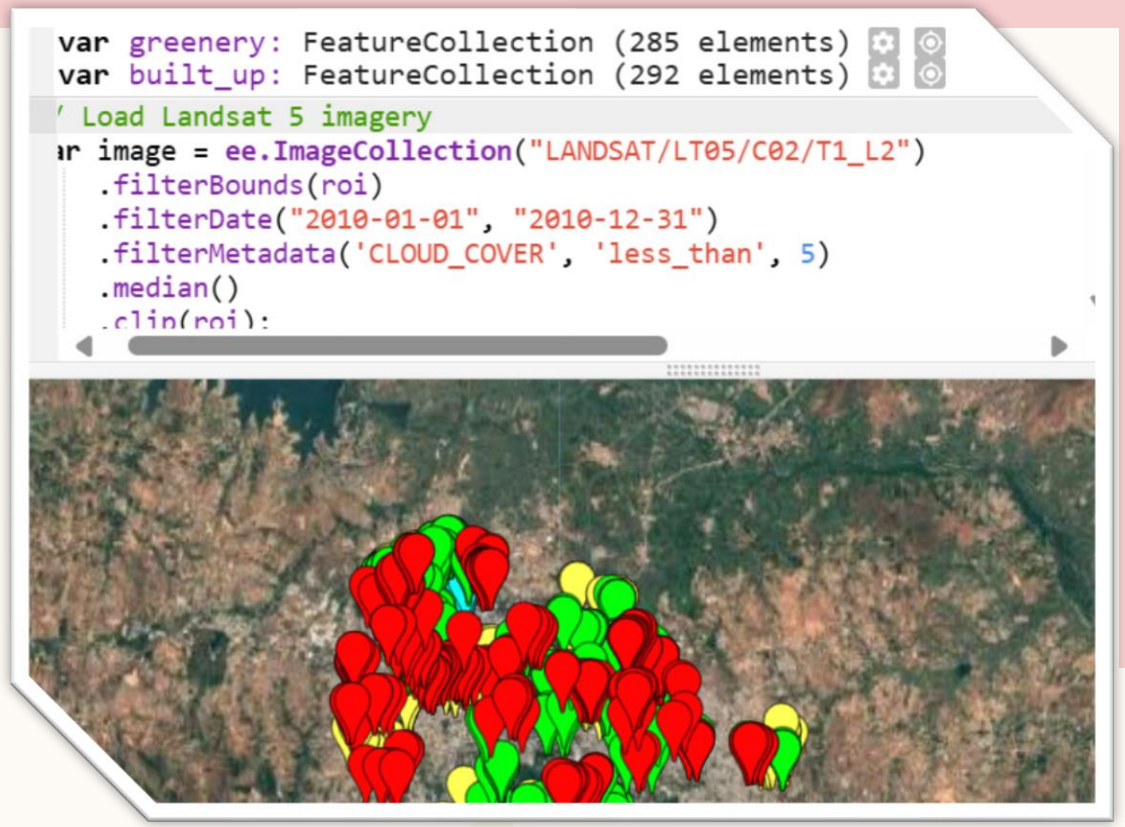
URBAN HEAT ISLAND IMPACT ASSESSMENT:- MYSORE CITY

LAND USE LAND COVER (LULC):-

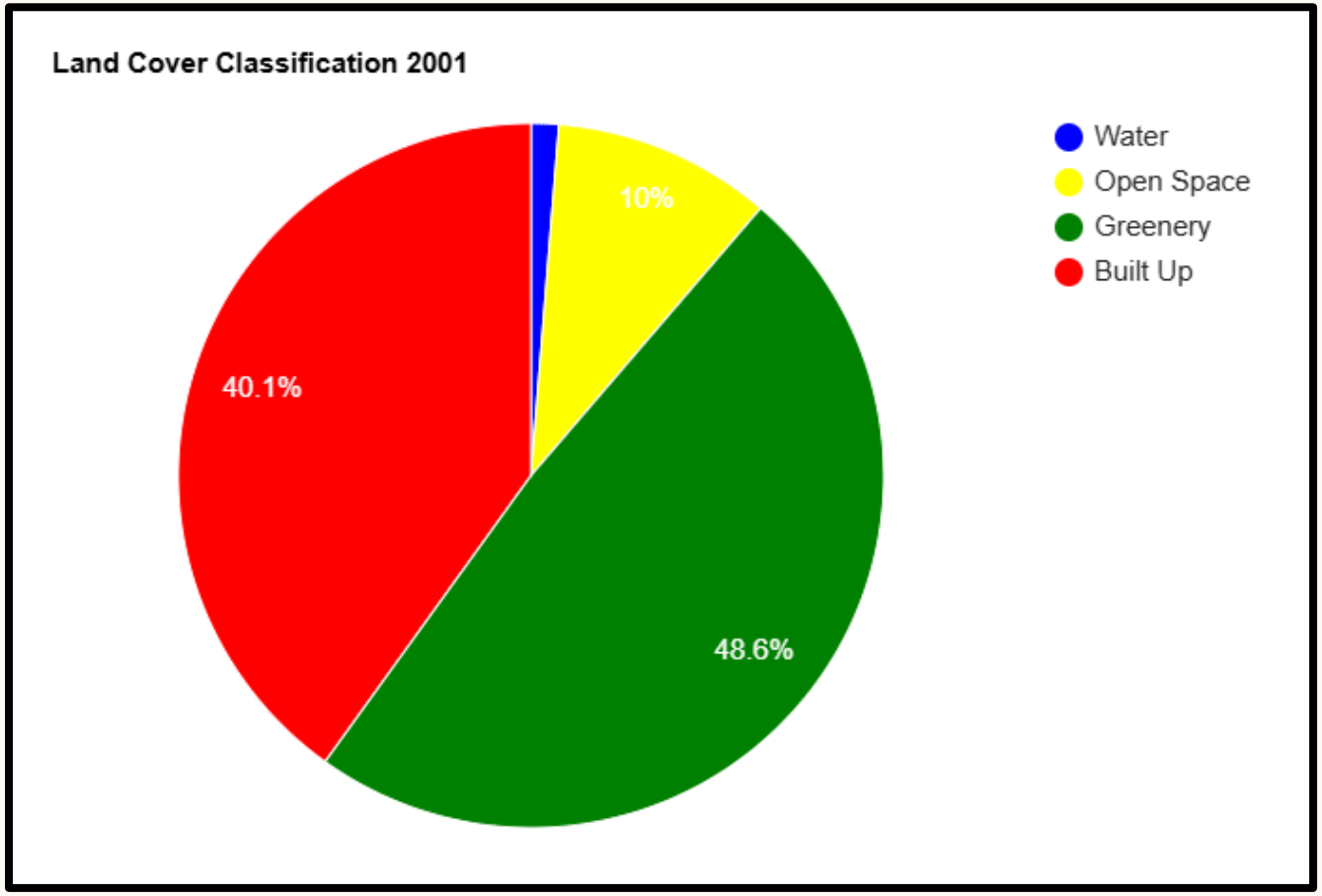


It is a crucial concept in environmental and geographical studies, representing two related but distinct aspects of the Earth's surface:

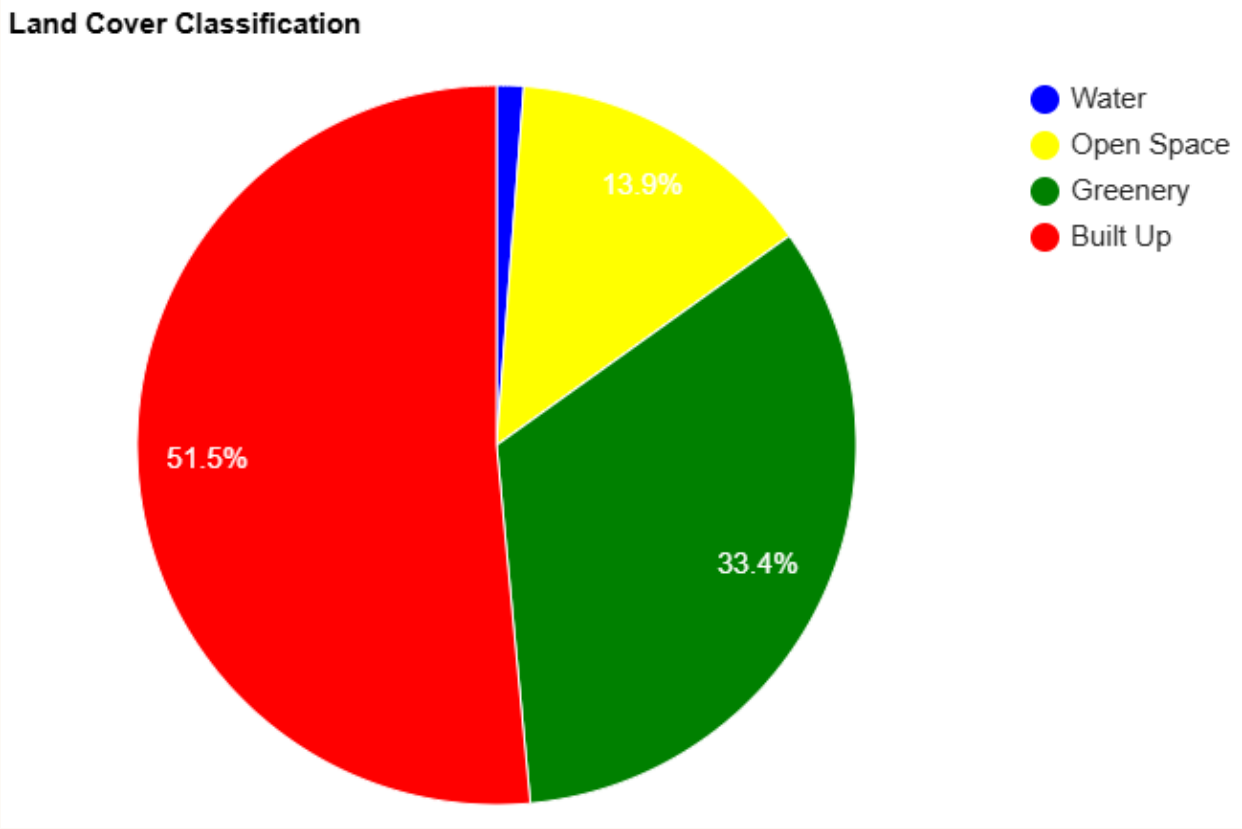
1.Land Cover: Refers to the physical material on the surface of the Earth, such as vegetation, water bodies, bare soil, built-up areas, and more. This aspect describes what is actually present on the land (e.g., forest, grassland, agricultural fields).

2.Land Use: Refers to the human activities or purposes that are associated with a specific land cover. This includes how people use the land for agriculture, residential or commercial purposes, recreation, conservation, and industrial activities.

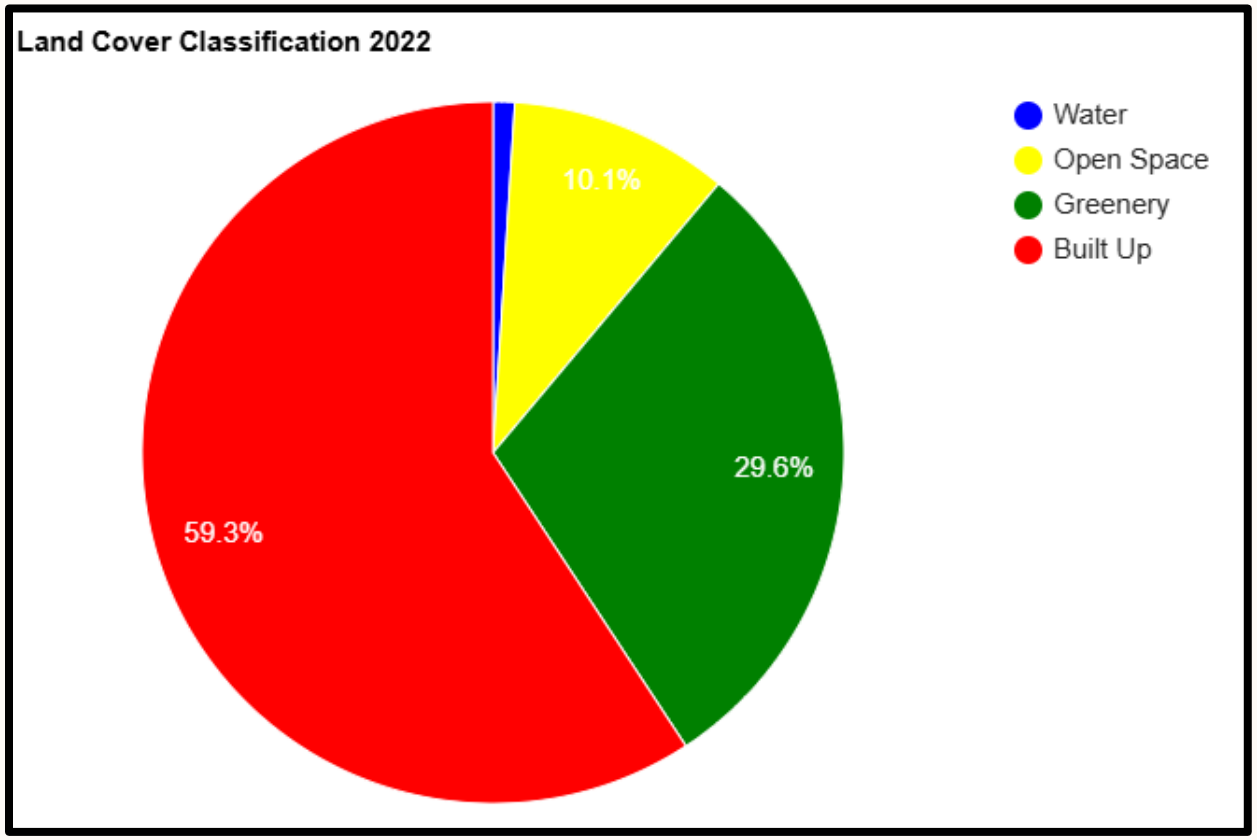
LAND USE LAND COVER (LULC)-2001:-



LAND USE LAND COVER (LULC)-2010:-

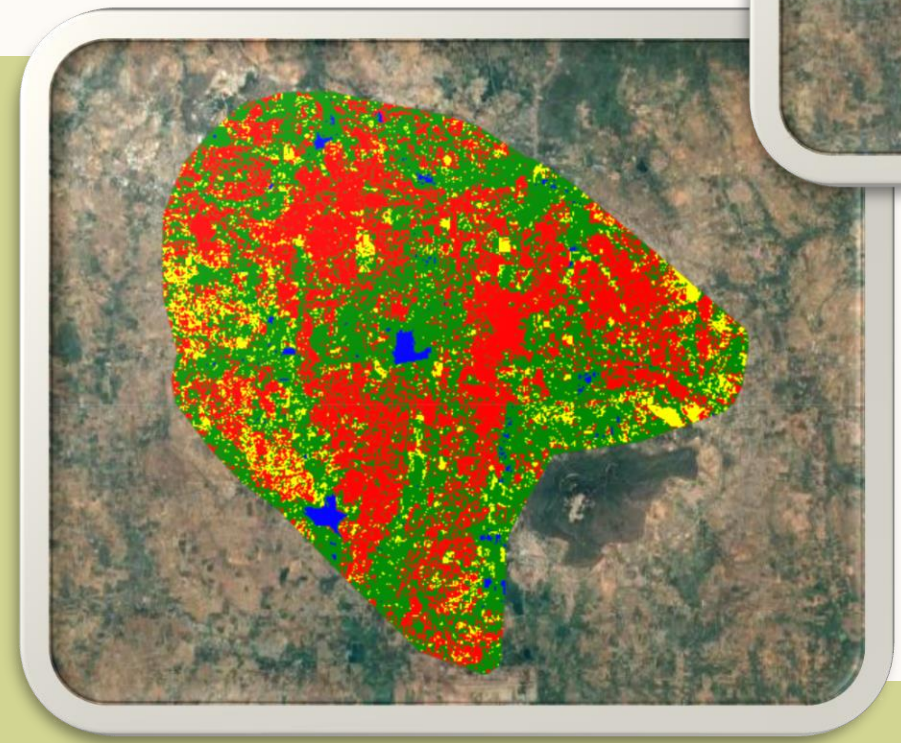


LAND USE LAND COVER (LULC)-2022:-

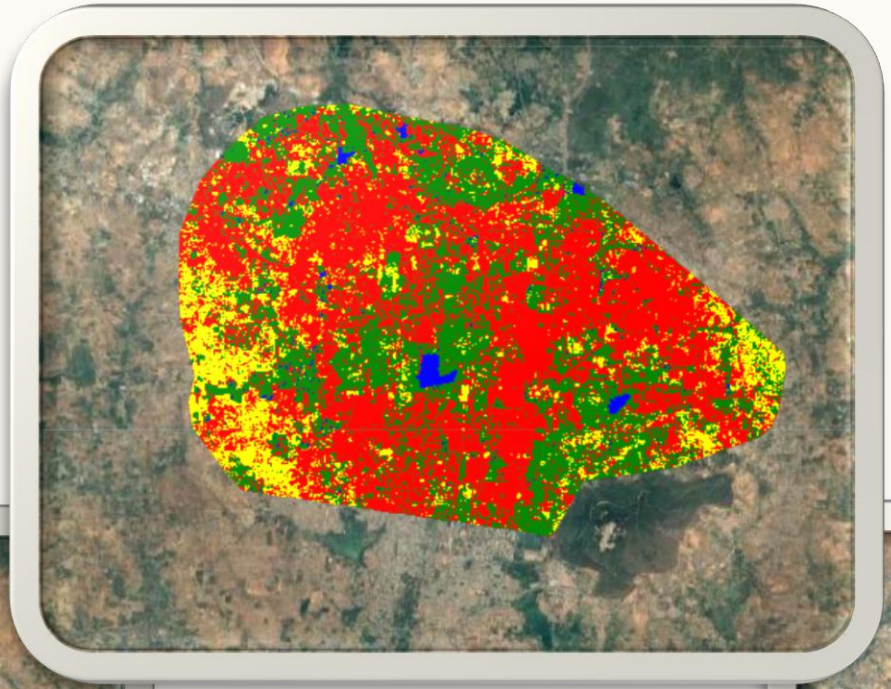


ANNUAL LULC MAPS:-

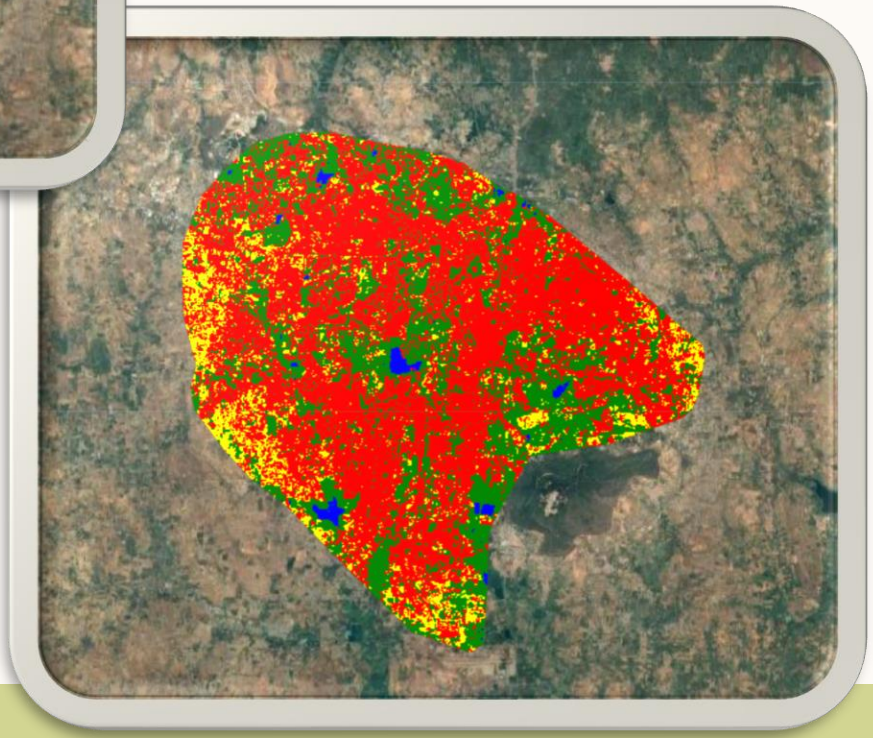
2001



2010

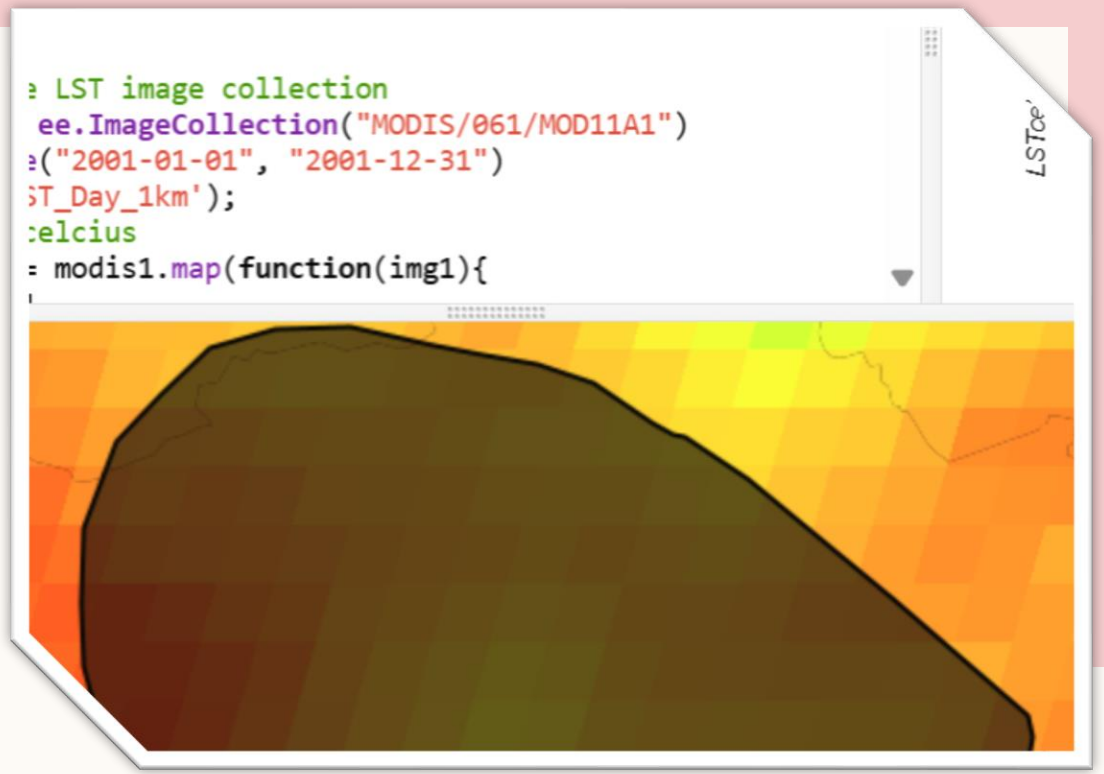


2022

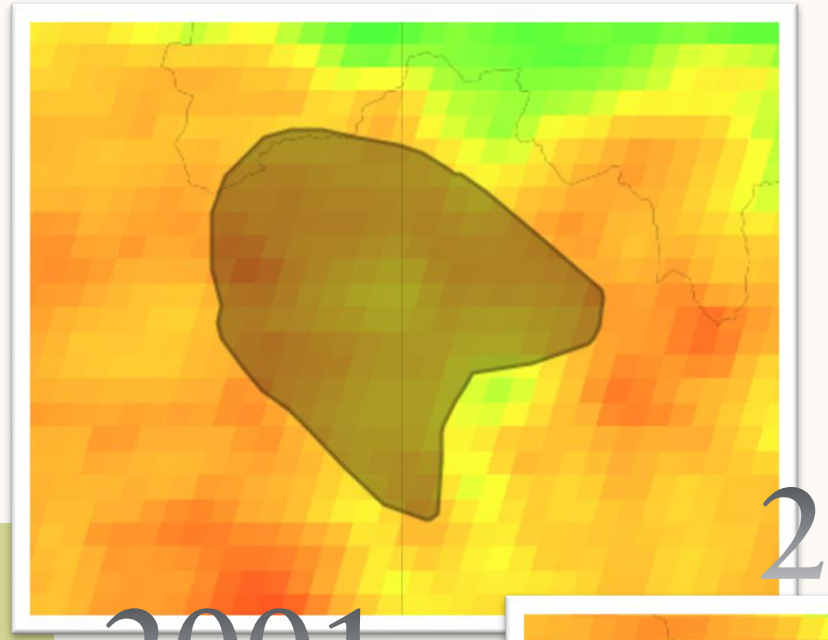


LAND SURFACE TEMPERATURES(LST):-

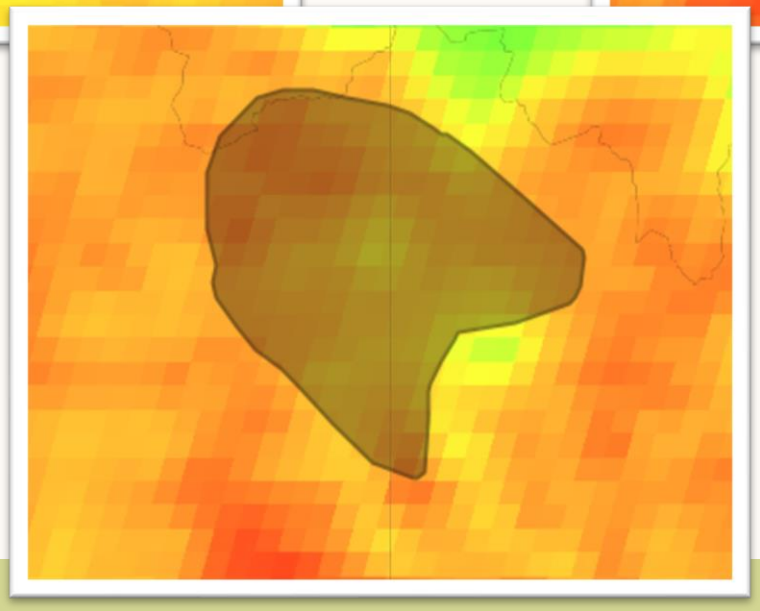
refers to the temperature of the Earth's surface as measured from above, typically by satellites. It represents the heat emitted by the ground surface and includes the effects of land cover types, such as soil, vegetation, water bodies, and urban infrastructure.



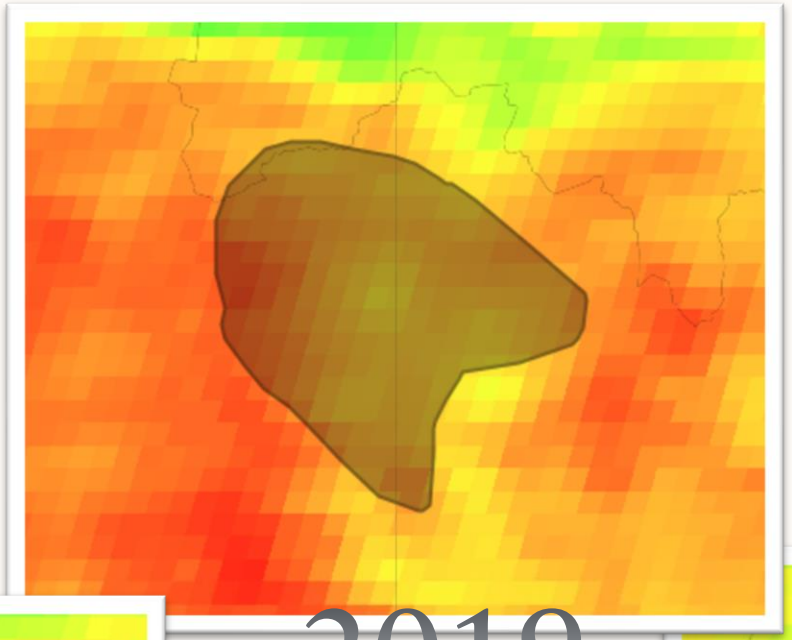
ANNUAL LST MAP:-



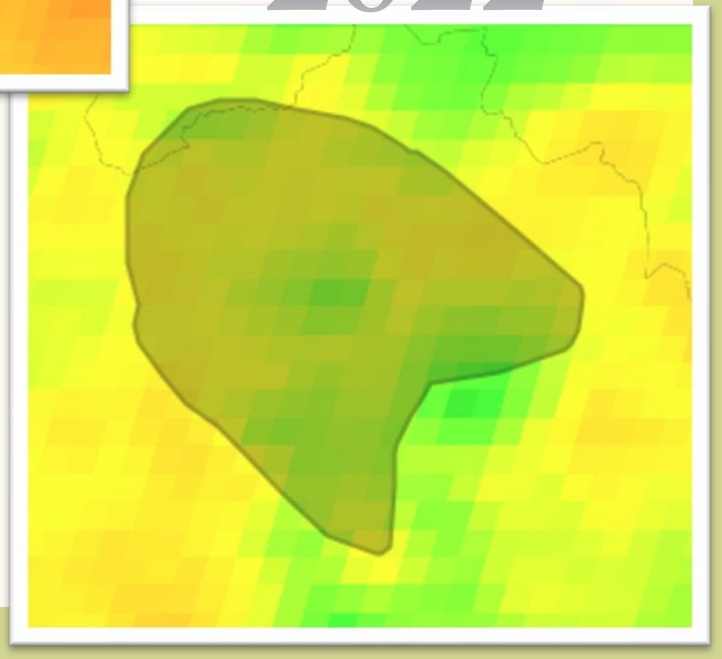
2001



2010



2019



2022

REASON FOR SUDDEN DIP IN MEAN TEMPERATURES AFTER 2019:-

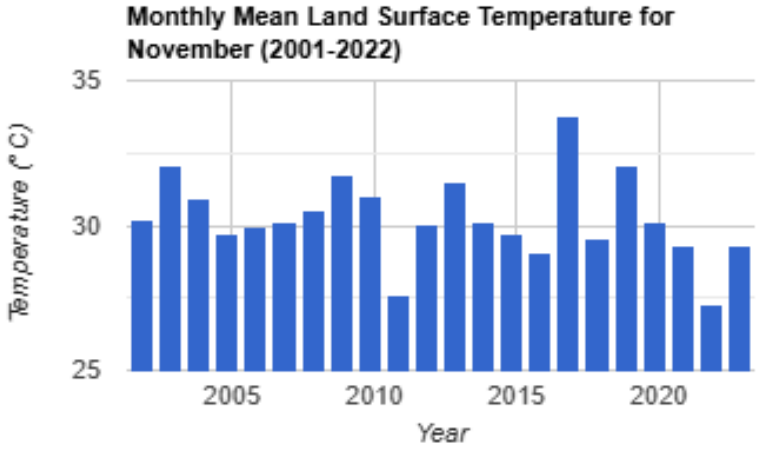
- The decline in mean temperatures in Mysore after 2019 can largely be attributed to the impacts of the COVID-19 pandemic. During this period, there was a significant decrease in human activities, which directly and indirectly influenced local climate conditions. The key factors include:

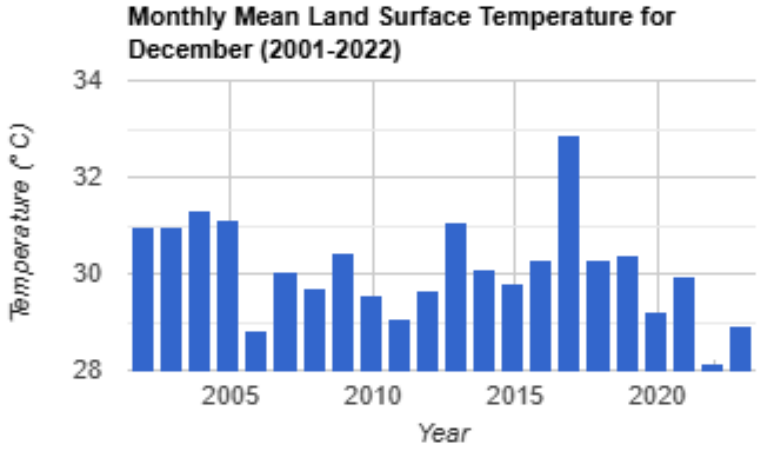
1. **Reduction in Air Pollution**: Lockdowns and restrictions on travel led to a sharp decrease in vehicle emissions, industrial activities, and construction. This resulted in lower levels of greenhouse gases and particulate matter in the atmosphere, reducing the heat trapped by pollutants. The cleaner air allowed more sunlight to escape back into space, contributing to lower temperatures.
2. **Decrease in Urban Heat Generation**: Urban areas typically experience the Urban Heat Island (UHI) effect, where human activities, vehicle emissions, and industrial processes elevate local temperatures. During COVID-19 lockdowns, reduced human presence and lowered energy consumption in commercial areas lessened the UHI effect, bringing down temperatures.
3. **Changes in Land Use**: Some urban areas saw a temporary "greening" effect as natural vegetation grew more freely in the absence of human interference. This increase in greenery provided additional shade and reduced surface heating in certain areas.
4. **Global Climate Influence**: The global slowdown also meant reduced emissions on a larger scale, which may have contributed to minor cooling effects that were reflected locally. Though small, this impact, combined with local factors, played a role in lowering mean temperatures.

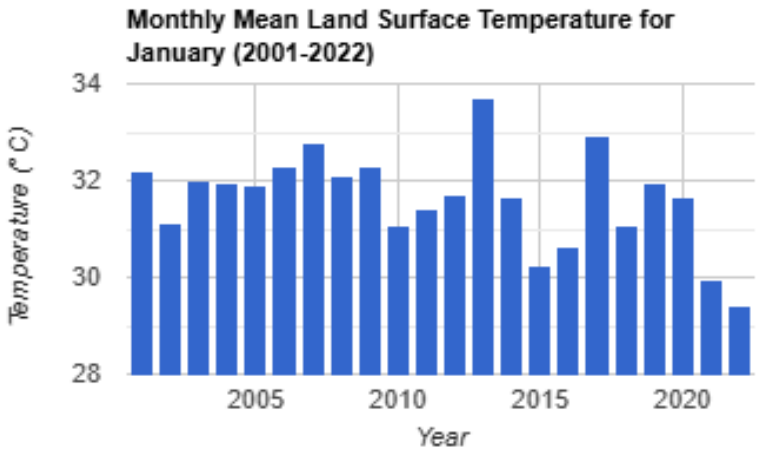
LST TREND ANALYSIS:-

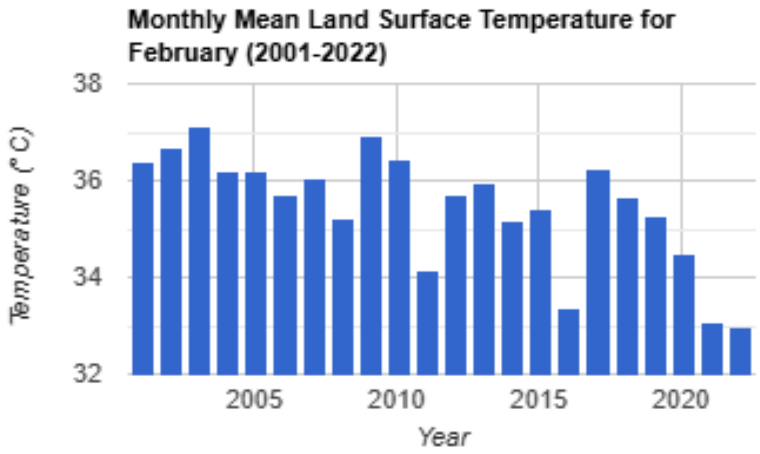
The variation in mean tertile temperatures of Summer (March, April, May, June) and Winter (November, December, January, February) from 2001-2022 used for LST projection of years 2028-30.

MEAN MONTHLY TEMPERATURES (WINTER MONTHS):-

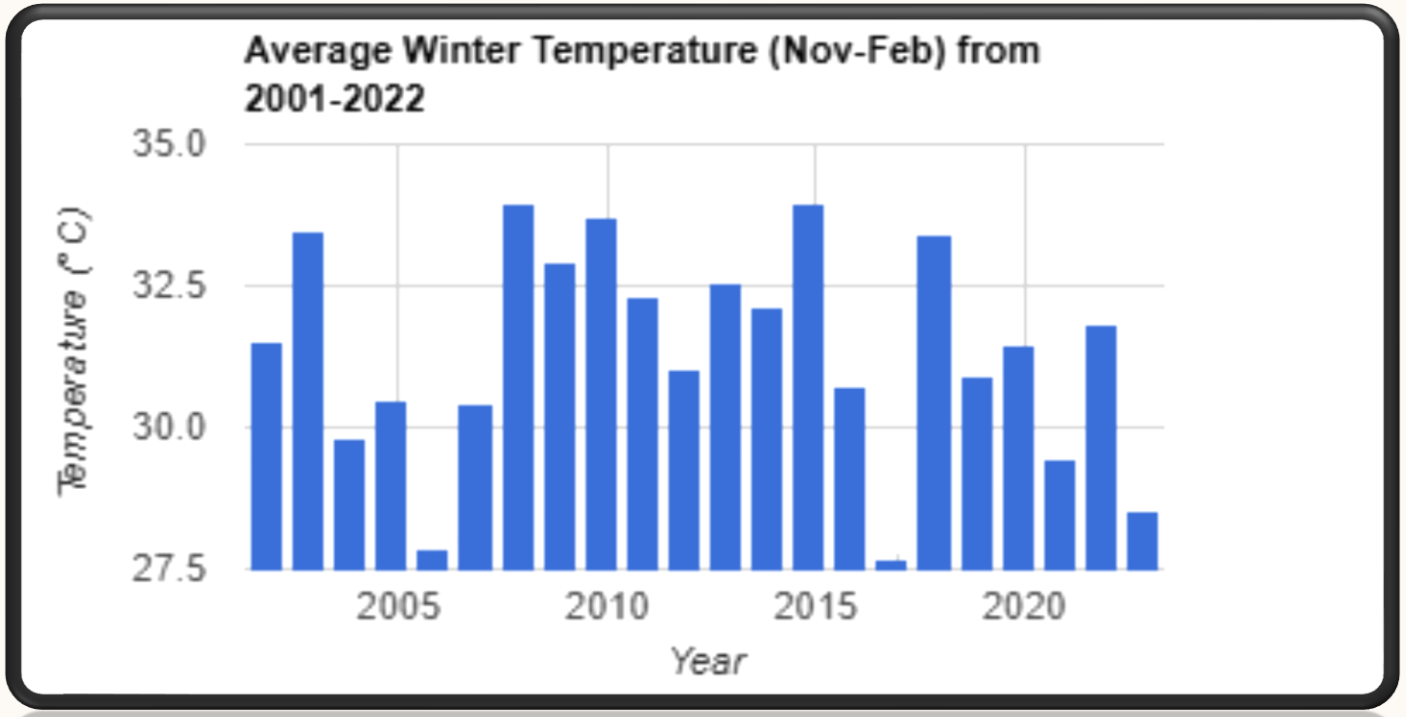






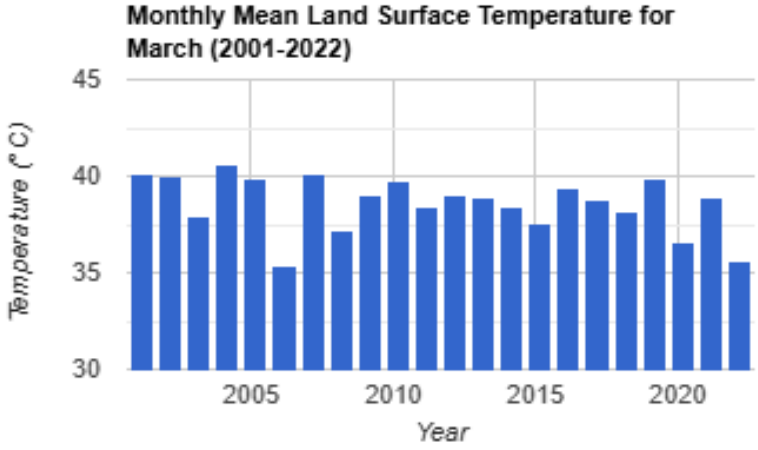


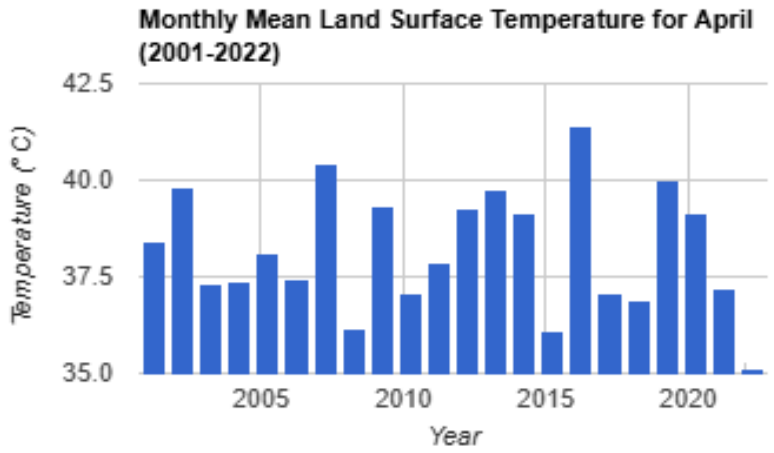
MEAN MONTHLY TEMPERATURES (WINTER MONTHS):-

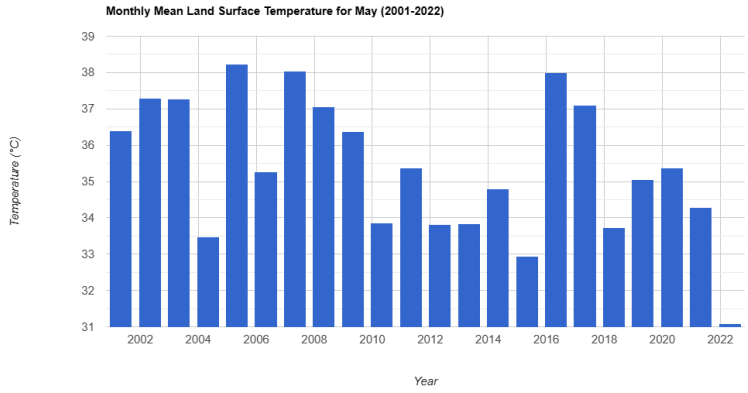


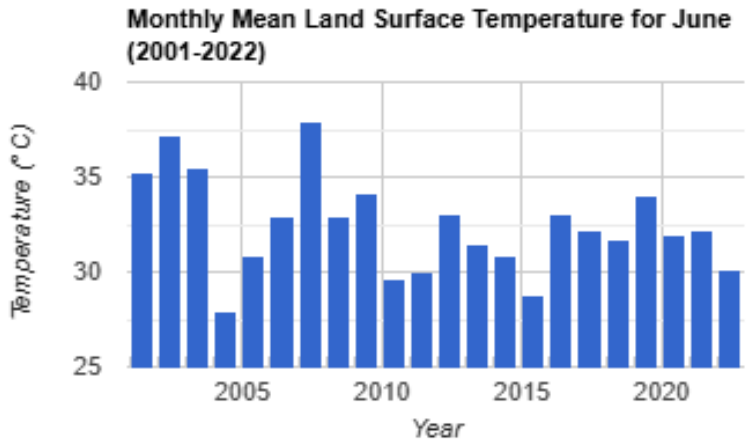
Winter: $\text{Temperature} = -0.0462 \times \text{Year} + 124.263$

MEAN MONTHLY TEMPERATURES (SUMMER MONTHS):-

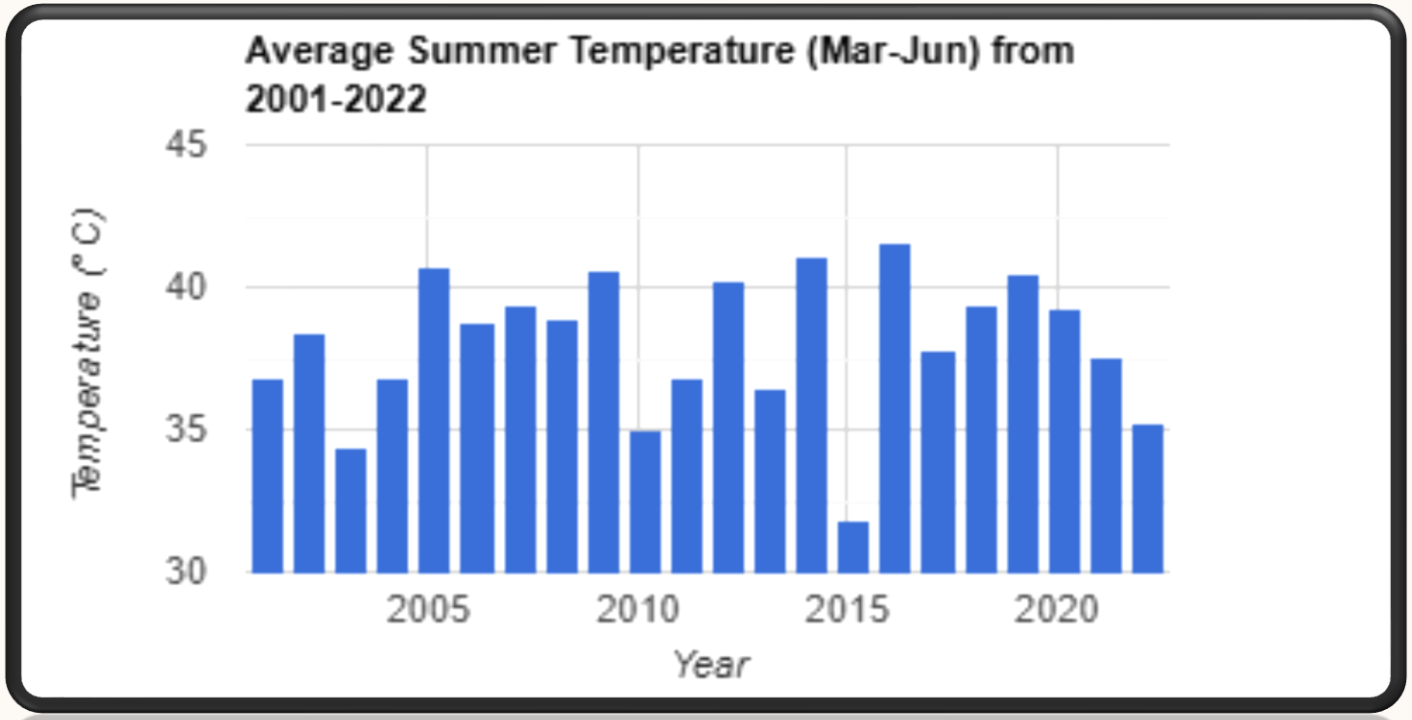






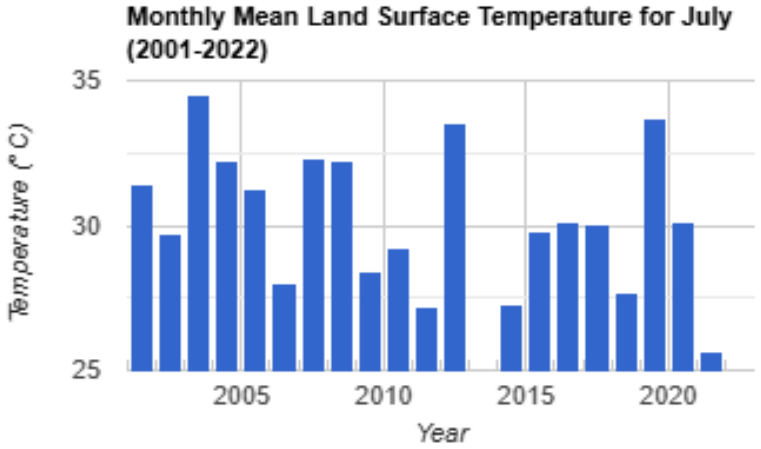


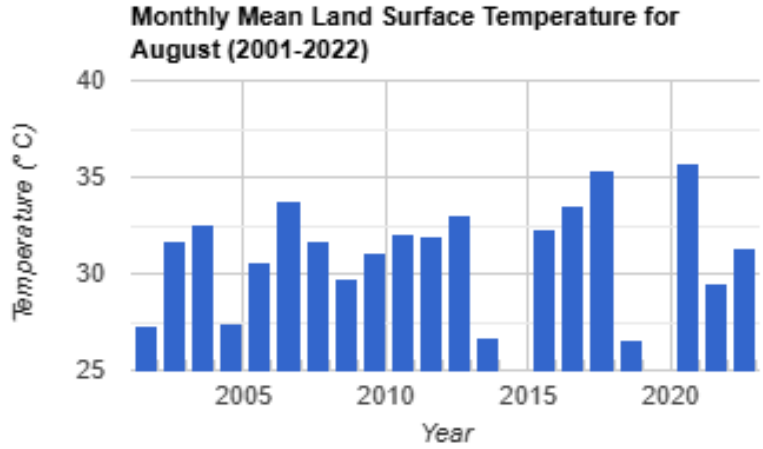
MEAN MONTHLY TEMPERATURES (SUMMER MONTHS):-

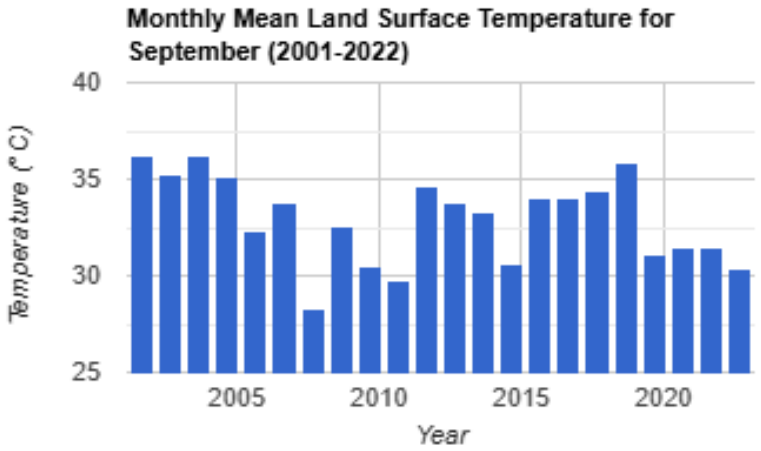


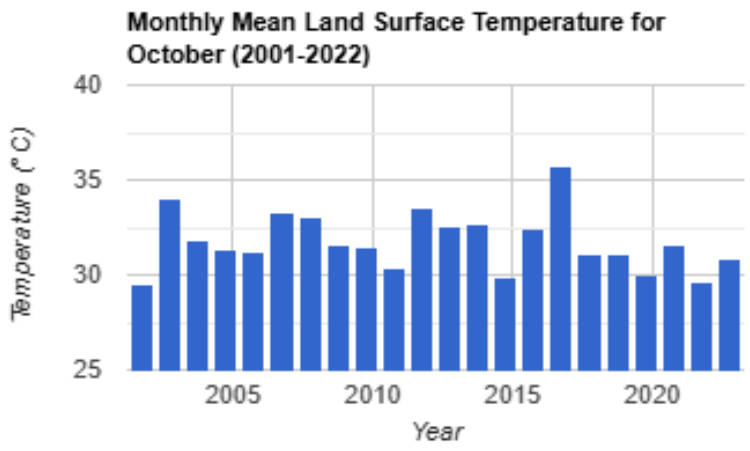
Summer: $\text{Temperature} = 0.0239 \times \text{Year} - 9.902$

MEAN MONTHLY TEMPERATURES (MONSOON MONTHS):-

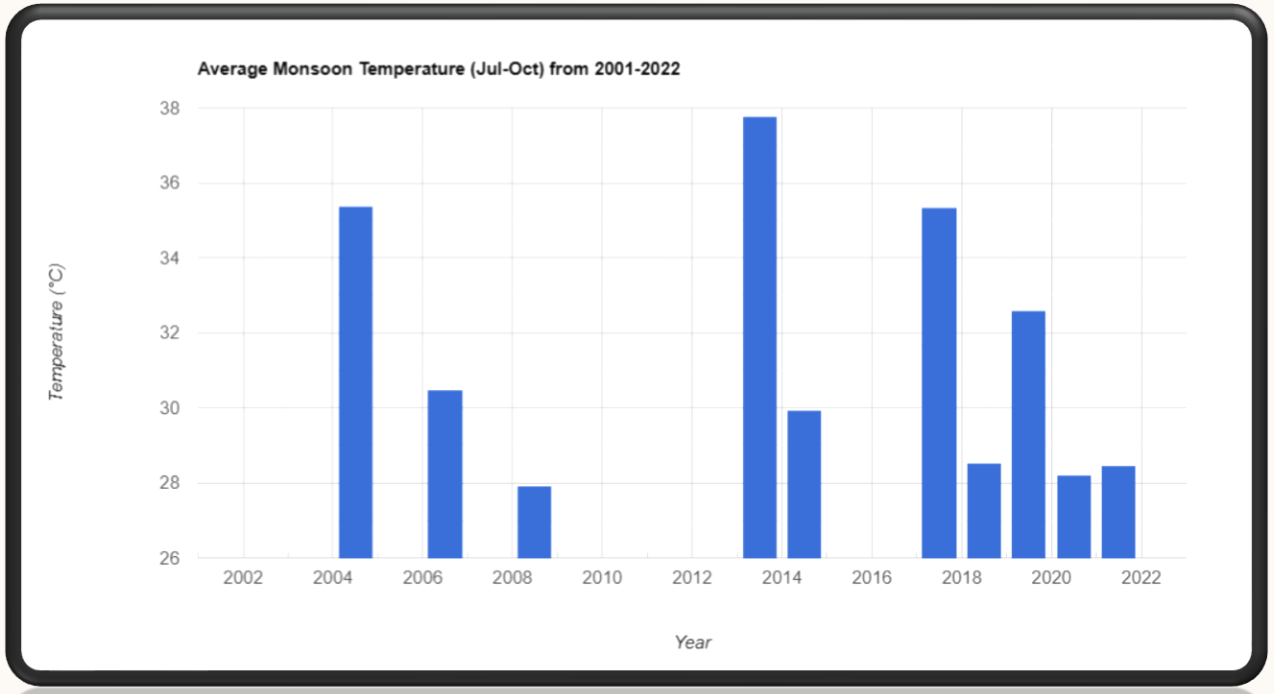








MEAN MONTHLY TEMPERATURES (MONSOON MONTHS):-



Monsoon: $\text{Temperature} = -0.1529 \times \text{Year} + 339.425$

PROJECTION 2028-2030:-

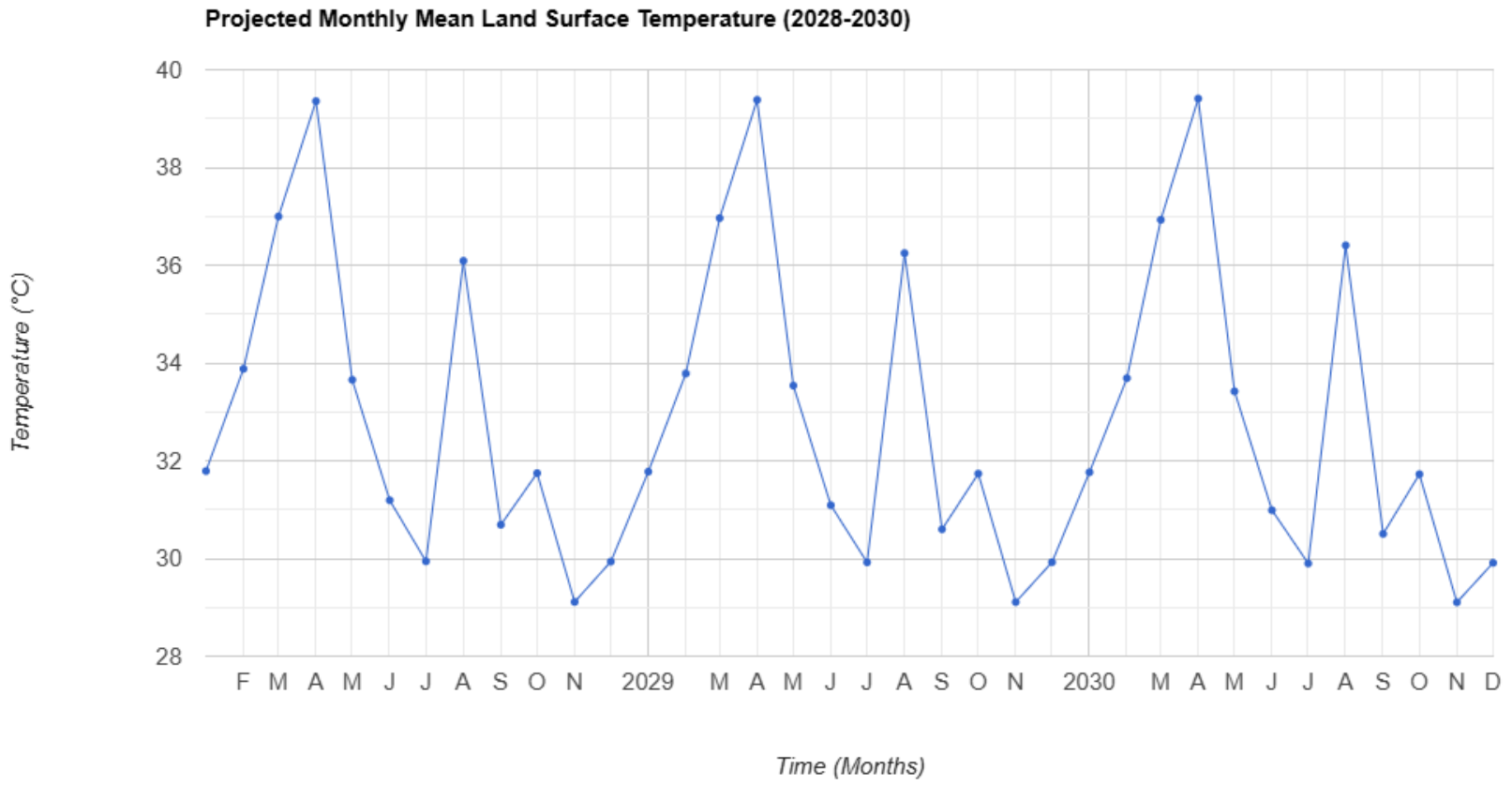
LULC PROJECTION:-

Method used for the projection is Linear Regression on GEE.

ENTITY	2001	2010	2022	2030
BUILT UP	40.1%	51.5%	59.3%	67.4%
GREENERY	48.6%	33.4%	29.6%	20.6%
OPEN SPACE	10%	13.9%	10.1%	11.1%
WATER	1.3%	1.2%	1%	0.9%

LST PROJECTION:-

Time	Temp.	Time	Temp.	Time	Temp.
Jan 1, 2028	31.788	Jan 1, 2029	31.776	Jan 1, 2030	31.763
Feb 1, 2028	33.88	Feb 1, 2029	33.784	Feb 1, 2030	33.688
Mar 1, 2028	36.997	Mar 1, 2029	36.963	Mar 1, 2030	36.928
Apr 1, 2028	39.356	Apr 1, 2029	39.382	Apr 1, 2030	39.409
May 1, 2028	33.654	May 1, 2029	33.537	May 1, 2030	33.42
Jun 1, 2028	31.191	Jun 1, 2029	31.089	Jun 1, 2030	30.988
Jul 1, 2028	29.942	Jul 1, 2029	29.92	Jul 1, 2030	29.899
Aug 1, 2028	36.089	Aug 1, 2029	36.247	Aug 1, 2030	36.404
Sep 1, 2028	30.69	Sep 1, 2029	30.597	Sep 1, 2030	30.504
Oct 1, 2028	31.745	Oct 1, 2029	31.734	Oct 1, 2030	31.723
Nov 1, 2028	29.111	Nov 1, 2029	29.107	Nov 1, 2030	29.103
Dec 1, 2028	29.936	Dec 1, 2029	29.923	Dec 1, 2030	29.911


Projected Monthly Mean Land Surface Temperature (2028-2030)
Temperature (°C)
40
38
36
34
32
30
28
F M A M J J A S O N 2029 M A M J J A S O N 2030 M A M J J A S O N D
Time (Months)

THANK YOU

SPECIAL THANKS :-
TA MAYANK UPADHYAY SIR
Assessing the impact of land use land cover changes on land surface temperature over Pune city, India – ScienceDirect
Kashyap Jyoti Gohain, Pir Mohammad,
Ajanta Goswami