases (Core)**

  - In 2020, the number of water-borne disease cases registered was 20, i.e. 0.3% of the total population. In 2018, there were 64 cases of water-borne diseases i.e., 0.9% of the total population. This includes diseases such as cholera, typhoid, jaundice etc., indicating improvement in the town's water quality.

- **Period prevalence of vector-borne diseases (Core)**

  - In 2018, there were 12 cases of vector-borne diseases i.e. 0.1% of the total population. The current rate of vector-borne diseases in Leh town is better than the rest of India.

The overall index score is 18.57 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3). The index score for 2018 was 15, which indicates improvement in Le h town's healthcare sector.
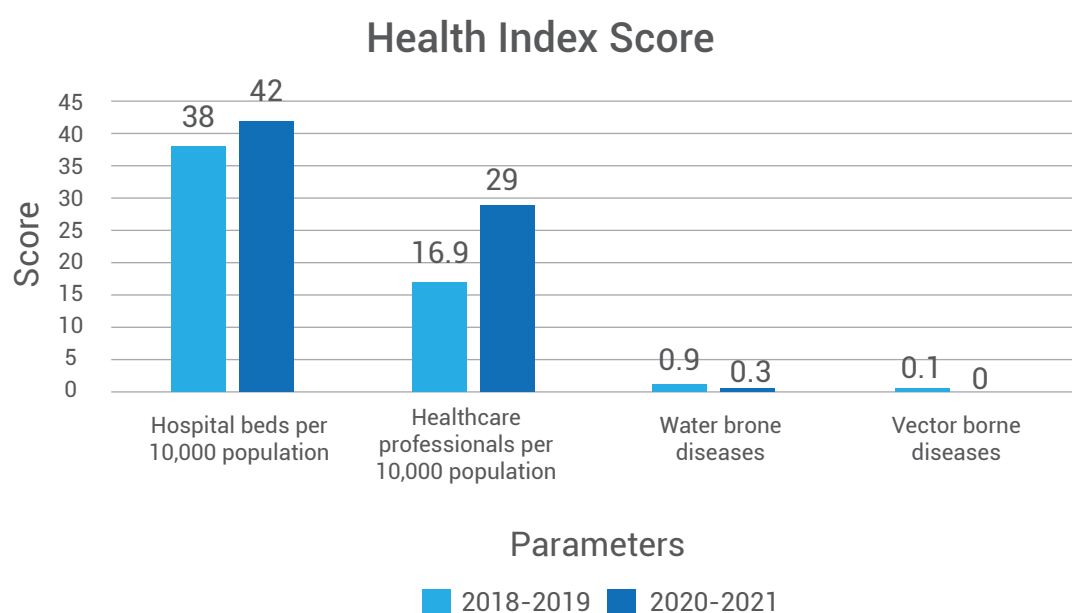

Figure 5: Health index score in 2018 and 2020.

Safety and Security

- **Number of streets, public places, junctions covered through surveillance systems (Core)**

  - Out of 62 major streets, only six streets have CCTV surveillance systems as of now. According to SDG 16.1, Leh should aim to achieve 100% coverage. In 2018, only two streets in Leh had CCTV surveillance systems.

- **Number of recorded crimes per lakh population (Core)**

  - Leh recorded 201 cases of crime in 2020 i.e. 304 crimes per lakh population. In 2018, it was 297 per lakh population, which indicates an increase in the town's crime rate.

  - The town needs to lower its crime rate by using effective safety and security measures. Better planning and programming of public spaces, illumination of streets, compact and active neighbourhoods can also contribute to safer urban spaces.

- **Extent of crimes recorded against women, children and the elderly per year (Core)**

  - The town recorded 18 crimes against women, children and the elderly, compared to one case in 2018. This indicates a deterioration of security and safety systems of the town.

- **Transport-related fatality per lakh population (Supporting)**

  - The town recorded 71 cases of transport-related fatalities in 2020 i.e. 107 fatalities per lakh population compared to 47 fatalities in 2018. This implies that the transport network in Leh town is unsafe.

  - The town needs to move from its current vehicle-oriented designs and policies to a safer pedestrian-oriented design to reduce the number to meet the benchmark of two cases per lakh population.

Overall status of safety and security in Leh town is good with an overall index score of 108 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3), compared to the index score of 84 in 2018. This is mainly due to low crime rates but it needs to improve the safety of its transport network and expand surveillance systems.
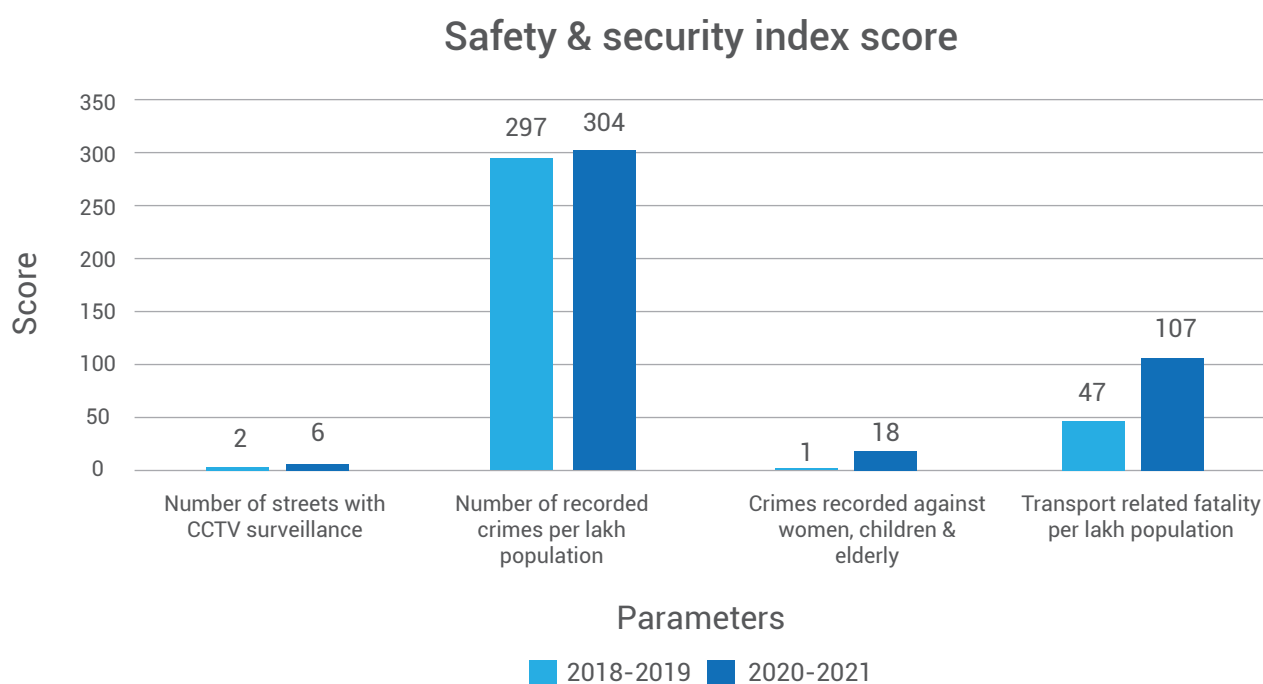
Safety & security index score

Figure 6: Safety and security index score in 2018 and 2020.

Overall social index score:

The total score of social pillar is 58.1 (25 % of average of all social indices), but final score for the calculation is 14.4 as the social pillar is given a weightage of 25%. In 2018, the score was 12.5. There is this a marginal improvement in the social sector of the town.
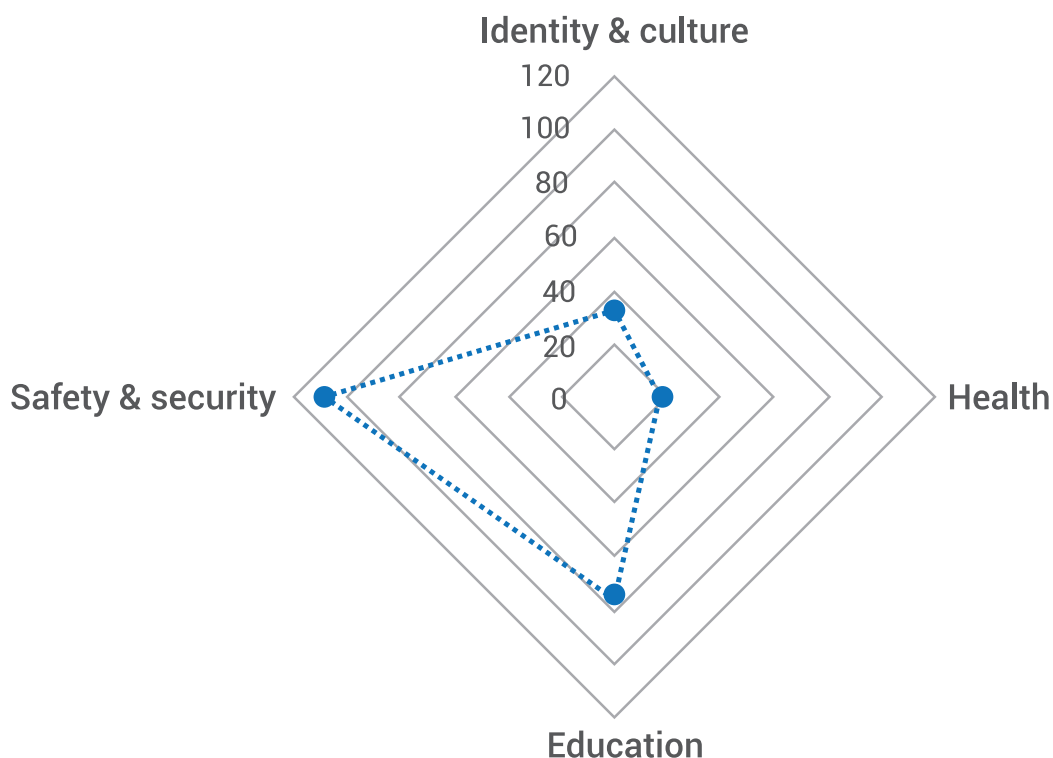

Figure 7: Social pillar performance, 2020.

ECONOMIC

Economy and Employment

- **Increase in VAT/GST collection (Core)**

  - There is an increase from 7.14% to 18.3 % in GST collection since 2018. This indicates the productivity and competitiveness of the town, and is a proxy for improvements in trade and services.

- **Increase in collection of Professional tax (Core)**

  - No one pays professional tax in Leh Town as the residents of ladakh are exempt from paying income and professional tax under section 10 (21) of Income-Tax Act, 1961.

- **Increase in issuance of construction permits (Core)**

  - There was an increase of 15% in issuance of construction permits in the town as compared to the preceding year (2019).

- **Unemployment rate (Core)**

  - Unemployment is a serious issue in Leh as 254 per 1,000 persons in the town are unemployed compared to 203 in 2018. Unemployment rate of a town denotes the proportion of the a town's workforce that is not engaged in gainful employment or economic activity.

- **Percentage of vendors registered and provided formal spaces (Supporting)**

  - Leh town has around 133 vendors of which 110 i.e. 82.7% have been provided formal spaces at six locations as compared to 60.90%.

  - The town should implement inclusive strategies to protect livelihoods of street vendors by integrating such activities with public places (including streets) in line with the Street Vendors Act, 2014 to achieve the benchmark of 100% coverage.

The Economic status of Leh town needs further improvement with an overall index score of 75.07 in 2020 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3), which has improved from 56.7 in 2018.

Thus, the economic pillar score is 3.75 as the economic pillar is weighed at 5%.
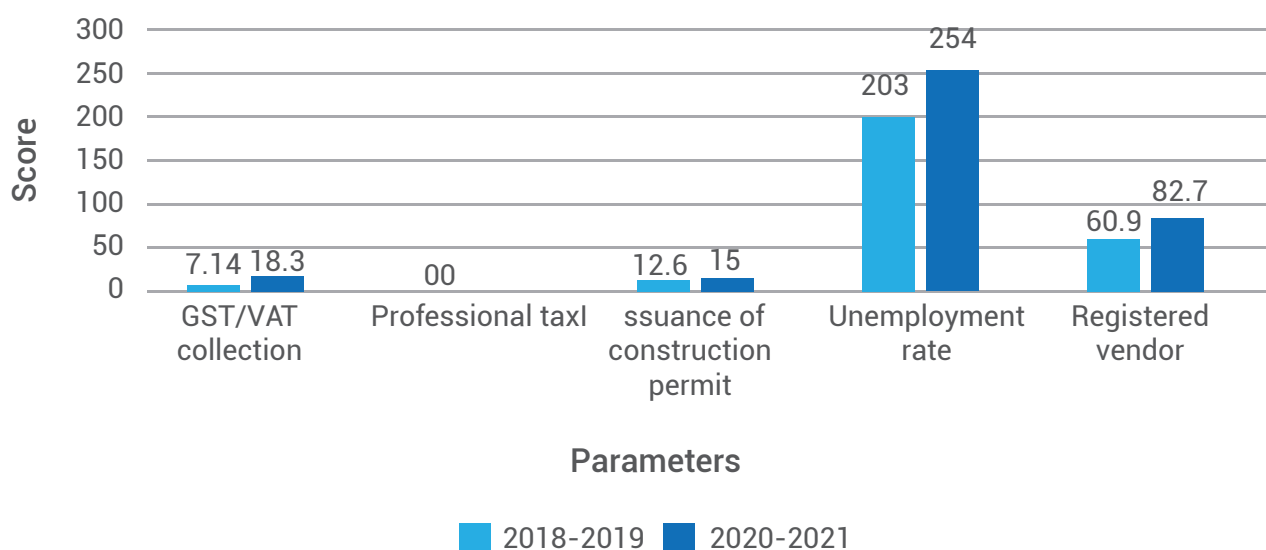
Economy Index Score

Figure 8: Economy index score in 2018 and 2020.
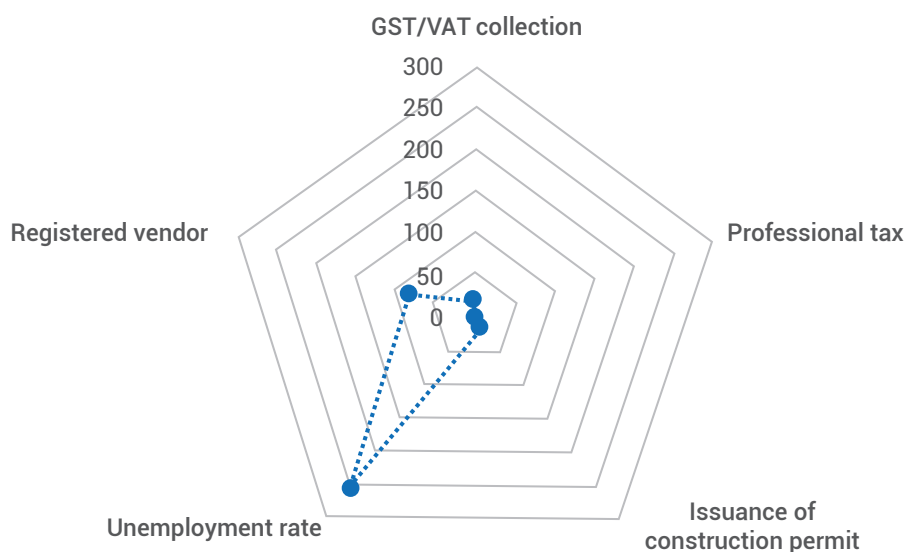
Economy Pillar Performance

Figure 9: Economy pillar performance, 2020.

PHYSICAL

Housing and Inclusiveness

- **Percentage of Slum/EWS households covered through formal/affordable housing (Core)**

  - A total of 171 households have benefitted from EWS housing schemes like Rajiv Awaz Yojna (RAY) and Pradan Mantri Awaz Yojna (PMAY) till 2020, i.e. 79% of the total EWS households in Leh town. This has improved from 50.9% in 2018.

- **Percentage of slum areas covered through basic services (Core)**

  - Leh town has no notified slums. There are a few areas that still lack basic services such as sanitation and water supply.

Status of housing and inclusiveness in Leh town is high with a category index score of 27.65 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3) compared to the index score of 17.9 in 2018. This indicates an improvement in the housing sector.

Public Open Spaces

- **Per capita availability of green spaces (Core)**

  - Leh has 2.6 sq. m. per capita green space, which was 2.2 sq m per capita in 2018. The green space includes parks in Leh Market and Housing Colony and grasslands/wetlands in Skara (Skare Spang), Gonpa, Gangles and Chubi.

- **Per capita availability of public and recreational places (Core)**

  - Leh has a 5.2 sq. m. per capita availability of public and recreational places for recreation, social interaction and active physical activities against the benchmark of 15 sq. m. per capita public and recreational places.

- The town needs to develop more public spaces. Such spaces can include playgrounds, stadiums and sports complexes, town and district parks, neighbourhood parks and tot lots, zoological/botanical gardens, multi-use open spaces and spaces for cultural events, publically-accessible waterfront areas, promenades, and public squares.

The open space index score is 2.73 as compared to a score of 2.45 in 2018. The index score is low and implies that the public and open space sector has been performing poorly. However, the Liveable Leh Project has many proposals focusing on development of public and open spaces in the town, which will gradually increase the index score.

Mixed Land Use and Compactness

- **Share of mixed land use area in overall town land use (Core)**

  - Leh have 34.4 hectares or 2% of total town area of mixed land use. Leh town has grown organically with predominantly residential areas and agricultural lands on fertile areas with access to water. There are commercial establishments along the streets and main arterial roads with residential and commercial use at different levels.

- **Net density (Core)**

The net density of Leh town is 488 persons per hectare as Leh has 135 hectares of residential area. This differs in different municipal wards. This denotes the intensity of development in the town. Higher net densities coupled with mixed land use areas can result in a compact development pattern, potentially forming walkable and inviting activity centres and neighbourhoods.

Net density
- 32
- 36
- 56
- 66
- 67
- 112
- 140
- 145
- 163
- 202
- 234
- 680
- 765
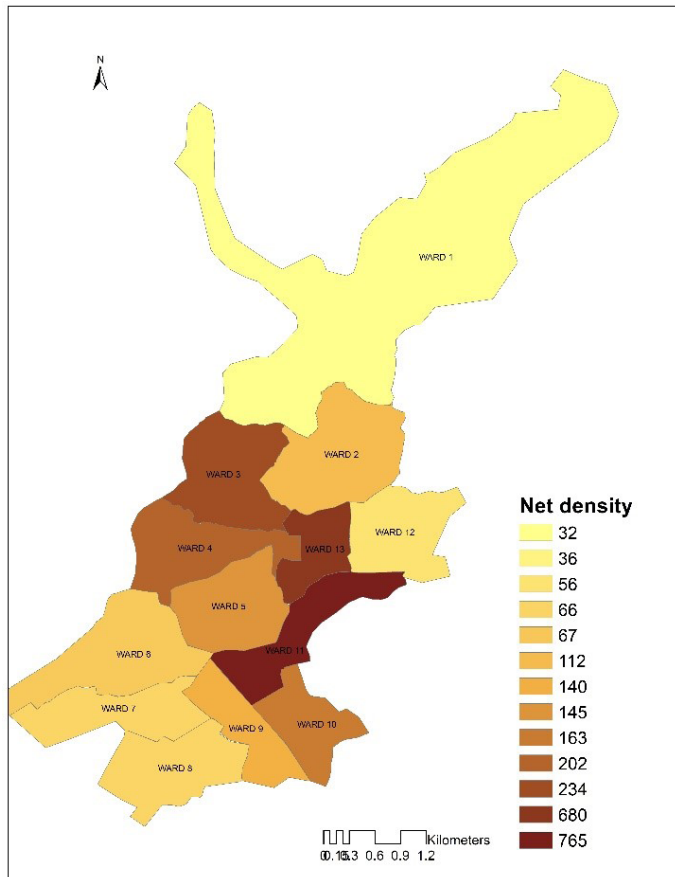
The land use mix and density category index is 171.5. The town needs to promote more mixed uses, which will be important to shift from a vehicle-dominated environment by reducing the number of trips while also making them shorter and walkable.

Power Supply

Percentage of urban population with authorised electricity service (Core)

- Almost 100% of the town's population has authorised electricity service. Authorized electric connection is mandatory for all commercial establishments and industrial businesses.

Percentage of electrical connections covered through smart meters (Supporting)

- None of the electrical connections use smart meters in Leh. The town is yet to introduce smart meters.

Average number of electrical interruptions per customer per year (Core)

- Electricity in Leh town is not reliable especially in winters. The town had 780 electric interruptions in 2020 i.e. 0.10 interruptions per customer per year as compared to 0.16 interruptions per customer per year in 2018.

Average length of electrical interruptions per customer per year (Supporting)

- The average length of electrical interruptions per customer per year in 2020 was 1.12 hours as compared to 2.24 hours in 2018.

Percentage of total energy derived from renewable sources (Core)

- Leh derived 100% of its energy from non-conventional sources or renewable sources. The only source of electricity for Leh is Alchi Hydro-electrical Project.

Energy consumption per unit – water supply and sewerage (Supporting)

- The total energy consumption for supplying water to Leh town is 100,000 kWh primarily used to lift Indus river water through a series of high capacity pumps, which consumes a lot of energy. Energy consumption per million litres is 2,105 kWh compared to 1,525 kWh in 2018.

Energy consumption per unit - street lighting (Supporting)

- The total energy consumed by streetlights in Leh is 1,000 kWh. There are almost 1,000 streetlights in the town and the energy consumption per unit of streetlight is 1 kWh.

- Though the ULB has adopted energy-saving options, it needs to invest in low-cost street lighting system such as retrofitting LED lights on existing electric poles instead of installing new ones. It also needs to use decentralised lighting systems such as solar-powered lights.

Percentage of new and redeveloped buildings following green building norms (Supporting)

- None of the buildings in Leh town follows green building norms such as GRIHA, LEEDS or equivalent green ratings. An ideal town should have 80% of its buildings following green building norms.

Total energy consumption per capita (Core)

- Total energy consumption in Leh is 19.9 kWh per capita, which increases in winter months due to heating needs.

The status of power supply in Leh town is good with a category index score of 196 (Category index = average score for core indicators × 0.7 + average score for supporting standards × 0.3) as compared to a score of 130 in 2018. This is mostly due of the 100% coverage of authorised electrical connection and 100% renewable energy source. The town needs to focus on installing smart meters, energy efficient services and buildings.

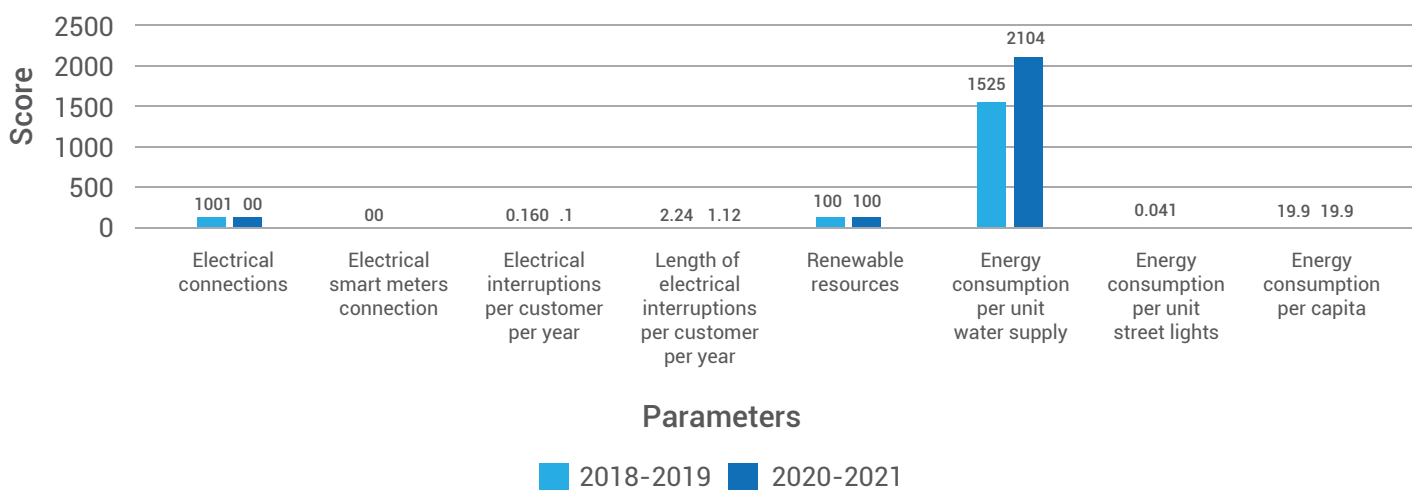## Power Supply Index Score

Figure 10: Power supply index score in 2018 and 2020.

Transportation and Mobility

- **Geographical coverage of public transport (Core)**

  - Public transport has not improved much in the last two years. It covers the southern part or 1% of the town and the geographical coverage of public transport is 0.34 km per square metres. This makes the public transport route very inefficient. However, there is a proposal to extend the public transport route to cover a route of 19.3 km, which will cover 50% of the town.

- **Availability of public transport (Supporting)**

  - The public transport in Leh is operated by the Mazda Union. They currently they have a fleet of 131 buses or 1.98 per 1,000 persons as compared to 1.85 per 1,000 persons in 2018.

- **Mode share of public transport (Core)**

  - About 20% of the trips made use public transport. For a medium town like Leh, mode share should be more than 12%.

  - With the extension of public transport route, mode share of public transport should increase to 40%.

- **Percentage of road network with dedicated bicycle tracks (Core)**

  - There are no dedicated bicycle tracks in Leh town. Cycling is very unsafe on the streets of the town. However, there is a proposal of a 3 km-stretch of bicycle track.

  - The town should aim for more than 50% (Service Level Benchmarks for Urban Transport, MoUD) of road network with dedicated bicycle tracks.

  - There is a detailed strategies and plan document dedicated for walkability and cyclability of Leh town.

- **Percentage of interchanges with bicycle parking facilities (Supporting)**

  - There is no bicycle parking facility in Leh town.

  - More than 75% of transport interchanges should have bicycle parking facilities (Service Level Benchmarks for Urban Transport, MoUD).

- **Mode share of non-motorised transport (Core)**

  - In 2018, non-motorised transport accounted for 25% of all trips in Leh town, which increased to 40% in 2020. This indicates a huge improvement in pedestrian facilities.

  - For a medium town like Leh, the mode share of NMT should be more than 67% (National Transport Development Policy Committee, 2013).

  - There is a detailed strategies and plan document dedicated for walkability and cyclability of the town to help improve non-motorised mobility in the town.

- **Extent of signal synchronisation (Supporting)**

  - There are no traffic signals on any intersections in the town.

- **Availability of Passenger Information System (Supporting)**

  - Leh does not have a Passenger Information System at bus stops or at bus stations.

- **Availability of paid-parking spaces (Core)**

  - The town currently has six paid-parking spaces out of 23 on street parking i.e. 26% of the on-street parking spaces. In 2018, it was 17.3%. This indicates an improvement in paid-parking facilities.

  - According to MoUD service level benchmark, more than 75% of parking spaces should be paid-parking spaces.

- **Percentage coverage of footpaths – wider than 1.2m (Core)**

  - The town has only 10.5 km of road with footpath wider than 1.2m. i.e. 7.89% of the total road network in town.

  - The town should have at least 75 % coverage of footpaths (Service Level Benchmarks for Urban Transport, MoUD).

- **Percentage of traffic intersections with pedestrian crossing facilities (Supporting)**

  - The town has not developed such facilities so far.

  - Leh needs to install table-top crossings, zebra crossings, pedestrian signals, grade separators etc. wherever required.

- **Extent to which universal accessibility is incorporated in public right-of-way (Supporting)**

  - There is negligible incorporation of universal accessibility in public right-of-way.

  - New projects and proposals have tried to incorporate universal accessibility.

The transport and mobility category index score is 12.47 (average score for core indicators × 0.7 + average score for supporting standards × 0.3) as compared to a score of 6.1% in 2018. This indicates a huge improvement in the transport sector. Traffic and transportation still require prioritisation in Leh town, especially public transport, cyclability and walkability, while incorporating universal accessibility in public right-of-way.
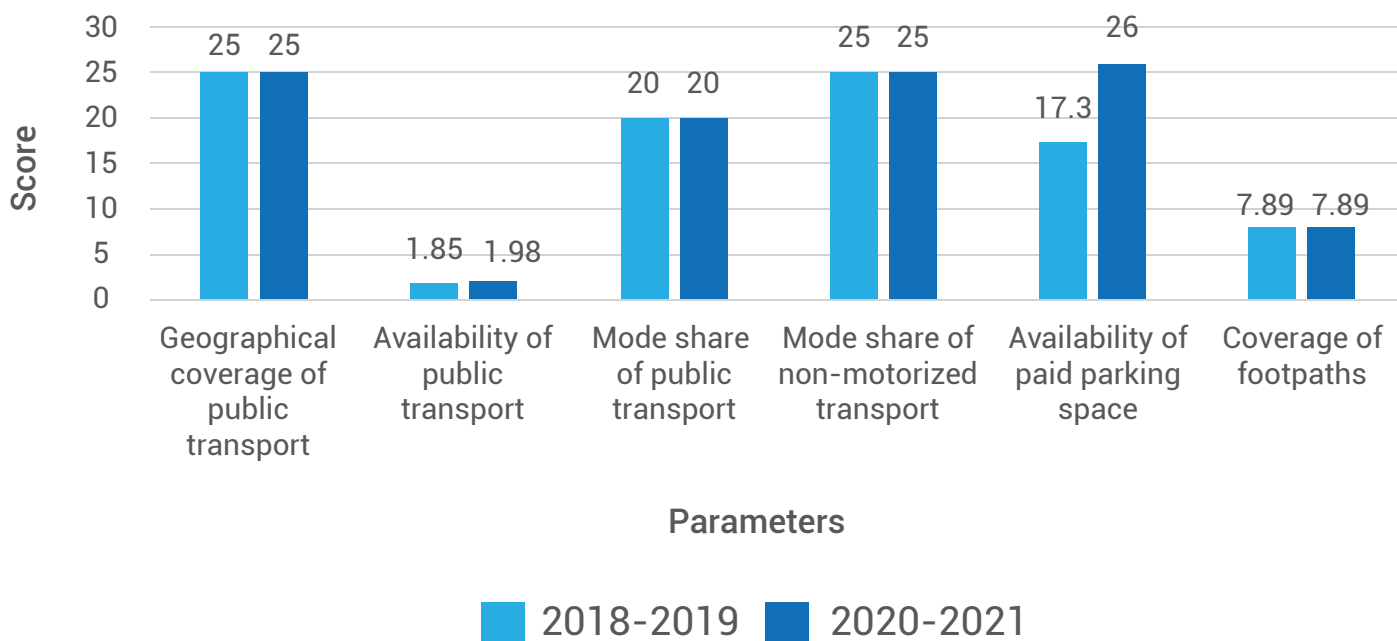
Transportation & Mobility Index Score

Figure 11: Transport and mobility index score in 2018 and 2020.

Assured Water Supply

- **Household-level coverage of direct water supply connections (Core)**

  - Only 13.4% or 921 households in Leh have direct water supply. In the 2018, only 10.4% or 833 households had direct water supply.

- **Per capita supply of water (Core)**

  - PHE supplies around 72 litres per capita per day but there is inequality in access to water as not everyone gets an equal quantity of water. Tourists and local residents get about 100 and 75 litres per capita per day (LPCD) respectively. Migrant labourers get as little as 25 to 35 LPCD, which is insufficient for personal health and hygiene.

- **Quality of water supplied (Core)**

  - Almost 90% of samples tested for water quality meet or exceed specified potable water standards as per norms set by CPHEEO (Manual on Water Supply and Treatment, 1999).

- **Level of non-revenue water - nrw (Core)**

  - Most of the water supplied or 93.5% is non-revenue water. This denotes the quantity of water produced and supplied by the ULB, which does not earn any revenue.

- **Percentage of water connections covered through meters (Supporting)**

  - None of the existing water connections have water meters. In the new project design, 100% of the households are expected to be connected with the new water supply scheme.

- **Percentage of plots with rainwater harvesting facility (Supporting)**

  - There are no buildings and plots with a rainwater harvesting facility

Category index score for water supply is 47.04 as compared to 33.8 score in 2018. There are many issues in water supply and management. The per capita water supply is much lower than accepted standards, the level of non-revenue water is high, and there are no water meter connections. These issues will be addressed in the new water project.
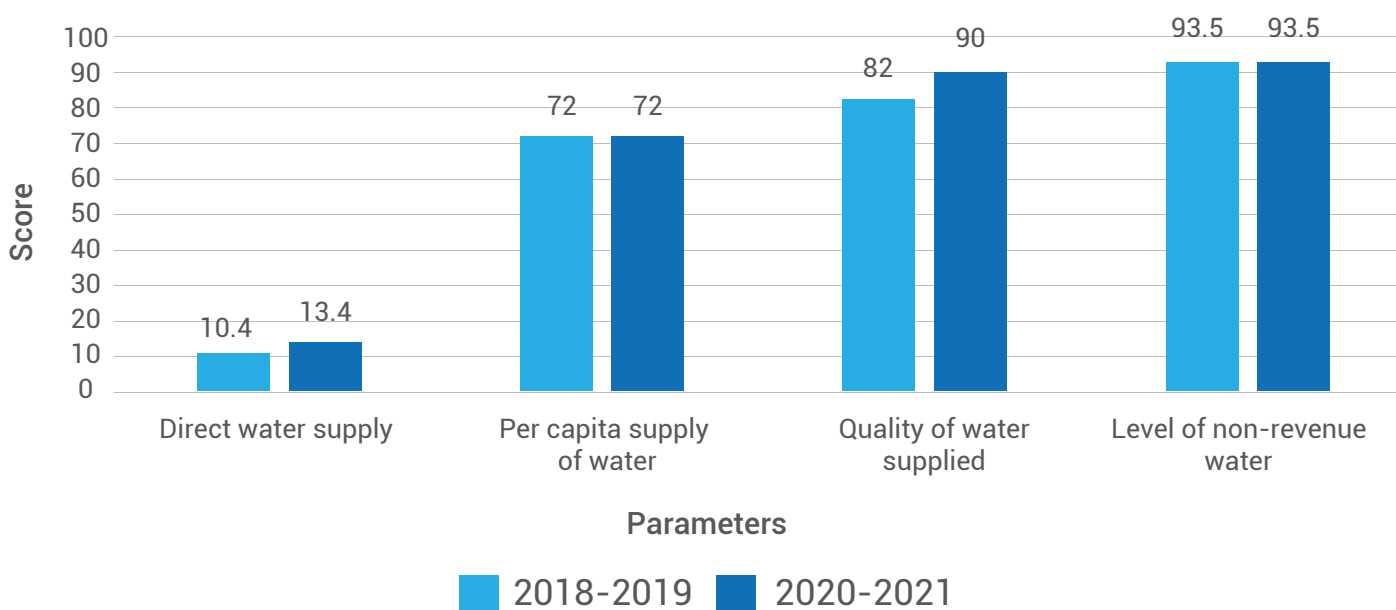
Water Supply Index Score

Figure 12: Water supply index score in 2018 and 2020.

Waste Water Management

- **Coverage of toilets (Core)**

  - Almost 99% of households have a toilet on their premises. A few commercial business establishments and offices do not have toilets on their premises and this leads to open defecation in the market and institutional area. The construction of two all-weather public toilets has helped reduce open defecation.

- **Coverage of sewerage network (Core)**

  - Sewerage network is under construction but it is not complete yet.

- **Collection efficiency of sewerage network (Core)**

  - Collection efficiency of sewerage is only 0.3%, which is the same as 2018. Waste water in Leh is collected and treated in the Faecal Sludge Treatment Plant in Leh, which collects black water from a few hotels as many hotels do not have proper septic tanks.

- **Extent of reuse and recycling of waste water (Core)**

  - About 11% of the treated water from the Faecal Sludge Treatment Plant is being reused and recycled for various purposes. This was 3% in 2018. The treated waste water can be used for horticultural purposes in parks and gardens, irrigation of farmlands on the town's periphery, and/or supplied to power plants and industries.

  - A greenhouse has been constructed adjacent to the treatment plant to complete the cycle. The wastewater treated at the plant is used in the greenhouse.

- **Coverage of storm water drains (Core)**

  - No additional storm water drain has been constructed since 2018. Only 15% or 14 km of road have storm water drains on 93km of roads (wider than 3.5).

The category index score of waste water management is 17.5 (average score for core indicators × 0.7 + average score for supporting standards × 0.3) compared to a score of 16.3 in 2018. This indicates a minute improvement in the sector.

Leh needs to manage sewerage efficiently through the construct of a functional sewerage network.
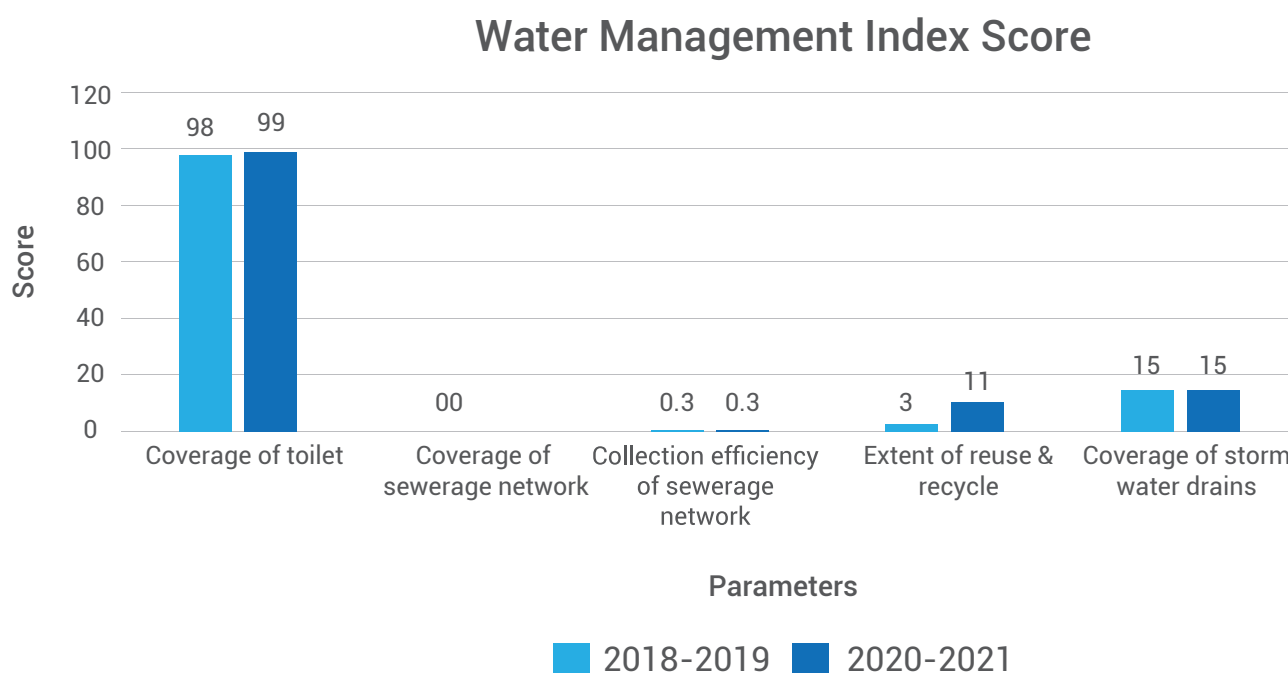
Water Management Index Score

Figure 13. Waste water management index score in 2018 and 2020.

Solid Waste Management

- **Household-level coverage of municipal solid waste collection (Core)**

  - A total of 63.6% of households are covered by municipal solid waste collection facility as compared to 48% in 2020. The municipality has deployed tippers for door-to-door collection of waste wherever possible. Different locations have different frequencies of waste collection.

- **Efficiency of collection of municipal solid waste (Core)**

  - Leh has a collection efficiency of 84.2% of municipal solid waste.

- **Extent of municipal solid waste recovered through reuse (Core)**

  - Around 3 tonnes of municipal waste was recycled or recovered in 2020. A new centralised segregation and recycling centre is under construction near Leh town.

The category index score for solid waste management is 35.14 (average score for core indicators × 0.7 + average score for supporting standards × 0.3) as compared to 30.8 in 2018. The score of SWM has not increased much in two years, which indicates a less than efficient solid waste management system.

The waste generated in Leh is now being dumped and burned. There is an urgent need for a new system of segregation and recycling . Uncontrolled dumping and burning takes place in the landfill site at Bombgarh. However, this site is is located in a residential area and exposes residents to various health hazards.

Solid Waste Management Index Score

Figure 14.Solid waste management index score in 2018 and 2020.

Reduced Pollution

- **Concentration of SO2 - air pollution (Core)**

    - The mean concentration of sulphur dioxide (SO2) concentration over 24 hours in Leh town is 6.2 μg/m³. As per accepted standards, it should be lower than 80 μg/m³ (Central Pollution Control Board).

- **Concentration of NO2 - air pollution (Core)**

    - Mean concentration of Nitrogen Dioxide (NO2) concentration over 24 hours in Leh town is 15.3 μg/m³. The standard for air pollutants (including NO2) has been prescribed by National Air Quality Standards (2009) by the CPCB. It sets the acceptable level of NO2 as being lower than 80 μg/m (Central Pollution Control Board).

- **Concentration of PM10 - air pollution (Core)**

    - Mean concentration of PM10 over 24 hours in Leh is 43.5 μg/m³, as compared to 50.77 μg/m³ in 2018. The acceptable level should be lower than 100 μg/m3 (Central Pollution Control Board).

- **Level of noise pollution (Core)**

    - A total of 90% of noise samples taken in different locations meets acceptable noise levels. Around 20 different locations around the town were sampled for sound at different times of the day (industrial, commercial, residential and sensitive (silence) zones such as hospitals, educational institutions.)

Category of area/zone	Limits in dB/A L eq *	
	Day time	Night time
Industrial area	75	70
Commercial area	65	55
Residential area	55	55
Sensitive area (silence zone)	50	40

Table 1: Benchmark as per Noise Pollution (Regulation and Control) Rules, 2000

- **Quality of water in public surface water bodies (Core)**

    - Barely 15% of surface water samples tested met prescribed standards for quality of water in public surface water bodies such as rivers, streams and ponds.

    - Water bodies in the town are polluted and it is critical to maintain the health of these water bodies.

Category index score of reduced pollution is 38.1 (average score for core indicators × 0.7 + average score for supporting standards × 0.3) as compared to a score of 35.6 in 2018 . This indicates a small improvement in the quality of air, noise, and water.

Air quality index for Leh town has improved over the last two years. It is possible that reduced vehicular movement in 2020 due to the lockdown to control the spread of COVID-19 may have contributed to the improvement in air quality.

Noise pollutions is also under permissible standards except at Skalzangling street. Leh town needs to pay special attention to streams and rivers, which are being used to discharge grey water and waste water. Overall, Leh needs to revive its streams and ponds.
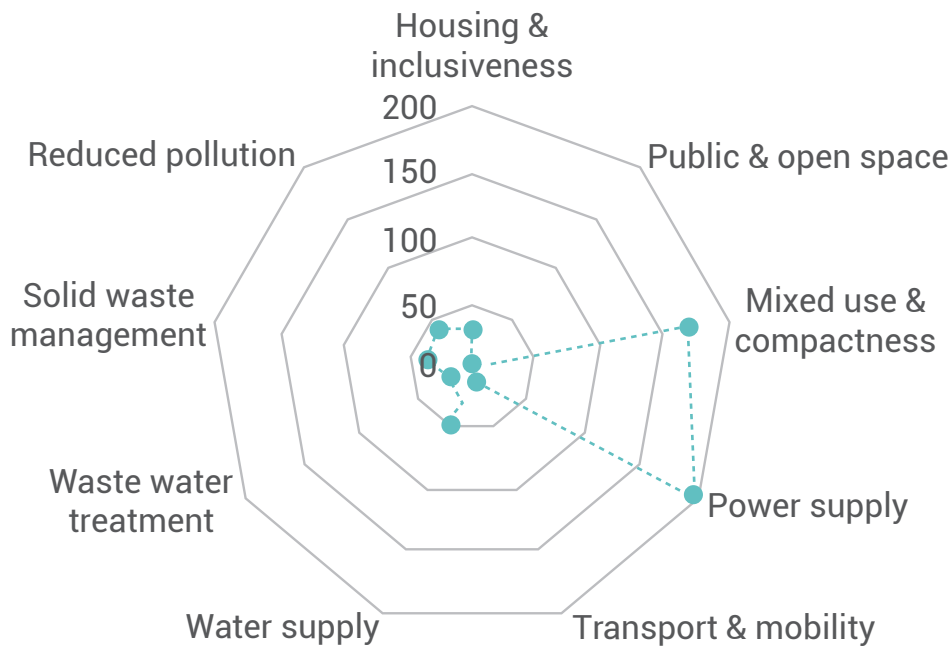
Overall physical index score:

The index score of physical pillar is 60.9. The final score for the social pillar is 25.5 as it is weighed at 45%.

Status of waste management, water supply, solid waste management is poor in Leh town. More attention needs to be given to improve all physical indicators.

Phisycal Pillar Performance

Liveability Index of Leh town 2020-2021

The institutional pillar scored the highest and the physical pillar and social pillars scored significantly lower. However, it is important to highlight the fact that there is growth in every sector. The institutional pillar has shown significant growth, whereas the social sector has only witnessed a marginal improvement.
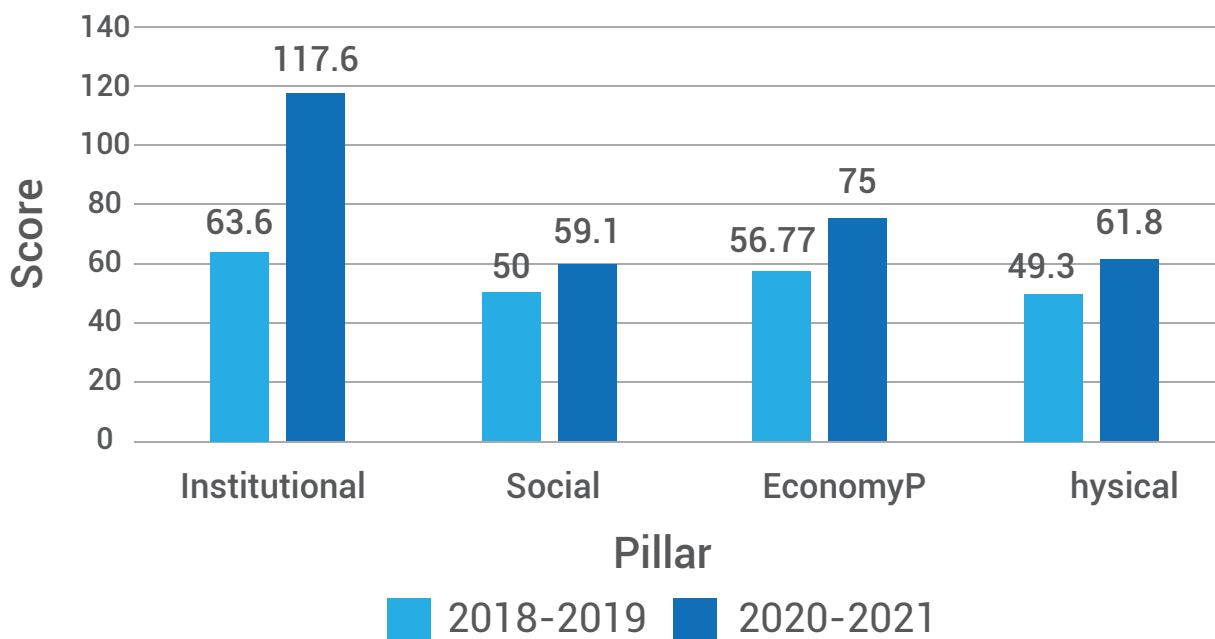

Figure 16: Pillar-wise liveability score in two different financial years i.e., 2018-2019 and 2020-2021.

Pillar of Comprehensive Development	Category Index		Average value for each Pillar	Weight Adjustment	City Liveability Index
Institutional (25% weight)	Governance Index (A)	117.6	A 117.6	T=A×0.25 29.4	
Social (25% weight	Identity and Culture Index (B)	32.1	R=B+C+D+E/4 R=**58.1**	U=R×0.25 U= 14.4	
	Education Index (C)	74			
	Health Index (D)	18.57			
	Safety and Security Index (E)	108			
Economic (5% weight)	Economic Index (F	75.07	F= **75.07**	V=F×0.05 V= **3.75**	
Physical (45% weight)	Housing and Inclusiveness Index (G)	27.65	S= G+H+J+K+L+ M+N+P+Q/9 S= **60.9**		City Liveability Index = T+U+V+W CLI=**73.05**
	Open Space Index (H)	2.73			
	Mixed Use and Compactness Index (J)	171.5			
	Energy Index (K)	196.3		W=S×0.45 W= **25.5**	
	Mobility Index (L)	12.47a			
	Water Index (M)	47.04			
	Waste Water Index (N)	17.5			
	Solid Waste Index (P)	35.14			
	Pollution Index (Q)	38.1			

The liveability index of Leh town in 2020-2021 is 73.05, whereas in was 53.4 in 2018. The liveability of the town increased by 20% in two years, indicating improvement in quality of life for the people living in the town.

At the global level, Vienna scores the highest liveability index at 99.1 and is considered the most liveable city in the world. Leh still needs to improve its liveability with increased focus on the social and physical sectors.

LIVEABLE
LEH

LEDeG

BORDA

Funded by
The European Union