



Geography of Chennai

Chennai is located at 13.04°N 80.17°E﻿ / ﻿13.04°N 80.17°E﻿ / 13.04; 80.17 on the southeast coast of India and in the northeast corner of Tamil Nadu. It is located on a flat coastal plain known as the Eastern Coastal Plains. The city has an average elevation of 6 metres (20 ft), its highest point being 60 m (200 ft). Chennai is 2,184 kilometres (1,357 miles) south of Delhi, 1,337 kilometres (831 miles) southeast of Mumbai, and 1,679 kilometers (1,043 miles) southwest of Kolkata by road.

Geology

The geology of Chennai comprises mostly clay, shale and sandstone.^[1] The city is classified into three regions based on geology, sandy areas, clayey areas and hard-rock areas. Sandy areas are found along the river banks and the coasts. Clayey regions cover most of the city. Hard rock areas are Guindy, Velachery, Adambakkam and a part of Saidapet.^[2] In sandy areas such as Tiruvanmiyur, Adyar, Kottivakkam, Santhome, George Town, Tondiarpet and the rest of coastal Chennai, rainwater run-off percolates very quickly. In clayey and hard rock areas, rainwater percolates slowly, but it is held by the soil for a longer time. The city's clayey areas include T. Nagar, West Mambalam, Anna Nagar, Perambur and Virugambakkam. The geology of the Chennai city and its surroundings derived from the map of the Geological Survey of India is shown in figure.^[3]

Climate

Under the Köppen climate classification, Chennai has the dry-summer version of a tropical savanna climate (As),^{[5][6]} closely bordering the dry-winter version (Aw) due to a February average rainfall of 4.7 mm (0.19 in). Chennai lies on the thermal equator and is also coastal, which prevents extreme variation in seasonal temperature.^[7] For most of the year, the weather is hot and humid. The hottest part of the year is late May and early June, known locally as *Agni Nakshatram* ("fiery star") or as *Kathiri Veyyil*, with maximum temperatures around 38–42 °C (100–108 °F). The highest recorded temperature was 45 °C (113 °F) on 31 May 2003.^[8] The coldest time of the year is in December–January, with average temperature of 19–25 °C (66–77 °F) and the lowest recorded temperature of 13.9 °C (57.0 °F) on 11 December 1895 and 29 January 1905.^[9]

The average annual rainfall is about 1,400 mm (55 in). The city gets most of its seasonal rainfall from the north-east monsoon winds, from mid-September to mid-December while smaller amounts also come from the south-west monsoon winds from mid-June to mid-September. The dry season is between January and May, with March having the least average rainfall at 3.4 mm (0.13 in). Cyclones and depressions from the North Indian Ocean tropical cyclone in the Bay of Bengal sometimes hit the city. The highest annual rainfall recorded is 2,570 mm in 2005.^[10] The most prevailing winds in Chennai is the Southwesterly between the end of May to end of September and the Northeasterly during the rest of the year. Water inundation and flooding happen in low-lying areas during the season with significant flooding in 2015 and 2023.^[11]



Chennai is situated on a flat coastal plain, as can be seen in this Landsat 7 map.



Chennai and surrounding towns



Geology of Chennai and surroundings (after GSI)^[4]

Climate data for Chennai (Nungambakkam; rainfall from Chennai Airport) 1991–2020, extremes 1901–2012													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	34.4 (93.9)	36.7 (98.1)	40.6 (105.1)	42.8 (109.0)	45.0 (113.0)	43.3 (109.9)	41.1 (106.0)	40.0 (104.0)	38.9 (102.0)	39.4 (102.9)	35.4 (95.7)	33.0 (91.4)	45.0 (113.0)
Mean daily maximum °C (°F)	29.3 (84.7)	30.9 (87.6)	32.9 (91.2)	34.5 (94.1)	37.1 (98.8)	37.0 (98.6)	35.3 (95.5)	34.7 (94.5)	34.2 (93.6)	32.1 (89.8)	29.9 (85.8)	28.9 (84.0)	33.1 (91.6)
Daily mean °C (°F)	25.4 (77.7)	26.7 (80.1)	28.7 (83.7)	31.0 (87.8)	33.0 (91.4)	32.3 (90.1)	31.0 (87.8)	30.3 (86.5)	29.8 (85.6)	28.5 (83.3)	26.7 (80.1)	25.6 (78.1)	29.1 (84.4)
Mean daily minimum °C (°F)	21.2 (70.2)	22.2 (72.0)	24.2 (75.6)	26.6 (79.9)	28.0 (82.4)	27.5 (81.5)	26.4 (79.5)	25.9 (78.6)	25.6 (78.1)	24.6 (76.3)	23.1 (73.6)	21.9 (71.4)	24.8 (76.6)
Record low °C (°F)	13.9 (57.0)	15.0 (59.0)	16.7 (62.1)	20.0 (68.0)	21.1 (70.0)	20.6 (69.1)	21.0 (69.8)	20.5 (68.9)	20.6 (69.1)	16.7 (62.1)	15.0 (59.0)	13.9 (57.0)	13.9 (57.0)
Average rainfall mm (inches)	20.0 (0.79)	4.7 (0.19)	3.4 (0.13)	17.5 (0.69)	49.7 (1.96)	75.4 (2.97)	113.1 (4.45)	141.4 (5.57)	143.9 (5.67)	278.3 (10.96)	377.3 (14.85)	183.7 (7.23)	1,408.4 (55.45)
Average rainy days	1.4	0.6	0.2	1.0	1.8	4.5	6.7	8.8	7.4	10.6	11.5	5.7	60.2
Average relative humidity (%) (at 17:30 IST)	67	66	67	70	68	63	65	66	71	76	76	71	69
Mean monthly sunshine hours	232.5	240.1	291.4	294.0	300.7	234.0	142.6	189.1	195.0	257.3	261.0	210.8	2,848.5
Mean daily sunshine hours	7.5	8.5	9.4	9.8	9.7	7.8	4.6	6.1	6.5	8.3	8.7	6.8	7.8
Average ultraviolet index	7	7	7	8	8	8	8	7	7	6	7	7	7
Source 1: India Meteorological Department ^{[12][13][14][15]}													
Source 2: Tokyo Climate Center (mean temperatures 1991–2020) ^[16]													

Chennai has been ranked 41st best "National Clean Air City" (under Category 1 >10L Population cities) in India.^[17]

Water bodies

Two rivers meander through Chennai, the [Cooum River](#) (or *Koovam*) in the central region and the [Adyar River](#) in the southern region. Both rivers are heavily polluted with effluents and trash from domestic and commercial sources. The Adyar, which is much less polluted than the Cooum, is de-silted and cleaned periodically by the state government. A protected [estuary](#) of the Adyar forms the natural habitat of several species of birds and animals. The [Buckingham Canal](#), 4 km (2.5 mi) inland, travels parallel to the coast, linking the two rivers. The [Otteri Nullah](#), an east–west stream runs through north Chennai and meets the Buckingham Canal at [Basin Bridge](#).^[18] Several lakes of varying size are located on the western fringes of the city. [Red Hills](#), [Sholavaram](#) and [Chembarambakkam Lake](#) supply Chennai with potable water. Groundwater sources are mostly brackish. A study by the Department of Geology, Anna University, based on a city map of 1893, has revealed that there were nearly 60 large waterbodies in the core of then Madras.^[19] The study traced the shrinking and vanished waterbodies through a series of city maps.^[20]

Historically, Chennai has faced a problem of water supply shortages as no big river flows through it with a resulting over-reliance on annual [monsoon](#) rains to replenish water [reservoirs](#). The city's ground water levels have been depleted to very low levels in many areas. Many residents buy their drinking water. An earlier [Veeranam](#) project was unsuccessful in solving the city's water supply shortages, but the New Veeranam project which became operational in September 2004 has greatly reduced dependency on

distant sources.^[21] In recent years however, due to heavy and consistent monsoon rains and the implementation of rainwater harvesting (RWH) techniques by Chennai Metrowater at their Anna Nagar Rain Centre, water shortages have been reduced significantly, and this has led Chennai to be a model of RWH technology for other cities.^[22] Moreover, newer projects like the Telugu Ganga canal project that brings water from water-surplus rivers like the Krishna River in Andhra Pradesh have eased water supply shortages. The city is also constructing sea water desalination plants to further ease water supply shortages.

Layout

For administrative purposes Chennai is divided into five talukas; namely Egmore-Nungambakam, Fort Tondiarpet, Mambalam-Guindy, Mylapore-Triplicane and Perambur-Purasawalkkam.

The Chennai Metropolitan area consists of five districts namely Chennai city and the districts of Kanchipuram, Chengalpattu, Thiruvallur and Ranipet. The city area covers an area of 476 km² (184 sq mi).^[23] The metropolitan area covers 1,177 km² (454 sq mi). The city is divided on the basis of composition into four major parts: North, Central, South and West.

North Chennai is primarily an industrial area. Central Chennai is the commercial heart of the city and the downtown area. South Chennai and West Chennai, previously predominantly residential areas are fast turning into commercial areas, hosting a large number of IT and financial companies. The city is fast expanding along the Old Mahabalipuram Road, GST Road, Sriperumbudur, Koyambedu and Ambattur.

The Chennai Metropolitan Development Authority has drafted a Second Master Plan for Chennai, that aims to develop a satellite townships around the city. Contiguous satellite towns include Mahabalipuram to the south, Chengalpattu and Maraimalai Nagar to the south west, Kanchipuram town, Sriperumpudur, Tiruvallur and Arakkonam to the west.

References



1. "Practices and Practitioners – Chennai" (<http://www.rainwaterharvesting.org/Urban/Practices-and-practitioners.htm>). *Rainwater harvesting*. Retrieved 5 August 2005.
2. "A ready reckoner on rainwater harvesting" (<https://web.archive.org/web/20050623074539/http://www.tn.gov.in/pressclippings/archives/pc2003/newindpress/newindpress11082003.htm>). *Govt. of Tamil Nadu / New Indian Express*. Archived from the original (<http://www.tn.gov.in/pressclippings/archives/pc2003/newindpress/newindpress11082003.htm>) on 23 June 2005. Retrieved 5 August 2005.
3. "Suganthi" (<https://revistas.unal.edu.co/index.php/esjr/rt/printerFriendly/34011/44761>). *revistas.unal.edu.co*. Retrieved 30 July 2020.
4. "Suganthi" (<https://revistas.unal.edu.co/index.php/esjr/rt/printerFriendly/34011/44761>). *revistas.unal.edu.co*. Retrieved 30 July 2020.
5. Elbeltagi, Ahmed; Pande, Chaitanya B.; Moharir, Kanak N.; Pham, Quoc Bao; Singh, Sudhir Kumar (13 February 2023). *Climate Change Impacts on Natural Resources, Ecosystems and Agricultural Systems*. Springer International Publishing. p. 348. ISBN 9783031190599.
6. Khan, Ansar; Akbari, Hashem; Fiorito, Francesco; Mithun, Sk; Niyogi, Dev (2022). *Global Heat Island Migration* (https://www.google.co.uk/books/edition/Global_Urban_Heat_Island_Mitigation/P7JYEAAAQBAJ?hl=en&gbpv=1&dq=chennai+dry+summer+climate+As+koppen&pg=PA160&printsec=frontcover). Elsevier. p. 160. ISBN 978-0-323-85539-6.
7. "About Chennai" (<https://www.cmdachennai.gov.in/pdfs/tenders/ChengalpattuNewTownDevelopmentPlan/TOR.pdf>) (PDF). Chennai Metropolitan Development Authority. p. 28. Retrieved 25 February 2024.
8. "Climatology tables:Extremes till 2012" (<https://imdpune.gov.in/library/public/EXTREMES%20OF%20TEMPERATURE%20and%20RAINFALL%20upto%202012.pdf>) (PDF). India Meteorological Department. Archived (<https://web.archive.org/web/20200205042509/http://imdpune.gov.in/library/public/EXTREMES%20OF%20TEMPERATURE%20and%20RAINFALL%20upto%202012.pdf>) (PDF) from the original on 5 February 2020. Retrieved 29 May 2023.
9. "Climatology tables:Normal 1981-2010" ([https://imdpune.gov.in/library/public/1981-2010%20CLIM%20NORMALS%20\(STATWISE\).pdf](https://imdpune.gov.in/library/public/1981-2010%20CLIM%20NORMALS%20(STATWISE).pdf)) (PDF). India Meteorological Department. p. 279. Archived ([https://web.archive.org/web/20230620142419/https://imdpune.gov.in/library/public/1981-2010%20CLIM%20NORMALS%20\(STATWISE\).pdf](https://web.archive.org/web/20230620142419/https://imdpune.gov.in/library/public/1981-2010%20CLIM%20NORMALS%20(STATWISE).pdf)) (PDF) from the original on 20 June 2023. Retrieved 29 May 2023.

10. T. Ramakrishnan (3 January 2006). "Entering 2006, city's reservoirs filled to the brim" (<https://web.archive.org/web/20070228083427/http://www.hindu.com/2006/01/03/stories/2006010315310300.htm>). *The Hindu*. Archived from the original (<http://www.hindu.com/2006/01/03/stories/2006010315310300.htm>) on 28 February 2007. Retrieved 4 May 2007.
11. "Chennai Flooded, 2015 All Over Again! Cyclonic Storm Michaung to blame or infrastructure" (<https://www.timesnownews.com/chennai/chennai-flooded-2015-all-over-again-cyclonic-storm-michaung-to-blame-or-infrastructure-article-105728590>). *Times Now*. 4 December 2023. Archived (<https://web.archive.org/web/20231204114100/https://www.timesnownews.com/chennai/chennai-flooded-2015-all-over-again-cyclonic-storm-michaung-to-blame-or-infrastructure-article-105728590>) from the original on 4 December 2023. Retrieved 23 January 2025.
12. "Station: Chennai (Nungambakkam) Climatological Table 1981–2010" (<https://web.archive.org/web/20200205040301/http://imdpune.gov.in/library/public/1981-2010%20CLIM%20NORMALS%20%28STATWISE%29.pdf>) (PDF). *Climatological Normals 1981–2010*. India Meteorological Department. January 2015. pp. 185–186. Archived from the original (<https://imdpune.gov.in/library/public/1981-2010%20CLIM%20NORMALS%20%28STATWISE%29.pdf>) (PDF) on 5 February 2020. Retrieved 2 March 2020.
13. "Extremes of Temperature & Rainfall for Indian Stations (Up to 2012)" (<https://web.archive.org/web/20200205042509/http://imdpune.gov.in/library/public/EXTREMES%20OF%20TEMPERATURE%20and%20RAINFALL%20upto%202012.pdf>) (PDF). India Meteorological Department. December 2016. p. M192. Archived from the original (<https://imdpune.gov.in/library/public/EXTREMES%20OF%20TEMPERATURE%20and%20RAINFALL%20upto%202012.pdf>) (PDF) on 5 February 2020. Retrieved 2 March 2020.
14. "Table 3 Monthly mean duration of Sun Shine (hours) at different locations in India" (https://web.archive.org/web/20200205042602/http://imdpune.gov.in/library/public/Daily%20Normals%20of%20Global%20&%20Diffused%20Radiations%20%201971_2000.pdf) (PDF). *Daily Normals of Global & Diffuse Radiation (1971–2000)*. India Meteorological Department. December 2016. p. M-3. Archived from the original (https://imdpune.gov.in/library/public/Daily%20Normals%20of%20Global%20&%20Diffused%20Radiations%20%201971_2000.pdf) (PDF) on 5 February 2020. Retrieved 2 March 2020.
15. "Chennai Climatological Table 1981–2010" (<http://city.imd.gov.in/citywx/extreme/MAR/chennai2.htm>). India Meteorological Department. Retrieved 2 March 2020.
16. "Normals Data: Chennai/Minambakkam – India Latitude: 13.00°N Longitude: 80.18°E Height: 14 (m)" (https://ds.data.jma.go.jp/gmd/tcc/tcc/products/climate/normal/parts/NrmMonth_e.php?stn=43279). Japan Meteorological Agency. Retrieved 1 December 2022.
17. "Swachh Vayu Sarvekshan 2024" (https://prana.cpcb.gov.in/ncapServices/robust/fetchFilesFromDrive/Swachh_Vayu_Survekshan_2024_Result.pdf) (PDF). *Swachh Vayu Sarvekshan 2024*. 7 September 2024.
18. "Chennai" (http://www.lifeinchennai.com/chennai_geography.htm). lifeinchennai.com. Retrieved 27 July 2009.
19. Lakshmi, K. (1 April 2018). "The vanishing waterbodies of Chennai" (<https://www.thehindu.com/news/cities/chennai/the-vanishing-waterbodies-of-chennai/article23404437.ece>). *The Hindu*. ISSN 0971-751X (<https://search.worldcat.org/issn/0971-751X>). Retrieved 30 July 2020.
20. Lakshmi, K. (1 April 2018). "The vanishing waterbodies of Chennai" (<https://www.thehindu.com/news/cities/chennai/the-vanishing-waterbodies-of-chennai/article23404437.ece>). *The Hindu*. ISSN 0971-751X (<https://search.worldcat.org/issn/0971-751X>). Retrieved 30 July 2020.
21. "Chennai Water Supply" (<https://web.archive.org/web/20070812071544/http://www.chennaietrowater.com/engg/operationmaintenance/cmwdrw04.htm>). *Management of water supply during acute water scarcity in 2003 & 2004*. Chennai Metropolitan Water Supply and Sewage Board (CMWSSB). Archived from the original (<http://www.chennaietrowater.com/engg/operationmaintenance/cmwdrw04.htm>) on 12 August 2007. Retrieved 16 March 2007.
22. "Bangalore team visits RWH structures in city", *The Hindu*, 3 August 2007, accessed 11 August 2007 (<https://web.archive.org/web/20071001015212/http://www.hindu.com/2007/08/03/stories/2007080360510500.htm>)
23. "General statistics" (http://www.chennaicorporation.com/general_stats.htm). *Corporation of Chennai*. Retrieved 4 August 2005.

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