

**Carbon Inventory and Preparation of Action plan
for
Carbon Neutrality & its monitoring for Satara City,
Maharashtra**



Final Report

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Prepared

By

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Preface

This report contains the “Carbon Inventory and Action plan for Carbon Neutrality for Satara City, Maharashtra and the carbon sequestration by forest ecosystem of Satara City.

In this report basic concepts on carbon accounting and different approaches of estimation of GHG inventory are described. More specifically report covers the estimation and assessment in the specific sectors viz., electricity consumption, fossil fuel consumption, municipal solid waste, forestry and assessment of air, water in Satara City.

Chapter 1 describes the introduction of Satara City state and provides the key indicators, economic development of the state, land use and human development indicators.

Chapter 2 describes the impact of climate change in global, national, and regional perspectives.

Chapter 3 describes Steps for preparing urban carbon inventories and the scope of carbon inventory.

Chapter 4 illustrate about objective and methodology for estimation of greenhouse inventory for Satara City.

Chapter 5 describes the electricity consumption and emissions from fossil fuel consumption. Also, the energy generation from renewable energy sources such as hydro dam and solar is accounted in emission mitigation aspect.

Chapter 6 describes the study of municipal solid waste management and provides the approach for sector and method to calculate the loss incurred due to solid waste. This chapter deals with the solid waste generated by hotels, households and market-places and estimation of GHG emissions. Chapter 7 covers the forest & biodiversity and carbon dioxide sequestration from forest trees and urban tree plantations.

Chapter 8 and 9 provide the information of air quality and water natural resources (lakes) in the Satara City. Also, the latest study on air quality is incorporated in this chapter. Chapter 10 covers the roadmap towards carbon neutrality for Satara City.

As this study shows the carbon inventory and the need for carrying out the steps towards carbon neutrality. Realizing the significance of GHG inventory and accepting the responsibility of the emissions at municipal level, which may contribute towards global impact, the SMC proactively took an initiative to document the GHG inventory for its municipal limits. This shall help Satara city to quantify and map the emissions from different sources and help develop specific strategies to curb the emissions.

List of Abbreviations

APC	Air Pollution Control
BEE	Bureau of Energy Efficiency
BPCL	Bharat Petroleum Corporation Limited
CACP	Clean Air and Climate Protection
CAGR	Compound Annual Growth Rate
CEAI	Central Electricity Authority of India
CH ₄	Methane
CNG	Compressed natural gas
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide equivalent
EPA	Environment Protection Agency
FO	Furnace Oil
GHG	Greenhouse Gas
GWh	Gigawatt-hour
GWP	Global Warming Potential
HCV	Heavy Commercial Vehicles
HFC	Hydrofluorocarbons
HPCL	Hindustan Petroleum Corporation Limited
HSD	High Speed Diesel
HT	High tension (Used in the context of electricity distribution above 650 V)
ICLEI	International Council for Local Environmental Initiatives
IEA	International Energy Agency
IOCL	Indian Oil Corporation Limited
IPCC	Intergovernmental Panel on Climate Change
ISDGEC	International Standards for Determining Greenhouse Gas Emissions for Cities
LCV	Light Commercial Vehicles
LDO	Light Diesel Oil
LED	Light-emitting diode
LPG	Liquefied petroleum gas
LT	Low tension (Used in the context of electricity distribution below 250 V)
MLD	Millions of Litres Per Day
MMT	Million Metric Tonnes
MNGL	Maharashtra Natural Gas Limited
MoEFCC	Ministry of Environment, Forests & Climate Change

MSEDCL	Maharashtra State Electricity Distribution Company Limited
MT	Metric tonnes
Mtoe	Million Tonnes of Oil Equivalent
N ₂ O	Nitrous Oxide
NATCOM	India's National Communication of Emissions to the UNFCCC
NUSP	National Urban Sanitation Policy
PFC	Perfluorocarbons
RTO	Regional Transport Office
SF ₆	Sulfur hexafluoride
SMC	Satara Municipal Corporation
STP	Sewage Treatment Plant
SWD	Solid Waste Disposal
tCO ₂ e	Tonne Carbon-dioxide equivalent
TPD	Tonne per day
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
VKT	Vehicle Kilometres Travelled
WB	World Bank
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute
WTP	Water Treatment Plant

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1. Satara Profile

1.1. Introduction

Satara district is located in the western part of Maharashtra, between north latitudes 17° 5' to 18° 11' and east longitude 73° 33' to 74° 54'. District is bounded by Pune to the north, Solapur in the east, Sangli in the south and Ratnagiri district in the west. Geographical area of the district is 10,484 sq. km. Population is 27,96,906. For administrative purpose district has 11 tahsils namely Satara, Karad, Wai, Mahabaleshwar, Phaltan, Man, Khatav, Koregaon, Patan, Jaoli and Khandala.

Satara is a city located in the Satara District of Maharashtra state of India, near the confluence of the river Krishna and its tributary, the Venna.



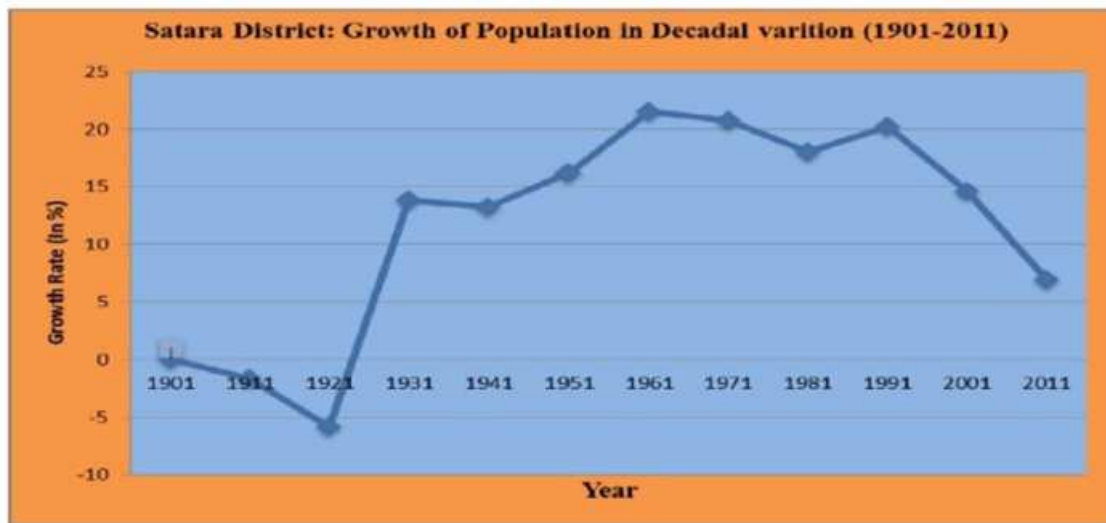
Satara City is a historical place with rich heritage. It was the capital of the erstwhile Maratha empire. There are beautiful temples and historical places in the city. Ajinkyatara being the major landmark of the city. Satara also played an important role in the independence movement of the country. Gandmala stands witness to this where 17 people laid their lives in the Sepoy Mutiny of 1857. Ajinkyatara Fort was built by Raja Bhoj. There are 17 doors to the fort with "Buruj". In the north of the fort a beautiful temple of Goddess Mangalai Devi is located. The city is situated around the fort.

Satara has emerged as a famous tourist spot with many hotels and lodges for the tourist. Maharashtra Tourist Development Corporation (MTDC) guest houses.

Table 1 Key Indicators of Satara

Sr. No.	Item (General)	Satara
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1:	Population	14,93,350 ¹
2:	Sex Ratio	51:49
3:	Latitude	17.5 to 18.11 N
4:	Longitude	73.33 to 74.54 E
5:	Average elevation above sea level	1700 feet
6:	Maximum and Minimum Temperature	15.5 °C - 28.3 °C
7:	Average annual rainfall	6000 mm
8:	Geographical Area	26.4 (sq.km.)



This is the first among a list of steps for the city to take mitigation actions aiming at reducing the city's carbon emissions. Based on the results of this study, the city would have to set before itself an emissions reduction target for a particular forecast year and develop a climate action plan. Subsequently, the results of the action plan and policies have to be monitored and results need to be verified and compared versus this baseline carbon inventory exercise.

¹ <https://www.census2011.co.in/census/metropolitan/330-satara.html>

Geographical Boundary of Satara City

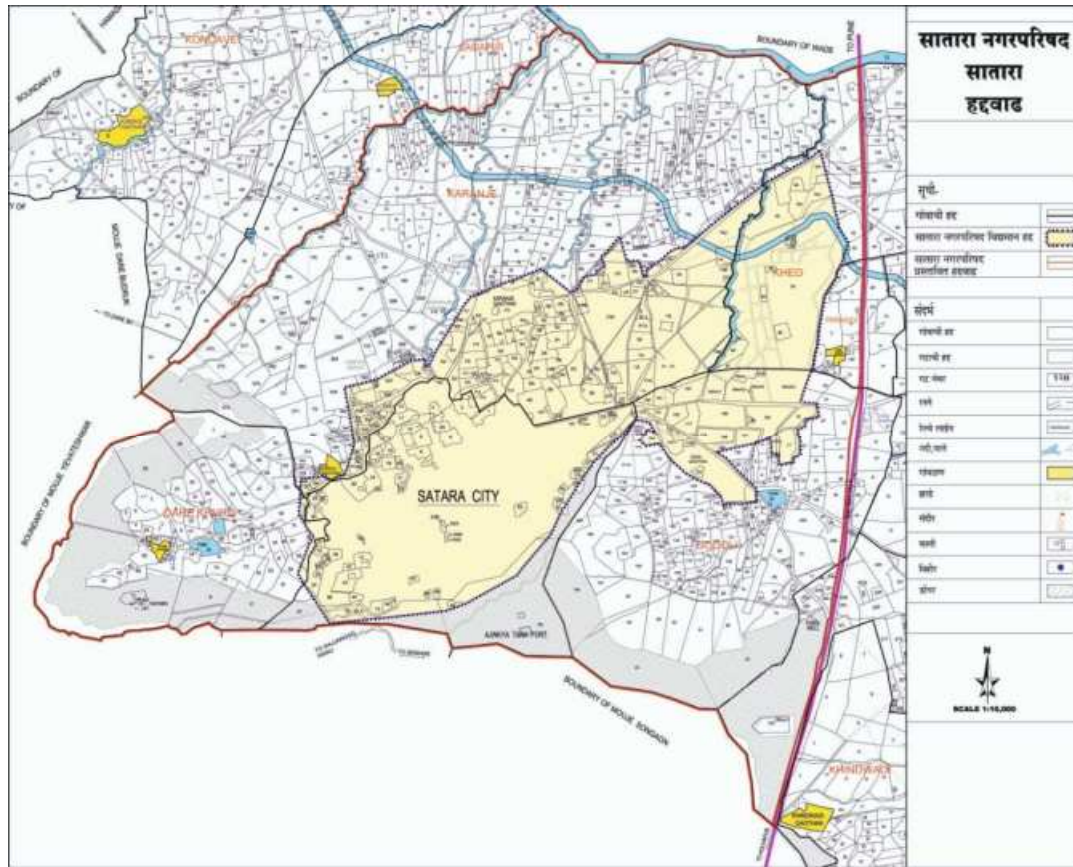


Fig. 1: Geographical boundary of Satara City

2. Climate Change

Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer).

Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.

Climate change has many different aspects to it. One can associate climate change with rise in sea water levels, change in atmospheric temperature, changing ecosystems, melting polar ice, and so on. It may be due to either natural or human influences. Scientists from all over the world have been working to find out the cause and impacts of climate change, for more than a century but there are still gaps in our knowledge. However, most of the experts feel that human activities are having an adverse effect on our planet.

Anthropogenic activities related to consumption of fossil fuels are mainly responsible for the GHG emissions. These emissions in the atmosphere are attributed to create a greenhouse effect subsequently leading to global warming².

Greenhouse Effect

The earth has atmospheric energy which supports life. The chemical composition of the atmosphere is nitrogen (78%); about 21% is oxygen, which all animals need to survive; and only a small percentage (0.0379%)² is made up of carbon dioxide which is required by plants for photosynthesis. To maintain life-sustaining conditions on earth, each day, energy from the sun — largely in the visible part of the spectrum, but also some in the ultraviolet and infrared portions — is absorbed by the earth atmosphere **Figure 2**.

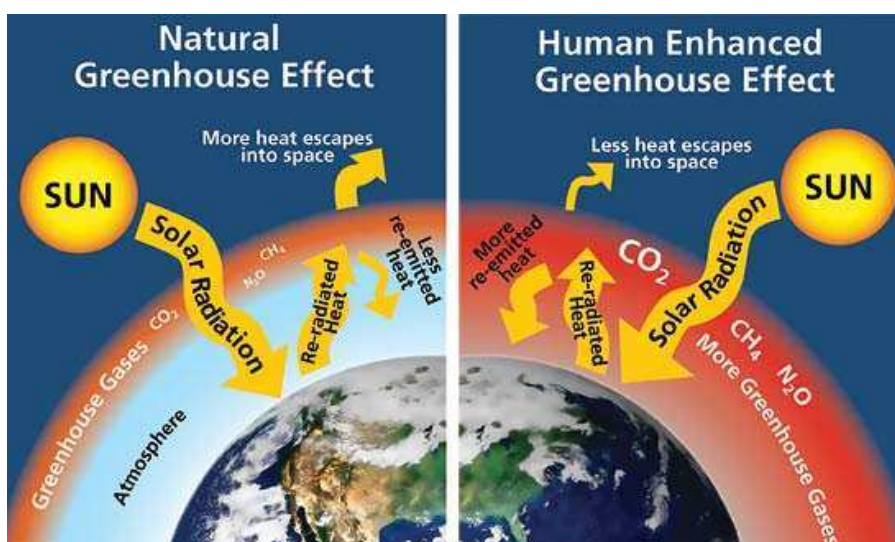


Fig. 2: Schematic of Greenhouse gas effect

If all this energy were to be absorbed completely, the earth would gradually become hotter. But actually, the earth absorbs and, simultaneously emits/reflects energy in the form of infrared waves (which cannot be seen by our eyes but can be felt as heat). About 31%² of incoming energy from the sun is reflected back in space while the rest reaches the earth, warming the air, oceans, and land, and maintaining surface temperature of earth. All this reflected heat is not lost to space but is partly absorbed by some gases present in very small (or trace) quantities in the atmosphere, called GHGs. These gases re-emit some of this heat to the earth's surface and prevent the escaping of heat from the earth's atmosphere and hence maintain the temperature favourable to support life on earth. However, disproportionate and unjustified increase in the GHGs lead to global warming.

² As defined by IPCC:6

Global Warming

It has been observed that, the atmospheric concentrations of CO₂, CH₄, and N₂O have grown by about 31%, 151%, and 17%, respectively, between 1750 and 2000.¹⁰ Since the early 20th century, the earth's mean surface temperature has increased by about 0.8°C (1.4°F), with about two-thirds of the increase occurring since 1980. This effect is termed as global warming which has a direct impact on the global climatic conditions, termed as Climate Change. Warming of the climate system is unequivocal, and scientists are more than 90% certain that it is primarily caused by increasing concentrations of GHGs produced by human activities, such as the burning of fossil fuels and deforestation.

Climate Change and India

National Action Plan on Climate Change (NAPCC) was released in June 2008 which emphasised on climate change and eight missions in the context of India. It identifies measures for promoting development objectives while yielding co-benefits for addressing climate change effectively. In August 2009, the Hon'ble Prime Minister of India urged each state government to create its own state-level action plan consistent with strategies in the national plan. In the light of this initiative, a nodal agency under Ministry of Environment and Forests (MoEF) for climate change cooperation and global negotiations was appointed as the Climate Change Division of MoEF. It functions as a nodal unit for co-ordinating the NAPCC. Many other initiatives like preparing the GHG inventory, under the National Communications (NATCOM) for the base year 1994, detailed work on estimation of sectoral GHG emissions, and identification of country-specific emission factors in the vulnerable sectors, have been developed. It also looks at a detailed vulnerability and adaptation assessment as a part of the National Communication Project.

India faces the challenge of providing massive infrastructure to its growing population while adopting a low carbon growth. It is estimated that the current level of per capita carbon dioxide equivalent emissions (CO₂e) in the country, i.e., 1.5 tonne per capita will increase to about 3 to 5 tonnes by 2030. As per this report the per capita emission for Satara city is 0.4 tCO₂eq and that is well below the national average.

International Council for Local Environmental Initiatives (ICLEI) has undertaken a similar study for 54 South Asian cities in 2009. Although the methodology followed as well as the area considered by ICLEI and The Energy and Resources Institute (TERI) for their respective studies are different, the cumulative and per capita emissions as estimated by both the studies are comparable. The cumulative emissions for both the studies fall in the range of 4-6 Million tonnes CO₂e whereas per-capita emissions fall in the range of 1.3–1.5 tonne CO₂e. Given the estimations of CO₂ emissions provided by ICLEI for 54 South Asian cities a comparative assessment of cities performance in terms of CO₂ emissions may be undertaken.

GHG Emissions and Satara City

The SMC aims to understand its current pattern of carbon emissions, in order to plan specific strategies/interventions to reduce the same. Thus, SBS Phoenix Enviro has conducted a detailed GHG inventory for the city of Satara (SMC limits). International Council for Local Environmental Initiatives (ICLEI) has undertaken a similar study for 54 South Asian cities in 2009³. Although the methodology followed as well as the area considered by ICLEI and The Energy and Resources Institute (TERI) for their respective studies are different, the cumulative and per capita emissions as estimated by both the studies are comparable.

Report Structure

Chapter 3 describes the standard methods and guidelines that are used for estimating and reporting city-level emissions and further presents the estimation methods used in some cities around the world. Chapter 3 gives the methodology used for the carbon inventory of Satara. Chapters 4 and 5 describe the present levels of energy and fossil fuels consumed in the city. The resulting emissions and carbon profile of the city from the use of energy is highlighted in the concluding section of this report.

³ ICLEI (2009) *Energy and Carbon Emissions Profiles of 54 South Asian Cities* New Delhi: British High Commission
http://www.iclei.org/fileadmin/user_upload/documents/Global/Programs/CCP/CCP_Reports/ICLEI_Indian_Cities_2009.pdf

3. Carbon Inventories of Cities: A literature review

Energy consumption is, by far, the greatest contributor to climate change, representing 80% of GHG emissions⁴. Two-third of world energy demand is consumed in cities⁵. This will increase to higher levels as the current global share of urban population of 50% in 2010, continues to increase⁶. It is, therefore, important that cities track their energy consumption pattern and estimate their GHG emissions in order to identify low carbon growth pathways.

A large number of cities have started to conduct their carbon inventories to evaluate their contribution to climate change. However, while it has been estimated that 81% of the increase in global energy demands by 2050 will take place in cities of the developing world; urban carbon inventories have mostly been limited to cities of the developed world. Cities like New York, Bloomington, London, and cities from the European Union (EU), have been documenting their carbon inventories and set targets to reduce them as against their baseline emissions. A target is the reduction of a specific percentage of GHG emissions from a baseline date, to be achieved by a set date or timetable (e.g., 2008–12). Under the Kyoto Protocol, the EU agreed to reduce its GHG emissions in the commitment period (2008–12) by 8% as compared to their emission levels in 1990.

It is important to undertake these studies in developing countries as well, by taking the lessons and learning from the inventories prepared in the cities of the developed nations, in order to follow the right inventory approach. A study undertaken by ICLEI attempted to estimate the emissions from 54 cities in South Asia. The report documents the estimated emissions from cities of developing countries like India, Bangladesh, Bhutan, Sri Lanka, and Nepal. This chapter attempts to understand the internationally accepted practices and case studies and summarizes the key points to be considered while designing an urban carbon inventory.

3.1. Steps for Preparing Urban Carbon Inventories

This section describes broadly the steps that have been followed to prepare the carbon inventory:

- (i) Understanding internationally followed general guidelines to prepare city-level carbon inventories
 - (ii) Defining the scope of the study for estimating emissions
 - (iii) Determining the method and extent of reporting
 - (iv) Identifying the right data source to estimate the level of emissions
 - (v) Choosing the appropriate timeframe for the reporting
 - (vi) Developing the GHG model
-

⁴ IPCC (2007). *Synthesis Report*, UNFCCC. Geneva: International Panel on Climate Change

⁵ IEA (2008). *World Energy Outlook*.: International Energy Agency

⁶ United Nations, Department of Economic and Social Affairs: <http://esa.un.org/unup/>

The International Standards for Determining Greenhouse Gas Emissions for Cities (ISDGGE⁷), a joint document by UNEP, the World Bank, and the UN-HABITAT gives guidelines for urban carbon inventories. According to the guidelines, the urban carbon inventories should be “transparent, consistent, comparable, complete and accurate”; they should hence follow IPCC guidelines to determine emissions from major sources (to satisfy transparency and comparability requirements).

A brief description of the terms as defined by IPCC guidelines 2006 is presented hereafter:

Transparency

There is sufficient and clear documentation such that individuals or groups, other than the inventory compilers, can understand how the inventory was compiled and can assure that it meets the good practice requirements for national GHG emissions inventories.

Consistency

Estimates for different inventory years, gases and categories are made in such a way, that differences in the results between years and categories reflect real differences in emissions. Inventory annual trends, as far as possible, should be calculated using the same method and data sources in all years and should aim to reflect the real annual fluctuations in emissions or removals and not be subject to changes resulting from methodological differences.

Comparability

The GHG inventory is reported in a way that allows it to be compared with other GHG inventories for other countries, cities or regions. This comparability should be reflected in appropriate choice of key categories.

Completeness

Estimates in the inventory are reported for all relevant categories of sources and sinks, and gases. Where elements are missing their absence should be clearly documented together with a justification for exclusion.

Accuracy

The GHG inventory contains neither over- nor under-estimates. This means making all endeavours unbiased from the inventory estimates.

⁷ http://www.unep.org/urban_environment/PDFs/InternationalStd-GHG.pdf

3.2. The Scope of the Carbon Inventory and Addressing the Issue of Double Counting

Double counting is one of the main issues with carbon inventories especially that of cities, since activities related to the city are not limited to municipal jurisdiction limits. The ISDGGEC document⁸ suggests that while preparing the carbon inventory, emissions generated outside the city (jurisdiction under consideration) from activities such as energy generation (electricity), aviation and marine freight, as well as, from waste that is generated within cities should be integrated in the city's inventory. However, this might result in the problem of double counting. For instance, emissions from waste generation occurring at a particular location may be accounted in the inventory of the location of waste disposal, which might be outside the SMCs jurisdiction. Therefore, the scope, of emissions should be defined clearly, in order to identify sources that are included in the inventory, so as to avoid double counting.

The three scopes defined as per the ISDGGEC document are as follows:

- ❖ Scope 1: GHG emissions occurring within the territorial boundary of a given area.
- ❖ Scope 2: Also includes indirect emissions occurring outside the given area as a result of energy being consumed within the area (e.g., electricity uses and solid waste treatment).
- ❖ Scope 3: Includes indirect emissions occurring outside the given area, other than those defined in Scope 2. They include electrical transmission and distribution losses, solid waste disposal, waste incineration, wastewater handling, aviation, marine, and embodied emissions upstream of power plants in fuels and in imported materials.

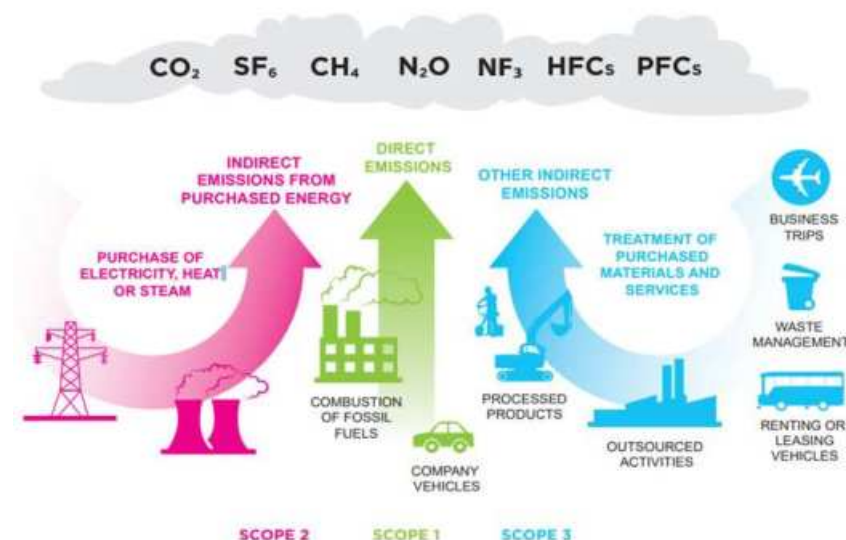


Fig. 3: Scope for emission inventory as per ISDGGEC document

⁸ http://www.unep.org/urban_environment/PDFs/InternationalStd-GHG.pdf

The Method and Extent of Reporting

There are different ways to report carbon emissions of cities or any type of physical entity. Many GHGs may be insignificant and hard to monitor. Their reporting can be time consuming and of little added value to the study. The ISDGGECC document suggests that inventories may focus on gases representing 95% of emissions. Therefore, gases such as CO₂ and CH₄ are considered for reporting, and gases with minor overall impacts such as SF₆, CF₄, and so on, are left out for the sake of clarity and efficiency of the estimates.

Further, GHG emissions can be either reported by energy source (e.g., emissions from electricity, oil, heat, and so on) or by sector (e.g., emissions from residential sector, industrial sector, and so on). The ICLEI and IPCC recommend the use of sector analysis as it provides more information on increase/decrease in energy consumption of various categories of high/low emitters. The sector analysis proves more valuable for policy-makers.

3.2.1. Identification of the Appropriate Data Sources

Residential, commercial, industrial

The main rule to follow is that emissions should be reported in common units (i.e., CO₂ equivalents). Emissions from residential, commercial, and industrial sectors are fairly straight forward to compute, given standard assumptions (i.e., efficiency of devices), carbon emission factors of fuels used, and data on fuel consumption of each sector. Such data can either be derived from fuel bills or directly from energy providers or surveys.

Waste

Emissions from waste can prove harder to obtain. On top of the quantity of waste generated by the city, knowledge of the average composition of waste and the way in which the waste is being processed is also required to be known. Composition of waste gives information on the carbon content of the waste material, which is generally highly variable in nature. The way in which the waste is actually processed determines the actual level of emissions. If the waste is recycled there are hypothetically zero-emissions; if it is burnt then it releases carbon dioxide and ashes; and if it is processed anaerobically, then it results in producing CH₄ and other solid by-products. Such information is available only at the regional level and assumptions have to be made for estimating the city-level information.

Transportation

Emissions from transportation can be obtained in two ways. The first method involves estimation of emissions by using the data on quantities of fuel sold at petrol stations within the city. The average emission factors are applied depending on the characteristics of the fleet (i.e., the share of cars, trucks, and two-wheelers) to obtain the level of emissions. The second method to estimate emission levels is to obtain data on average Vehicle-Kilometres- Travelled (VKT) within the city from transport municipal offices. Such data is generally measured and available in terms of peak VKT per day. A correction factor is applied to such VKT figures to convert the information into average VKT per year. Emissions are derived from these numbers by applying constant emission factors depending on the characteristics of the vehicle fleet.

Defining the Time Frame of Analysis

Another challenge in reporting the carbon inventories of urban centres is in defining the proper time frame for analysis. Emissions should not only be estimated for the present situation, but it is also important to understand the evolution of emissions over a given period of time. The problem mostly rises in the fact that, it is often hard to trace reliable historical data on energy consumption or CO₂ emissions.

Developing the Right GHG Model

GHG emissions can be estimated by using any spread sheet software (e.g., Microsoft Excel), provided users have the right information on emission factors. Spread sheet models can be developed (with country-specific emission factors) to estimate GHG emissions. The above discussed guidelines have been considered while drawing up the methodology of carbon inventory for Satara. Some international and domestic initiatives of estimating city level inventories have also been reviewed to devise the methodology (Appendix 1).

4. Satara City Greenhouse Gas Inventory

This is the first among a list of steps for the city to take mitigation actions aiming at reducing the city's carbon emissions. Based on the results of this study, the city would have to set before itself an emissions reduction target for a particular forecast year and develop a climate action plan. Subsequently, the results of the action plan and policies have to be monitored and results need to be verified and compared versus this baseline carbon inventory exercise.

4.1. Objectives

The objectives of documenting the carbon inventory for Satara city are as follows:

- To determine the baseline carbon inventory and estimate the carbon footprint of Satara city
- To map the sources of GHG emissions
- To develop a source apportionment of the GHG emissions

4.2. Study Area

The carbon inventory has been undertaken for the SMC area. All key urban activities taking place within the administrative boundaries of SMC have been considered while estimating the carbon emissions. The urban services like sewage treatment and solid waste collection in the city area is provided by SMC. Also, MSEDCL supplies electricity to households in Satara city area. Hence, the data collected and per-capita calculation for emissions includes population of Satara city.

Identification and collection of the appropriate data sources from SMC and other nodal authority.

4.3. Methodology

The inventory methodology designed for the study draws from the carbon inventories and the general guidelines reviewed in Chapter 2. The methodology developed also had to take into account specificities of Satara city (data limitations, size of the area, etc.). Hence, different existing methods were combined and adapted in order to come up with a coherent and rigorous framework that respects the main guidelines of the IPCC (2006) as well as the guidelines given by the UNEP.

4.3.1. Time period

The time period chosen to document the inventory spans between 2021 - 22. This is the most recent and relevant time frame after COVID period on which data could be retrieved and compared.

4.3.2. Study Scope

Scope 2 is chosen for the inventory of Satara City, i.e., emissions released at the point of use within the city, as well as, emissions released outside the city boundaries, but related to energy consumed within the city. The inventory includes carbon emissions from energy consumption, municipal waste disposal sites, and sewage treatment. It is acknowledged that there may be a few other activities within the city — apart from energy consumption, municipal waste disposal sites, and sewage transport by pipelines — that may contribute to carbon emissions, however, the contribution of these activities is understood to be very small. These small activities may include use of coal for tandoors in hotels, use of fire-wood by population Below Poverty Line (BPL). Hence, it was decided to consider only sources of energy consumption, municipal waste disposal, and sewage treatment sites while estimating the carbon emissions from Satara city.

A schematic depicting the sources of carbon emissions mapped while developing the carbon inventory for Satara city is presented in **Figure 4**.

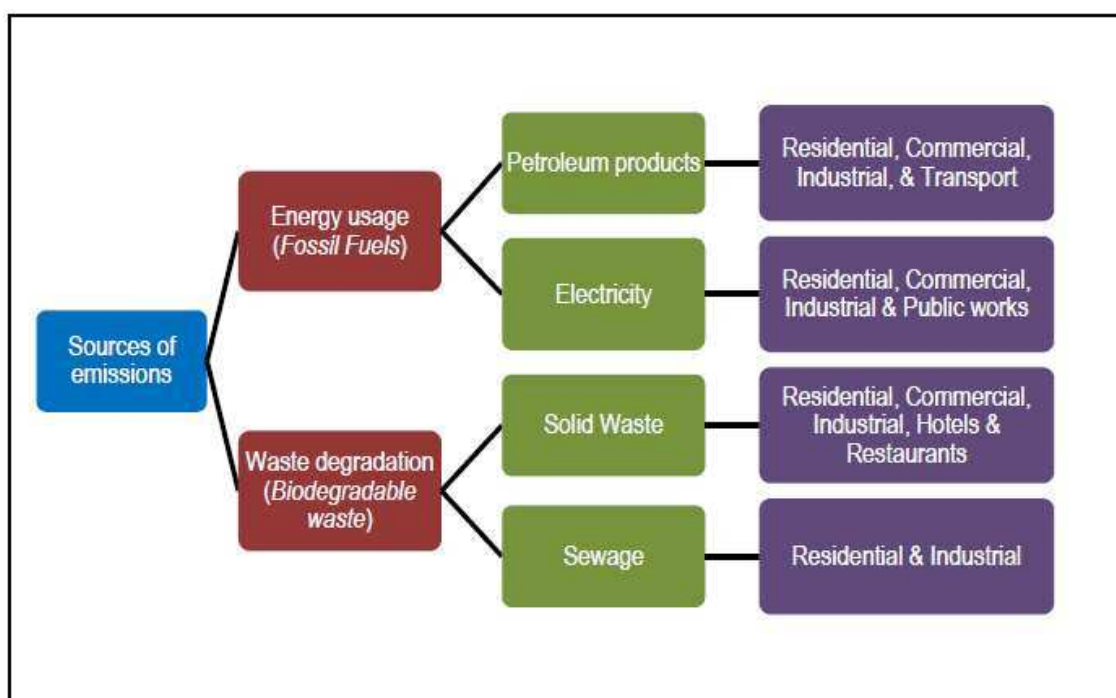


Fig. 4: Sources of emissions for Satara city

As per IPCC and ICLEI’s recommendations, emissions from aviation are reported for comparison purposes only. Since the uncertainty around these estimates is much higher than for emissions from other sources, i.e., residential, commercial sectors, they should be read separately.

The embodied carbon in consumption of goods and services which is present on account of their production/delivery is not accounted in the carbon inventory, to avoid any double counting. It is understood that if the goods are being produced within the city limits, the carbon emissions due to their production and delivery, will be reflected in emissions of manufacturing and transportation sectors of the city. If goods

are being produced outside the city, their carbon impact will be accounted in the inventory of their place of production and not in the Satara city inventory.

Survey was conducted in the month of Dec. 2022 and Feb. 2023 to identify the appropriate data sources. During these surveys, primary and secondary data were collected from Municipal Corporation and other government departments to assess the data accuracy and estimation of carbon dioxide emissions from these sources.

4.3.3. Sectors of Activity

The sectors identified for the study and the energy sources considered in each of these sectors are given in Table 2.

Table 2: Sectors identified for carbon inventory

Sectors	Fuels used
Residential	Electricity, LPG,
Commercial	Electricity, LPG,
Industrial	Electricity, LPG, Diesel, Furnace oil
Transportation	Petrol, Diesel, CNG, LPG
Utilities/Municipal services	Petrol, Diesel, Electricity

Note: Apart from the sectors listed above, electricity usage through High Tension consumption was not available with sector classification. Hence information regarding, HT has not been accounted.

4.3.4. Greenhouse Gases Included for Assessment

As defined by the IPCC, a GHG is a gas in the atmosphere that absorbs and emits radiation within the thermal infrared range and this process is the fundamental cause of the greenhouse effect. The primary GHGs arising due to anthropogenic activities are CO₂, CH₄, and N₂O. The sources of emissions at the city level can be segmented into emissions from energy usage (fossil fuel) and waste generation (see Figure 4). The nature of emission profile from both these activities, are very different which are discussed below.

Carbon Inventory of Energy Consumption

The carbon inventory of energy consumption in the end-use form of electricity or petroleum products focuses on CO₂ emissions only. It does not include CH₄ and N₂O emissions due to energy consumption. In a study conducted by TERI⁹. on estimating the carbon footprint of urban energy use, it was observed that

⁹ TERI (2009) *Estimating Carbon footprint of urban energy use in India and China (Phase II)*: New Delhi: The Energy and Resources Institute, 124 pp, project code 2008 UD04

the CH₄ and N₂O emissions released due to urban energy consumption activities, are insignificant compared to CO₂ emissions. As per this study, the share of CH₄ and N₂O in the per capita CO₂ equivalent emissions from urban energy use in Jaipur city was less than 4%. IPCC (guidelines 2006) also states that CO₂ emissions account typically for 95% of the energy sector emissions with CH₄ and N₂O responsible for the balance.

Carbon Inventory of Municipal Waste Disposal Sites and Sewage Treatment

The carbon inventory of municipal waste disposal sites and sewage treatment within the city focuses on CH₄ emissions. These activities release significant amount of CH₄ on account of anaerobic digestion or fermentation of biodegradable materials.

4.3.5. Tier 2 Emission Factors and Scope 2 Approach

The study uses the Tier 2 emission factors, in line with the IPCC (2006) guidelines. The calculation of carbon emissions is based on national emission factors, assuming a single conversion technology for each fuel in residential, commercial, and transportation sectors.

4.4. Main Assumptions

4.4.1. Fuel Sales Data is Equal to Fuel Combustion

In order to calculate CO₂ emissions, data on fuel combusted in different sectors is needed. Since, it is difficult to obtain the data on actual fuel combusted; it is assumed that the fuel sold in the city is equal to the fuel combusted.

There may be cases where fuel sold within the city is used outside the city. Ideally this fuel consumption should be discounted from total fuel consumption but since it is difficult to estimate this amount of fuel, we assume all fuel sold within the city is being used for the city activities only. Also, it may happen that some part of the fuel used in the city is bought from outside the city limits but used within the city. Ideally, this fuel consumption should be added to the fuel consumption data for the city but since it is difficult to estimate this data, it is not included in the city estimates. This approach is consistent with IPCC guidelines 2006, which recommends that the emissions from fuel should be attributed to the place where the fuel is sold.

4.4.2. Petrol, CNG, and Auto LPG Sold at Petrol Pumps are Used for Transportation Sector Only

It is assumed that the petrol, CNG, and Auto LPG sold at fuel stations (petrol pumps) are used for the transport sector only. There may be cases that some part of these fuels sold at fuel stations is used for purposes other than transport. However, it is felt that the share of this fuel will be very small and hence it is assumed that 100% of petrol, CNG, and Auto LPG sold at fuel stations are used for transport sector only.

4.4.3. Diesel Sold at Petrol Pumps is Used in Diesel Engines (Mobile and Stationary) that have Similar Emissions Profile

In addition to its use in the transport sector, some part of diesel sold at petrol pumps may be used in diesel generators used for power back-up. Since it is difficult to segregate the diesel sales, it is assumed that all diesels sold at petrol pumps is used in diesel engines (mobile and stationary) that have the similar emissions profile.

5. Energy Consumption and Emissions

5.1. CO₂ Emissions due to Electricity Consumption

The nature of CO₂ emissions from electricity consumption is directly dependent on the manner in which the electricity is generated. All regional grids have been integrated as a single Indian Grid covering all the states in December 2013. Small power exchanges also take place with the neighbouring countries Bhutan, Nepal, Bangladesh and Myanmar. For the unified grid, the main emission factors are calculated in accordance with the relevant CDM methodologies. CEA will continue updating the database at the end of each fiscal year.¹⁰ As per CO₂ Baseline Database for the Indian Power Sector, Version 18.0 the Combined Margin is equal to 0.92 tCO₂ eq.

Electricity Consumption

Year 2020-2021		Year 2021-2022	
Consumers	Units	Consumers	Units
64142	5590616	65858	5779934

Electricity Consumption in Satara Urban Sub-Division for The Year 2021-202

Tariff Category	Consumers	Units in KWh
Residential	65858	5779934
Commercial	10688	1767184
Industrial	1234	2582405
Public Services	66	127137
Street-Light	153	203747
Public Water Works	13	11148
Sewage Treatment	5	338
Total	78017	10471893

An example is provided to help understand the calculation process.

Electricity use in residential sector in Satara 10472MWh [A]

The CO₂ emission factors of 0.92 t CO₂eq. [B] given above as per CEA database have been used to derive CO₂ emissions by multiplying with the overall electricity usage numbers.

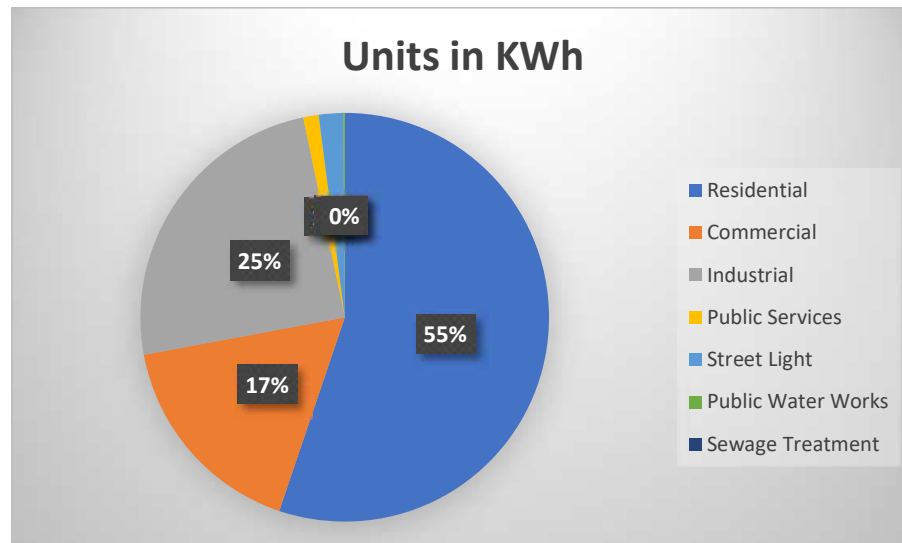
The CO₂ emission from electricity consumption is 9634 tCO₂e [A*B]

Annual Renewable Energy Consumption in Satara City is 151MWh and recently 1.5 MW of solar plant has been installed, thus the total CO₂ emission reduction from the renewable sources amounts to 2154 tCO₂ eq.

¹⁰ www.cea.nic.in

Based on the data collected from SMC, the annual CO₂ emission from fossil fuel consumption is 52,685 tCO₂ eq.

The residential sector which is responsible for 55% of the electricity use within the city in 2021–22 was responsible for 55% emissions. The commercial and industrial setups generated emissions of 1626 tCO₂ (16.87%) and 2579 tCO₂ (25%), respectively, in the year 2021–22.



5.2. Fossil Fuel Consumption



Total fossil consumption in the year 2021-22 is as follows:

Total fuel consumption in the year 2021-22	litres
Petrol	8475666
Diesel	5784468

Total LPG gas consumption of Satara City (Domestic +Commercial)	15804 tonnes
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Emissions from Fossil Fuels	tCO2eq
Emission from Diesel	15271
Emission from Petrol	19240
Emission from LPG	18175
Total Emission from Fossil Fuels	52685

5.3. Renewable Energy

1.5 MW of Solar power plant has been commissioned and installed at site of waste depot for supplying power to waste and sewage treatment plant.

SMC launched Majhi Vasundhara under which subsidy of 5% was given to consumers for installation of solar rooftop.



5.4. Electric Vehicle

Under SMC 1800 two-wheeler and 114 three-wheeler have been distributed/soled by transport department of Satara, Maharashtra.

6. Solid Waste and Sewage

One of the major challenges faced by any urban centre revolves around the disposal of its waste, both solid-waste as well as sewage. Satara, is no exception, with a rapidly increasing population with higher per capita incomes and changing lifestyles, the magnitude of the challenge has also been increasing. This has resulted in the creation of larger quantities of waste at the residential units, restaurants, shops, and commercial units.

Solid waste management poses a major environmental challenge. Most of our cities are unable to manage their waste and litter almost everywhere marks most of our urban landscape. This is not a matter of visual pollution but also breeds diseases and causes ill health.

6.1. Solid Waste Management Practices in Satara:

Municipal Councils (MC) is responsible for collection, transportation and disposal of solid waste generated within the municipal limits. Households and establishments including hospitals, private nursing homes, restaurants, etc., deposit their wastes in communal waste storage bins, for subsequent collection (manual) and transportation to a dumping site.

Collected and Uncollected Waste from The Following Categories

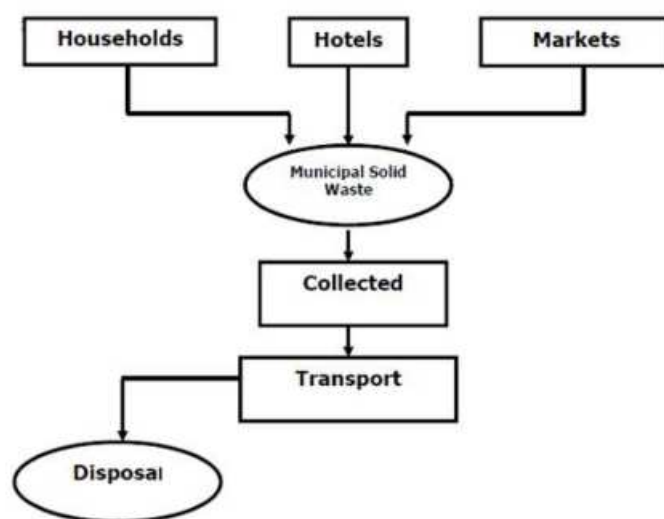


Fig. 5: Flowchart for collected and uncollected solid waste

Solid Waste Generation, Disposal & Collection, Solid Waste Treatment and Management.

- I. Daily Solid Waste Generation = 50.16 TPD
- II. Daily Solid Waste Collection = 50.16 TPD
- III. Daily Wet Waste Generation = 26 TPD
- IV. Daily Wet -Waste Collection = 26 TPD
- V. Daily Dry Waste Generation = 24.13 TPD
- VI. Daily Dry Waste Collection = 24.13 TPD
- VII. Daily wet Waste Processing = 26 TPD

Processing of wet waste by windrow composting of pit composting

- VIII. Daily compost production from wet waste = 3TPD
- IX. Daily dry waste Processing
 - a. Daily Hazardous and Sanitary waste generated = 0.33 TPD
 - b. Daily Hazardous and sanitary waste collection = 0.33 TPD
 - c. Daily H&S waste Processing = 0.33 TPD
 - d. Type of H&S waste Processing = By incineration Process
 - e. Capacity = 2 TPD
- X. A. Daily MRF generation = 23 TPD
 - a. Paper = 9 TPD
 - b. Glass = 1 TPD
 - c. Cloth = 2 TPD
 - d. Plastic = 10 TPD
 - e. Metal = 0.75 TPD
 - f. Non-recyclable = 0.25 TPD
 - B. Daily MRF Processed = 23 TPD
 - C. Daily MRF sold to vendor = 10 TPD
- XI. Daily C&D waste Generation = 0.8 TPD
 - a. Daily C&D waste Collection = 0.8 TPD
 - b. Daily C&D waste Management = 0.8 TPD

6.2. Physical Assessment of Solid Waste

Sr. No.	Type of Material	Commercial Area	Dump site		Household waste			Vegetable market Waste	Average
			Dump site (less than a year)	Dump site (more than 1 year old sample)	HIG -01	MIG-01	LIG-01		
		%	%	%	%	%	%	%	%
1	Plastic	21.52	17.56	18.56	8.29	7.42	4.93	4.1	9.3
2	Paper	19.87	4.39	3.5	6.81	8.2	6.34	2.54	8.8
3	Cloth	4.53	12.36	9.87	4.88	5.67	2.98	0.78	3.8
4	Bio-degradable	13.51	13.39	0	55.04	58.99	62.05	77.81	53.5
5	Leather, rubber, synthetics	2.91	33.58	19.61	7.75	7.98	4.38	0	4.6
6	Other (inert)	37.66	18.73	48.45	17.22	11.74	19.32	14.77	20.1

6.3. Solid Waste Disposal

As per the SMC estimates, majority of the total amount of about 99 MT of solid waste that is generated by the city every day is scientifically treated at its waste depot facility.

Although at present most of the waste is treated scientifically, there is still some amount of emissions generated in the process. The following calculative methodology presented in **Equation 3**, as prescribed in the IPCC 2006 guidelines for GHG emissions inventory for estimating the emissions from SWD is used to calculate the emissions in Satara.

Methane Emissions (MT/yr) =

$$MSWT \times MSWF \times MCF \times DOC \times DOCF \times F \times (16/12) - R \times (1 - OX)$$

where:

MSWT = total MSW generated (MT/yr)

MSWF = fraction of MSW disposed to solid waste disposal sites

MCF = methane correction factor (fraction)

DOC = degradable organic carbon (fraction)

DOCF = fraction DOC dissimilated

F = fraction of CH₄ in landfill gas (default is 0.5)

R = recovered CH₄ (MT/yr)

OX = oxidation factor (fraction - default is 0)

Variable Values and Calculated Emissions from Solid Waste Disposal in 2021–22

Total MSW generated 18,308.4 MT/year

% of MSW disposed to landfill sites	5%
Methane correction factor*	0.6
Degradable organic carbon	56%
Fraction DOC dissimilated*	0.5
Fraction of CH ₄ in landfill gas*	0.5
Recovered CH ₄	0%
Oxidation factor	0
Calculated CH ₄ emission	23 MT/year
Total CO ₂ equivalent emissions	571 MT/year

Bio-Medical Waste Treatment

SMC has contracted third party M/s. Nature in Need for Biomedical Waste Treatment of Satara city.

SMC team collects biomedical waste on daily basis and incineration is done. Waste is collected on daily basis and the monthly average is 25 tonnes of waste collection.

The BMW is treated in accordance with Maharashtra Pollution Control Board and adhering to

- Conditions under the Water (P&CP) Act, 1974
- Conditions under the Air (P&CP) Act, 1981
- Conditions under Hazardous and other Wastes (Management, Handling & Transboundary Movement) Rules 2016,

Biomedical wastes are transported within allocated jurisdiction. The body of vehicles used for BMW transportation is painted from outside with coloured symbol of Biohazard and Cytotoxic as shown below:-



Satara Hospital Association of Satara, maintain and keep record of hospital waste management. On daily basis the bio medical waste generation data is recorded.

Dumpsites Identified in the City

At the Songaon Depot, Survey number – 84, Satara, 100% remediation of legacy waste completed by March 2022 and the amount waste remediated is 57,355 (ton) and the area reclaimed is 1.1 acre.

Clean Air & Habitable Environment of Satara City- Satara Municipal Council collects the waste from all the 20 wards with the help of Ghantagadis which are available in 40 Numbers. The waste is collected in segregated manner at source itself which helps the council in further treatment & processing of the waste. For wet waste collected the city promotes the residents to opt for home composting providing them 5% concession in Property Tax. The dry waste is further processed through Trommel machine & sent for reuse also the city has an operational sanitary landfill. A separate plant is available which treats the Sanitary Waste & Domestic hazardous waste by adequate method. C & D waste has been collected by the separate vehicle & the materials thus segregated kept at site and reused for road construction & filling up of the backfill for building construction. There are 3 vehicles for desludging available in city for the collection of the sept age from the households, the city strictly follows scheduled desludging as it has helped in improving the quality of environment as whole further with the FSTP of 50 KLD capacity the waste is treated & then used as a manure in gardens & plants, the water obtained disused in gardens for watering. Apart from this the city undertakes the activity to have the air quality to get monitored in each month & it has come to the conclusion that the Air Quality Index is excellent & very much habitable for the environment & for the ecosystem of the Satara City.

Landfill Site and Waste Segregation Depot



Pic. 1: Sludge treatment plant at Saogaon



Pic. 2: Garden from Waste management at Saogaon



Pic. 3: Installation of 1504 KW Solar Power System on Compost Depo for Satara municipal council



Pic. 4: Landfill site at Saogaon



Pic. 5: Garden from waste at Landfill site



Pic. 6: Biomining at Soangaon waste management depot



Pic. 7: Sludge treatment facility and drying bed



Pic. 8: garden preparation from waste management



Pic. 9: Landfill area

6.4. Survey Analysis of Hotels in Satara

The present survey of hotels in Satara, is carried out to quantify tourism (within the hotel industry) and its role in the Satara economy. The target population of the survey includes hotels (5 Star, 3 star, 4 star and budget hotels) and the survey design is based on stratified sampling procedure through a set of 3 separate surveys.

Note that the Hotel & Restaurant Approval and Classification Committee (HRACC), set up by the Department of Tourism, classify the functioning hotels under the star system into six categories from one to 5-Star Deluxe. A new category of Heritage Hotels has also been introduced since 1994. The Department also re-classifies these hotels after every four years to ensure that these hotels maintain the requisite standards. The Committee set up for the purpose has representatives from Department of Tourism, Government of India, State Governments and hotel and travel industry associations.

Some data relating to the average duration of stay by domestic and foreign tourists, total no. of hotels with no. of rooms and no. of beds and average physical characteristics of waste generation by hotels of the study areas are collected from the publications of the Central Pollution Control Board (CPCB), Goa Pollution Control Board and The Department of Tourism (Government of Goa) in India.

The information about tourist inflow, employment inclusive of wage levels, entry tax, size, revenue generated, budget allotted for the tourism site are collected. Information is elicited on type of hotel, structural characteristics, and location comprising distances from major tourist spots, no. of

beds, waste generated, treatment plants (if any), pattern of energy use, total water intake is also elicited. The survey results for hotels are given in the Annexure I.

Treatment and management of Sewage

FSTP

Capacity = 50 KLD

Daily Collection = 33 KLD

Processed = 33 KLD

STP = Nil

Work of STP plant is in progress at Karanje Tarf Satara. Capacity of STP Plant is 5.5 MLD. The project will end by May 2023

The default methane correction factors have been used for calculating the emissions based on the methodology suggested in the IPCC guidelines. As per the SMC's Sanitation Plan 2022, it has been assumed that 100% of the waste that is generated within the city is collected every day and dispatched to the appropriate treatment facilities.

Environment Friendly Idol Immersion

SMC has introduced environment friendly idol immersion method for Satara city. During festival season, idols are immersed in artificial pond and spot. With this innovative approach the water bodies of Satara City are clean and free from water pollution.





6.5. E-Waste Management

Electronic waste, also known as e-waste, is a growing concern in Satara city and around the world. With the increasing use of electronic devices and appliances, the amount of e-waste generated in Satara city has also increased. Proper management and disposal of e-waste is important to protect the environment and human health.

To manage e-waste in Satara city, several measures already taken by Satara Municipal Council (SMC):

Awareness campaigns: Raising awareness about the importance of proper e-waste management among the residents of Satara city can be effective in reducing the amount of e-waste generated. Awareness campaigns held in schools, colleges, and other public places.

Collection centers: Established collection centers for e-waste in different areas of Satara city can help in the proper disposal of e-waste. These collection centers can collect different types of e-waste such as refrigerators, televisions, computers, and mobile phones.

Recycling: Recycling of e-waste is an effective way to manage e-waste. The components and materials from e-waste can be reused to make new products. Companies specializing in e-waste recycling can be approached for this purpose.

Disposal: Proper disposal of e-waste is important to prevent environmental pollution. E-waste must be disposed of in accordance with the regulations set by the government. Hazardous e-waste must be disposed of separately.

In conclusion, proper management of e-waste is important to protect the environment and human health. Awareness campaigns, collection centers, recycling, and proper disposal are some of the effective measures that has been taken to manage e-waste in Satara city.

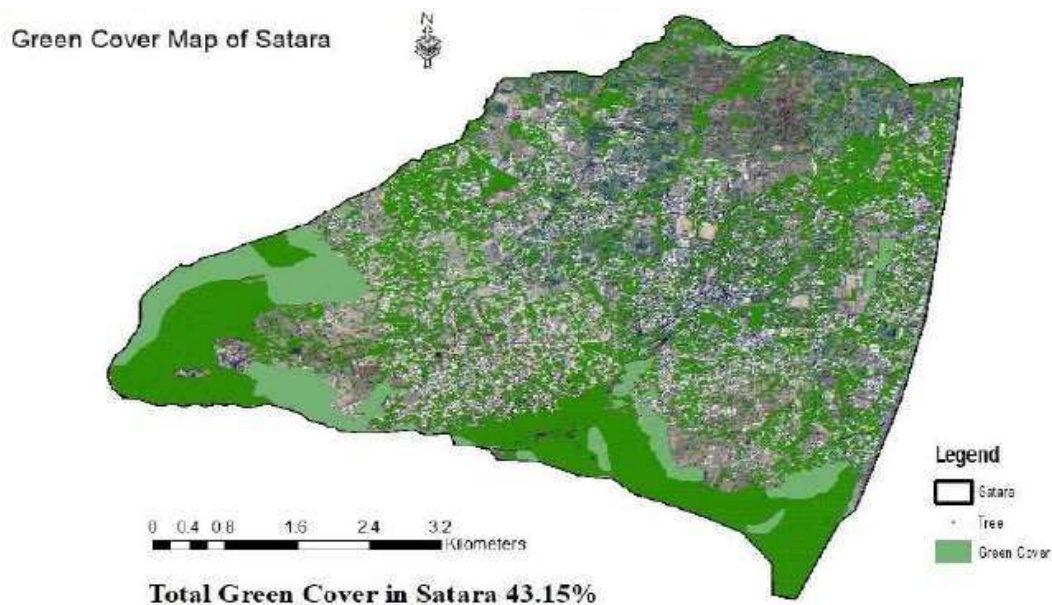
In Satara city, regular e-waste management is done by SMC. Annual average of e-waste in 0.275 tonne.

Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Total	Annual Average (tonne)
0.41	0.26	0.25	0.35	0.18	0.21	0.32	0.33	0.23	0.24	0.21	0.32	3.31	0.276

7. Forest cover & Biodiversity

7.1. Forest and Tree Cover

Satara city is well covered with forest trees and is good source of oxygen and sequestration of carbon-dioxide. The geographical area of Satara City is 26.5 square kilometer and 43.15% is green cover.



The details of the forest and tree cover in Satara city is mentioned in table below:-

Sl.No.	Particulars	Description
1	Forest and Tree cover in Satara City	1. Forest Cover – 5.18 sq.km. (518 Hect.) 2. Reserved Forest (Butterfly Garden) – 109 Hect. 3. Tree Cover – 512.5 Hect.
2	Land Use Change and Forestry Overview	Forestry and trees mainly contain Sa (<i>Tectona grandis</i>), Nilgiri (<i>Eucalyptus globulus</i>), Pimple (<i>Ficus religiosa</i>), Kadulimb (<i>Azadirachta indica</i>), Umber (<i>Ficus racemosa</i>), Jambhul (<i>Syzygium cumini</i>), Amba (<i>Mangifera Indica</i>), Awala (<i>Phyllanthus emblica</i>) etc.
3	Agricultural practices and livelihood in Satara City	Agriculture practices contains crops like Jawar, Sugarcane, Soyabeen, Wheat, maize and vegetables like Methi, Flower, Tomato, Coriander etc. There is no major industrial area except 3-4 industries, people mostly survive on shops like jewellery, textiles shops, cutlery, steel merchants, bakery and milk products, kirana shops, hotels, stationary and printing shops etc.

7.2. CO₂ Sequestration from Forest & Tree Cover

According to IPCC default value for typical sequestration rates for afforestation/reforestation, the CO₂ sequestration rate is determined.

Forest Types	in tonnes of carbon per hectare per year	Avg
boreal forests	0.8 to 2.4	1.6
temperate regions	0.7 to 7.5	4.1
tropics	3.2 to 10	5.16

Forest Cover in Satara City

Forest Cover in Satara	Ha
Forest Cover	518
Reserved Forest (Butterfly Garden)	109
Tree cover	512.5

CO ₂ sequestration	tCO ₂
Total CO ₂ sequestered	5879.82

Using IPCC default value¹¹ for the estimation of CO₂ sequestration from the forest and tree cover is 5,880 tCO₂e annually.

Biodiversity

Sustainable use of terrestrial biological resources plays a very important role in maintaining biodiversity. To achieve the AICHI Targets, some action plans have been drawn up to improve bioavailability at the local level. Maharashtra Biological Diversity Rules, 2008 have been implemented to promote the conservation of biodiversity.

Due to genetic variation and habitat diversity, the biodiversity of Satara city is rich and varied. disciplinary research, research papers, national and international reports, bioavailability website, g. i. S. References like GIS Tree Census PMC etc. have been used.

In terms of biodiversity, a total of 973 species of large trees, shrubs, weeds, vines, algae, fungi have been recorded. Also, a total of 689 species of rare mammals, reptiles, birds, insects, birds, fish, crabs, algae, snails, amphibians, microorganisms etc. have been recorded in Satara city.

¹¹ <https://www.fao.org/3/y0900e/y0900e06.htm>

Habitat biodiversity in the city is enhanced through restoration and reintroduction. Animal Rescue and Rehabilitation Centre has been established in Satara city with the help of Municipal Corporation and Indian Herpetological Society. Here the injured wild animals are treated and released back to their native place. Along with that, it is also an orphanage for animals that stray from the shelters of birds.

For the purpose of raising public awareness, various competitions and workshops are organized at Lajla Parshad Maidan. Animal Adoption Scheme is also implemented here. For preserving the dense old trees of the city, Harat Lake has been planted on some of the most popular trees in the city, viz. Powai Naka, Sainik School, Shahu Stadium, Gandhi Maidan etc. Also, this activity will be further strengthened.

Before starting any work like cutting/trimming of trees, it is imperative to obtain the permission of the Tree Protection Authority. At least 10 trees should be planted in place of the dangerous trees felled during civil works and if possible, transplant the big trees felled by root. This helps in curbing unnecessary felling of trees and indirectly helps in enhancing biodiversity.

There are 17 open spaces in Satara city and new layout approval is in progress. Plantation of trees is possible in the open space in the old layout and in the newly created open space. Plantation of 20000 trees will be possible through this. And this can increase the Harit Achadan of Satara city by 5%.

The city of Satara is an agriculture-provided city that encourages the farmers of the city to cultivate trees and 50% of the city is cultivated. At present the main agriculture is sugarcane cultivation. Currently the tendency towards agriculture is decreasing. If the farmers of Satara city are encouraged to do soil farming, tree cultivation is possible in 20% of the agricultural areas, through which 10% of the crop production will be possible.

In Satara city there are some vacant, abandoned, unutilized spaces which have been identified by Satara Municipality where Lathkani tree planting can increase 5% Harat area and also aim to prevent erosion at present.

Plantation of mangrove type plants in river-bed Satara city has got 10 lakhs of river Laknara. 20% if mangrove trees are planted in the river to stop the erosion due to annual floods.

Harat cover will be achieved, and it will be possible to stop erosion of river-banks.

Citizens of Satara city are tree lovers. If citizens plant trees in the open spaces near their houses, it is possible to increase the Harat income by 3 to 4%.

In the city of Satara, the city roads are 46 lakh m long and by planting two trees of that length, air pollution will be reduced, and oxygen will be increased to a large extent, and it is possible to increase the amount of waste by 10% by planting trees.

Plantation area | Harit area use

Plantation of trees using open space = 5 %

Encouraging urban farmers to take up tree farming = 10 %

Plantation of trees in plains = 5 %

Mangrove type vegetation in river-bed = 20 %

Plantation Encouragement of tree plantation on Vaysik land = 3 to 4 %

Cultivation of Dutaradh trees = 10 %



Pic. 10: Butterfly garden

8. Air Quality of Satara

Sample analysis of air was done by NABL accredited Lab in the month of March 2022. The air quality of Satara city was good and did not pose any health concern.

Parameter	Unit	Result	#NAAQM Standard	Method Reference
Discipline: Chemical Testing; Product Group: Atmospheric Pollution (Ambient Air)				
Location	Near Sadar Bazar		Duration of Survey	24 hours
Sulphur Dioxide (SO ₂)	µg/m ³	12.6	80	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.1-6
Nitrogen Dioxide (NO ₂)	µg/m ³	16.2	80	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.7-10
Particulate Matter (size less than 10µm) or PM ₁₀	µg/m ³	72	100	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.11-14
Particulate Matter (size less than 2.5µm) or PM _{2.5}	µg/m ³	31	60	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.15-30
Ozone (O ₃)	µg/m ³	<19.5	180	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.31-34
Lead (as Pb)	µg/m ³	<0.02	1.0	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.48-55

Parameter	Unit	Result	#NAAQM Standard	Method Reference
Carbon Monoxide (CO)	mg/m ³	0.96	4.0	CPCB Guidelines for the Measurement of Ambient Air Pollutants Volume-II, 2012-13, Page No. 16-22, (NDIR method)
Ammonia (NH ₃)	µg/m ³	<20	400	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.35-39
Benzene (C ₆ H ₆)	µg/m ³	<1	5.0	IS 5182 (Part 11): 2006
Benzo (a) Pyrene (Particulate phase only)	ng/m ³	<0.5	1.0	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.40-47
Arsenic (as As)	ng/m ³	<0.3	6.0	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.48-55
Nickel (as Ni)	ng/m ³	4.16	20.0	CPCB Guidelines for the Measurement of Ambient Air Pollutants, Volume I, 2012-13, Page No.48-55

9. Water Bodies in Satara

The Satara district is part of two main watersheds. The Bhima River watershed, which is a tributary of the Krishna, includes the north and northeast of the district, north of the Mahadeo hills. The rest of the district is drained by the upper Krishna and its tributaries.

The main rivers of Satara district are Koyna and Krishna. The Krishna is one of the three largest sacred rivers of southern India.

There are nine natural water bodies in Satara City. These water bodies serve the purpose for drinking water facility to the city and also a good source for forest and tree cover.

Annual Carbon Sequestration potential of Water bodies

The Kaas lake comes under the geographical boundary of Satara Municipal Corporation. This lake has the potential of carbon sequestration and an approximate estimation of carbon sequestered is done using the carbon burial rate in the water bodies such as lakes, lagoons and wetlands.

Annual Carbon Sequestration potential of Water bodies (Kaas Lake)		
Total area of Kaas lake	588124	square meter
Carbon Burial Rate ¹²	11.00	tonne/hectare/year
Total Carbon sequestered	647	
CO2 eq	2373.756	tCO2



Pic. 11: Futka Talav



Pic. 14: Kaas Lake



Pic. 15: Mahadare Lake



Pic. 16: Mangalwar Talav



Pic. 17: Moti Talav



Pic. 18: MT Tank



Pic. 19: Visarjan Talav



Pic. 20: Natural pond at village

Summary of Satara Municipal Council

The Satara Municipal Council is a local governing body responsible for the administration and development of the city of Satara in the state of Maharashtra, India. The council is comprised of elected representatives from various wards within the city. The main objective of the council is to ensure efficient and effective provision of various civic services to the residents of Satara.

The council is responsible for the maintenance of roads, street lighting, water supply, sewage and waste management, public health, and other basic infrastructure facilities within the city. It actively engages in urban planning and development activities to promote sustainable growth and improve the quality of life for its residents.

In addition to infrastructure development, the council also focuses on social welfare programs and initiatives. It provides healthcare facilities, education services, and promotes cultural and recreational activities for the community. The council strives to create a clean, green, and inclusive city that caters to the needs and aspirations of all its residents.

To ensure transparency and accountability, the council holds regular meetings and consultations with the citizens. It encourages public participation and feedback in decision-making processes and takes steps to address any grievances or concerns raised by the community.

The council also works in coordination with other government departments and agencies to implement various state and national schemes for the benefit of the city. It actively seeks grants and funds from the state and central governments to carry out development projects and initiatives.

Overall, the Satara Municipal Council is committed to the holistic development of the city and its residents. Through effective governance, strategic planning, and community engagement, it aims to transform Satara into a model city that provides a high quality of life for all its residents.

Satara Municipal Council taken a step to account its GHGs emission due to consumption of fossil fuel. The GHG emission from fossil fuel in Satara Municipal Council is 125 tCO₂eq. Thus, the net GHG emission is negative, and it is – 77 tCO₂eq.

Sectoral Emission	Total Emission CO ₂ eq	% emissions
Emission from electricity consumption	9634	93.3
Emission from Fossil fuel	125	1.2
Emission from Solid waste	571	5.5
Total Emission (C)	10330	

Total Emission Reduction

Carbon dioxide Removal and Sequestration (tCO ₂ eq.)	
CO ₂ removal from Forest	5880
CO ₂ reduction from Solar plant	2154
Total Carbon dioxide removal (CDR) (A)	8034

Annual Carbon Sequestration potential of Water bodies	
Total area of Kaas lake	588124
Carbon Burial Rate	11.00
Total Carbon sequestered	647
Total (tCO₂ eq) sequestered (B)	2373.756

Total Emission Reduction = (A) + (B) = 10408

Net Reduction = [A+B] –[C]

Net CO ₂ reduction (tCO ₂ eq.)	77
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Summary -Satara City

Satara is one of the first cities in India to document a detailed carbon emission inventory at the municipal level and by estimating its cumulative and per capita carbon footprint, it has set a unique example.

Conventionally, carbon footprint¹³ is defined as the accounting of the GHG emissions, resulting from the consumption of fossil fuels through various activities like transport, electricity consumption, and municipal solid waste and sewage degradation. Further, the values of GHG emissions are expressed in terms of CO₂ equivalents which help estimate the carbon footprint. The present carbon inventory is carried out for the period 2021–22 to map the latest GHG emission post COVID scenario. The study adopts the methodology as per the guidelines released by the Inter-governmental Panel on Climate Change (IPCC), United Nations Environment Programme (UNEP), UN-HABITAT, and the World Bank, to carry out carbon inventories at the national and city levels.

As estimated in the study, the carbon dioxide generated in Satara city is about 52,483 tonnes and 0.29 tCO₂e per capita emissions in 2021–22 and which is below the average per capita emissions 1.9 tonnes in 2021 of India. Petroleum and diesel use had the maximum contribution of 83.77% of the total CO₂e emissions, followed by Municipal solid waste and sewage contributed to 1.09% and electricity consumption which generated around 15.3% of emission. Also, the carbon sequestration from forest and tree cover in Satara city contributes to carbon-dioxide removal (CDR) by 11.3%. CO₂ emission reduction from the renewable sources amounts to 2154 tCO₂ eq. With this study, the result shows that the GHG emission level in Satara city is well below the national level as well as global per capita emissions.

Sectoral Emission	Total Emission CO ₂ eq	Sectoral emission %
Emission from electricity consumption	9634	15.32
Emission from Fossil fuel	52685	83.77
Emission from Solid waste	571	1.09
Total Emission	62890	

Carbon dioxide Removal and Sequestration (tCO ₂ eq.)	
CO ₂ removal from Forest	5880
CO ₂ reduction from Solar plant	2154
Total Carbon dioxide removal (CDR)	8034

¹³ Definition, as per World Resources Institute & World Business Council for Sustainable Development is provided in glossary section

Annual Carbon Sequestration potential of Water bodies	
Total area of Kaas lake	588124
Carbon Burial Rate	11.00
Total Carbon sequestered	647
Total (tCO2 eq) sequestered	2373.756

Net CO2 emission (tCO2eq.)	52483
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10. Conclusion

With this study it is inferred that the use of petroleum and diesel had the maximum contribution of 83.77% of the total CO₂e emissions, followed by Municipal solid waste and sewage contributed to only 1.09% and electricity consumption which generates around 15.3% of emission. Also, the carbon sequestration from forest and tree cover in Satara city contributes to carbon-dioxide removal (CDR) by 11.3%.

The per capita emission of Satara city is 0.29 tCO₂eq. which is well below the average per capita emissions of India i.e., 1.9 tonnes in the year 2021.

Sectoral Emissions

Sectoral Emission	Total Emission CO ₂ eq	Sectoral emission %
Emission from electricity consumption	9634	15.32
Emission from Fossil fuel	52685	83.77
Emission from Solid waste	571	1.09
Total Emission	62890	

Carbon dioxide Removal and Sequestration (tCO ₂ eq.)	
CO ₂ removal from Forest	5880
CO ₂ reduction from Solar plant	2154
Total Carbon dioxide removal (CDR)	8034

Annual Carbon Sequestration potential of Water bodies	
Total area of Kaas lake	588124
Carbon Burial Rate	11.00
Total Carbon sequestered	647
tCO₂eq	2373.756

Net CO₂ emission (tCO₂eq.)	52483
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11. Roadmap for Carbon Neutrality

Vision 2040 towards “Sustainability and Carbon Neutrality”.

Based on the results of this study, the city would have to set before itself an emissions reduction target for a particular forecast year and develop a climate action plan. Subsequently, the results of the action plan and policies have to be monitored and results need to be verified and compared versus this baseline carbon inventory exercise.

As per the current study report, the per capita emission 0.29 tCO₂eq. of Satara city is well below the national average. Many steps towards the environmental and health safety are already in place by SMC.

The per capita emission of Satara City is well below the level of national and world average. Inclusion of renewable energy sources will lead towards GHG neutrality. As the contribution from fossil fuel consumption is high. The implementation of CNG vehicles will curb direct emissions from vehicles.

Towards Carbon Neutrality

With implementation of renewable energy projects and carbon sequestration through forest and tree plantation carbon neutrality can be achieved from:

- ❖ Solar plant installation
- ❖ Hydro power plant
- ❖ Carbon sequestration through forest and tree plantation

Renewable energy projects like wind and solar plant will make the city carbon neutral and the conservation of forest and plantation activity will contribute towards carbon sequestration and making the air cleaner. In future the combined commissioning and installation of around forty megawatts of solar and wind power plant will make the city completely carbon neutral. Also, there is potential of developing landfill gas site in Soangaon location for mitigation of methane gas and utilization for power generation.

For better waste management, SMC to introduce:-

- Zero Plastic Model for Satara City
- Incorporating the ‘Garbage Free’, model across the Satara City

Considering the above best practices roadmap, Satara City will be one of the first carbon neutral city in India with high air and water quality for betterment of life.

Annexures

Annexure 1

Satara Nagar Parishad Satara Hotel List						
Hotel List						
Sr. No,	Name of Hotel	Name of Owner	Address	ward No	Daily waste Generated	Daily Waste Collected
1	Hotel Rajtara	Shri. Raju rukaram Bhosle	279 Karanje Satara	1	3.5 Kg	3.5 Kg
2	Hotel Maharaja Regency	Shri. Ravindra Baburao Chavan	174 Ravivar Peth Satara	4	3 Kg	3 Kg
3	Hotel Radhika Palace	Shri Harakchand Devli Shaha	288 Radhika Road Satara	1	4.9 Kg	4.9 Kg
4	Hotel Mayur	Shri.Kalpna Deambar Dhone	224 Ramach3 Got Satara	20	4.1Kg	4.1Kg
5	Hotel Ajantha	Shri. Dnyaneshwar Nivrutti Dhone	224 Ramacha Got Satara	13	5 Kg	5 Kg
6	Gole Snacks & Coldrinks	Shri Ramesh Krishna Gole	410 Guruwar Peth Satara	12	3.2 Kg	3.2 Kg
7	Hotel Lokpriy	Shri- Vasanttrao Shankar Dongre	1-2B Kamathipura Satara	5	3.7 Kg	3.7 Kg
8	Hotel Ambassador	Shri. Chandrashekhar Madhukar Chorge	478 Sadar Bazar Satara	1	4.4 Kg	4.4 Kg
9	Hotel Pearl	Shri. Ajitsingh Ramchandra Jadhav	52 Bhavani Peth Satara	13	4.9 Kg	4.9 Kg
10	Hotel Janseva Biryani House	Shri. Mahadeo Raghunath Patil	217 Ravivar Peth Satara	7	4.1 Kg	4.1 Kg
11	Hotel Savera	Shri. Digambar Nivrutti Dhone	224 Ramacha Got Satara	11	3.8 Kg	3.8 Kg
12	Hotel Dipafi	Shri. Dipak Vishwasrao Jadhav	497 SadarBazar Satara	6	5 Kg	5 Kg
13	Hotel Ratan Tea House	Shri.Hiraial Baburao Raval	4 Ravivar Peth Satara	6	3.1 Kg	3.1 Kg
14	Hotel Hind Tea House	Chabutai Baliram Malkapure	119 Shanivar Peth Satara	12	3 Kg	3 Kg
15	Hotel Maratha Khanaval	Shri.Ganpatrao Anandrao Mohite	174 B Ravivar Peth Satara	6	4.5 Kg	4.5 Kg
16	Hotel Unique Tea & Coldrinks	Shri. Shankar Patangrao Shinde	177 Pratapganj Peth Satara	11	4.7 Kg	4.7 Kg
17	Hotel Dadaj Biryani House	Shri. Shrikant Nandkumar Phadtare	178 Ravivar Peth Satara	1	4.9 Kg	4.9 Kg
18	Hotel White House	Shri.Sandip Vitthal Dhanwade	217 Ravivar Peth Satara	1	4.1 Kg	4.1 Kg
19	Hotel Kusum	Shri.Manoj Vijay Khataavkar	405 Mangalwar Peth Satara	19	5 Kg	5 Kg
20	Hotel Sourav	Shri. Amit Vijay Khataavkar	283 Karanje Satara	10	3 Kg	3 Kg
21	Hotel Dasbhavan	Shri. Dattatraya Dhulu Kachre	91 Malhar Peth Satara	7	3.1 Kg	3.1 Kg
22	Hotel Bharatbhuvan	Shri.Dilip Bhavarlal Purohit	3 Ravivar Peth Satara	6	5.1 Kg	5.1 Kg
23	Hotel Kusum	Shri.Hemant Kundlik Kanse	89 Yadogopal Peth Satara	15	4.4 Kg	4.4 Kg
24	Hotel Sayali	Shri.Jitendra Shashikant Ghorpade	173/3 Shanivar Peth Satara	6	4.9 Kg	4.9 Kg
25	Hotel Laxmi	Ashatai Vilasrao Deshmukh	620 Shanivar Peth Satara	12	4.7 Kg	4.7 Kg
26	Hotel Apurva	Shri.Dhansing Sadashivrao Kadarn	530 Sadar Bazar Satara	5	4.8 Kg	4.8 Kg
27	Hotet Ajinkya Restaurant	Ajinkya tara Sahakari Mandal Satara	1 Kesarkar Peth Satara	6	3.5 Kg	3.5 Kg
28	Hotel Ruchisagar	Shri. Charudatt Subhashrao Bagal	218 Shanivar Peth Satara	13	4.1 Kg	4.1 Kg
29	Hotel Rajesh	Shri.Subhashrao Laxmanrao Bagal	235 Somwar Peth Satara	5	5 Kg	5 Kg
30	Hotel Vikram	Shri.Moreshwar Gajanan Marulkar	14 Godoli Satara	5	3.9 Kg	3.9 Kg
31	Hotel Chandravilas Bhuvan	Indumati Shankarlal Joshi	356 Shanivar Peth Satara	12	3.8 Kg	3.8 Kg
32	Hotel New Aaram Coldrinks	Shri.Jayant Baliram Raut	279 Bhavani Peth Satara	11	4.7 Kg	4.7 Kg
33	Hotel New Satkar	Mangal Dattatraya Jagdale	42 Bhavani Peth Satara	11	4.1 Kg	4.1 Kg
34	Hotel Durgabhavan	Rohini Jagannath Naik	15 Ravivar Peth Satara	6	3.8 Kg	3.8 Kg
35	Hotel Shrikrishna	Shri.Ram Suryakant Raut	44 Malhar Peth Satara	12	3.2 Kg	3.2 Kg
36	Hotel Pearl	Shri.Ravindra Baburao Chavan	511/12 Sadar Bazar Satara	6	3.9 Kg	3.9 Kg
37	Hotel Shivprasad Bhuvan	Shri. Shivaji Gulabrao Bhange	80 Yadogopal Peth Satara	20	3.7 Kg	3.7 Kg
38	Hotel Bubbles	Priya Vijay Parchani	217 Shanivar Peth Satara	13	3.5 Kg	3.5 Kg
39	Hotel Greenfield	Shri.Pankaj taxman Uttekar	476/7 Sador Bazar Satara	4	4.2 Kg	4.2 Kg
40	Hotel Mayur Coldrinks House	Shri.Gurudas Bhairavnath Patil	178 Ravivar Peth Satara	12	4.9 Kg	4.9 Kg
41	Hotel Laxmi Bhavan	Anant Ganpat Zeple	743 Shanivar Peth Satara	12	4.1 Kg	4.1 Kg
42	Hotel Shivsagar	Shri.Dinesh Govind Nayak	218 Ravivar Peth Satara	1	3.8 Kg	3.8 Kg
43	Hotel Sitara	Samsher Sinh Ramchandra More Patil	312 Radhika Road Satara	1	4.5 Kg	4.5 Kg
44	Supnekar Caterars	Meena Supnekar	300 Yadogopal Peth Satara	16	4.4 Kg	4.4 Kg
45	Hotel Anugrah	Suresh Shesha Pujari	157 Bhavaru Peth Satara	13	5 Kg	5 Kg
46	Hotel Swad Restaurant	Seema Sunil Shinde	271 Bhavani Peth Satara	13	4.4 Kg	4.4 Kg

२। दि. २६ मार्च २०२३

गॉर्निंग

झिरो कार्बन सिटीसाठी सातारा पालिका सक्रिय

संक्षेप संधे

सातारा, दि. २५ - पर्यावरण, अन्नसुरासाठी व जलचक्राचे संतुलन राखण्यासाठी युनेस्कोने सुचित केलेल्या झिरो कार्बन सिटीसाठी सातारा पालिका निर्यात संतुलन कल्पनांना उदात्तगोवर्जाच्या अमलबजावणीकडे लक्ष देत आहे. हाचेतील कार्बनचे प्रमाण कमी करण्यासाठी येथे इको ग्रीन कन्स्ट्रक्शन संकल्पनेवर आधारीत नियमावली आणण्याचा विचार होत आहे.

जलपुनर्प्रेषण प्रक्रिया, नवीन बांधकामामध्ये पर्यावरणपूरक उपाययोजना, वृक्षारोपण, जलचक्र संवर्धन, अपारंपारिक उर्जा साधनांचा वापर याकरीता पर्यावरणामध्ये विशेष सवलत देण्याचे धोरण (५ टक्के सवलत) सातारा पालिकेने जाहीर केले आहे. त्यासाठी या योजनेला सातारकरांनी प्रसिद्ध छापा तर पालिका मंडळीसाठी एक पाऊल पुढे वेईस, असे आवाहन पालिकेचे प्रसारक अधिष्ठित वारंट यांनी केले आहे. देशातील श्वेत त्रिकोणी शहरे २०५० पर्यंत पर्यावरण संवर्धनाच्या दृष्टीने झिरो कार्बन शहरे बनविण्याचे धोरण केवळ शासनाने जाहीर केले आहे, झिरो कार्बन अर्थात

कार्बन कटवृत्ता म्हणजे कार्बन डाय ऑक्साईडचे वातावरणात उत्सर्जन होण्याचे प्रमाण व वातावरणातून कार्बन काढून टाकण्याचे प्रमाण यांचे संतुलन साधणे म्हणजे झिरो कार्बन सिटी होय. पर्यावरण, उर्जा, शेती व औद्योगिक प्रक्रियेशी संबंधित या संकल्पनेचा वापर होतो. उदा. उर्जा स्रोतांमध्ये बदल करणे सातारा पालिकेने कायद्यावर नैसर्गिक प्रक्रिया कळत त्याचे वितरणकरण, कोरप गौर उर्जेचा वापर, परगुली वापरामध्ये निघाती व व्यापारी इमारतींना रेन वॉटर हार्वेस्टिंग आदी योजनांच्या माध्यमातून पालिकेने झिरो कार्बन प्रक्रियेसाठी पावले टाकण्यास सुरुवात केली आहे.

इको ग्रीन इमारतीचे बांधकाम, अपारंपारिक उर्जा साधनांचा वापर आदी योजनांसाठी पालिकेने परगुलीमध्ये पाच टक्के सवलत अंदाजपत्रकाद्वारे जाहीर केली आहे. सातारा शहरात एकूण अस्मितीच्या सुल्लेख एकोणीस टक्के आहे. त्यामुळे पालिकेच्या खुल्या कार्यक्षेत्रात किमान पालिका टप्प्यात दोन लाख रोमंची लागवड हे बुध्दोरणाचे उद्दिष्ट वृक्ष विपणनाने निश्चित केले आहे. सातारा शहरात अजूनही रेन वॉटर हार्वेस्टिंग केवळ चार ते सहा टक्के

इतकेच आहे. यामध्ये वाढ करण्यासाठी पालिकेच्या अंतर्गत विभागाने कंसा कसली आहे, पालिकेच्या पाणीपुरवठा विभागाने मुद्रा झिरो वॉटर लॉसचा नारा दिला असून कोटकरी पेटवारी करण्याच्या मुद्द्यात वित्तीयपत्र यांना दिल्या आहेत.

झिरो कार्बन सिटी...

- ◆ भारत जगाच्या सात टक्के कार्बन उत्सर्जन करतो.
- ◆ ग्लोबल वॉर्मिंगचा धोका टाळण्याची आवश्यकता
- ◆ शंभर शहरे झिरो कार्बन करण्याचा केंद्राचा संकल्प
- ◆ 'इको ग्रीन'साठी घरपट्टीत सवलत देणारी सातारा पालिका एकमेव
- ◆ रेन वॉटर हार्वेस्टिंगसाठी पालिका घेणार कार्यशाळा
- ◆ शहरातील कार्बन उत्सर्जनावर येणार नियंत्रण

इको ग्रीन बांधकामांसह पर्यावरणपूरक योजनांना प्राधान्य

“ पर्यावरण संवर्धन व जल चक्र अर्थात नैसर्गिक संरचना अबाधित ठेवण्यासाठी शासन निर्देशित वैशिष्ट्यपूर्ण उपक्रमांतर्गत सातारा पालिकेने वाटचाल सुरू केली आहे. इको ग्रीन बांधकामे पाहिलेची काही स्थळं नियमावली तयार करत येईल का याचा निर्णय राज्यपाला सल्ल्यानेतर घेतला जाईल. स्वच्छ भासा अधिवसतांर्कण सातारा पालिकेच्या या वैशिष्ट्यपूर्ण प्रयत्नांची दखल घेऊन पोलीस जगण आहे

- अधिष्ठित वारंट (मुख्याधिकारी, सातारा नगरपालिका)

सातारा पालिका साकारणार एक मेगावॉट क्षमतेचा जलविद्युत प्रकल्प

सचिन काकडे

लोकाभत न्युज नेटवर्क
सातार : सातारा पालिकेने साकारणार
कपरा इंधन वीह मेगावॉट क्षमतेचा
सौरऊर्जा प्रकल्पाचे काम हाती
घेतल्यानंतर आता पॉवर हाऊस येथे
जलविद्युत प्रकल्प उभारण्याचा
निर्णय घेतला आहे. कास धारणातून
जलवाटिणीद्वारे वेणूच्या पाण्याच्या
स्थितीज ऊर्जेचा वापर करून हा
प्रकल्प साकारला जाणार असून
त्याची क्षमता एक मेगावॉट इतकी
असणार आहे.

सातारा येथे १९३३ मध्ये
इलेक्ट्रिक सप्लाय कंपनी स्थापन
झाली. या कंपनीने १९३५ मध्ये वीज

निर्मिती व वितरण सुरू केले. कास
धारणा विद्युत् मंडळ हावून
उंचीवरून पाणी खाली पडेल, अशी
जगण्या कल्पनेने पॉवर हाऊस येथे
७५ वॉट क्षमतेचे वीज निर्मिती केंद्र
सुरू झाले. हे भरतातिल पहिले सधु
जलविद्युत केंद्र होते. प्राथमी हे केंद्र
उत्तम पद्धतीने चालविले गेले. मात्र,
कालौघात ते बंद पडले. हे केंद्र पुन्हा
सुरू करण्याचे नियोजन पालिकेने
केले असून, एक मेगावॉट क्षमतेचा
जलविद्युत प्रकल्प उभारला जाणार
आहे. काबाबाचा प्रस्ताव पालिकेने
त्याच केला असून, कासचा नूतन
जलवाटिनीकरोतच याही प्रकल्पाचे
काम सुरू होणार आहे.

स्थितीज ऊर्जेचा वापर होणार

- पॉवर हाऊस ते साकारणारी ही
उर्जा प्रकल्पास १८० मीटर
इजावी आहे.
- या उर्जेचा पावसा
जलविद्युत निर्मितीसाठी
होणार आहे.
- उत्पादन पद्धत्या
पाण्याचा स्थितीज
ऊर्जेचा वापर जलविद्युत
निर्मितीसाठी केला जाणार
आहे.
- या प्रकल्पासाठी एप्रिल
००१ टोएमची इतके पाणी
वापरात आणले जाणार आहे.

०१
मेगावॉट वीज
प्रकल्पाची
क्षमता



असलेल्या सौर ऊर्जा
प्रकल्पातून देखील पालिकेची
कोटवारी सप्लायची
बचत होणार आहे.

प्रकल्पाचा लेखाजोखा

२०
हजार युनिट
दिवसाता उपास
होणार वीज

६४
लाख युनिट
वर्षासा तयार
होणार वीज

०३
कोटी
प्रकल्पाचा
अपेक्षित खर्च

वार्षिक तीन कोटींची बचत

जलविद्युत प्रकल्पाचे काम करी
लागवचानंतर सहतातील पध्दती, पाणी
खोला घडाली ही वीज उपयोगत आणली
जाणार आहे. त्यामुळे पालिकेला सध्या वीज
झिजारा येत असलेल्या तीन कोटी रुपयांची
बचत होणार आहे. कपरा इंधन आवासात येत



कास धारणात सुरुवात पाणीसठा झाला आहे. उंच होतारतून
सहतात होणारे या पाण्याचा स्थितीज ऊर्जेचा वापर विद्युत
निर्मितीसाठी केला जाऊ शकतो. त्यामुळे प्रशासनने विद्युत प्रकल्प
नव्याने साकारण्याचा निर्णय घेतला आहे. असा प्रकल्प साकारणारी
सातारा ही पहिलीच पालिका ठरणार आहे.

• अभिजित बापट, मुळाधिकारी

सोलर रुफ टॉप : १ हजार ५७९ ग्राहकांची वीजबिलातून सुटका

सातारकरांच्या छतावर होतेय ४५ लाख युनिट वीजनिर्मिती!



गुड न्यूज

सचिन काकडे

लोकमत न्यूज नेटवर्क

सातारा : पारंपरिक उर्जा साधनांचा वापर करून नागरिकांना विजेच्या बाबतीत स्वयंपूर्ण करण्यासाठी महावितरणकडून 'सोलर रुफ टॉप' योजना सुरू करण्यात आली आहे. सातारा जिल्ह्यातील वीजग्राहकही या योजनेकडून वळू लागले असून, ते स्वतःच स्वतःची वीज तयार करू लागले आहे.

घरगुती, वाणिज्य, औद्योगिक, उच्च दाब, पाणी योजना, सर्वजनिक पाणी योजना, पथदिवे आदी वर्गावारीतील १ हजार ५७९ ग्राहकांनी वीज वापराच्या गरजेनुसार आपल्या छतावर 'सोलर रुफ टॉप' बसविले आहेत. या माध्यमातून हे ग्राहक मासिक सरासरी ४५ लाख तर वर्षाकाठी ५ कोटी ४० लाख युनिट वीज तयार करत आहेत. या ग्राहकांची वीजबिलाच्या कटकटीतून कायमची सुटका झाली आहे. 'सोलर रुफ टॉप'साठी महावितरणकडून घरगुती ग्राहकांना किलोवॅटनुसार सबसिडी देखील दिली जात आहे.

सोलर बसविलेले ग्राहक व महिन्याला तयार होणारी वीज

ग्राहक	संख्या	वीजनिर्मिती
■ घरगुती	८७७	५,८५,३६९
■ व्यावसायिक	३९९	४,९३,३,३५
■ औद्योगिक	६९	६,५३,८८५
■ उच्च दाब	७२	२६,६५,९४७

असे होते बिल झिरो

समजा एखाद्या घरगुती ग्राहकाचा महिन्याचा वीजवापर १०० युनिट आहे. घरगुती दराप्रमाणे त्या ग्राहकाला स्थिर आकार, वीज आकार, वहन शुल्क असे सर्व प्रकारचे कर मिळून मासिक ७८९ रुपये वीज बिल येते. वर्षाचे गणित पाहिले तर सोलर रुफ टॉपच्या माध्यमातून त्या ग्राहकाची सुमारे साडेनऊ हजार रुपयांची बचत होऊ शकते.

सोलर रुफ टॉपमुळे घरगुती ग्राहकांचे वीज बिल झिरो झाले आहे. शासनाकडून या प्रकल्पासाठी सबसिडीदेखील मिळत आहे. छोटे उद्योजक, हॉटेल चालक, पीठ गिरणी व्यावसायिक ज्यांचा महिन्याचा वीजवापर दोन हजार युनिटपेक्षा अधिक आहे, अशांना ही योजना अधिक लाभदायी ठरत आहे.



सातारा जिल्ह्यात अनेक इमारतींवर अशा प्रकारे सोलर पॅनेल लावण्यात आले आहेत.

अशी मिळते सबसिडी

किलो वॅट	रक्कम
१	१४,५८८
२,५	३६,४७०
३	४३,७६४
४	५१,०५८
६,५	६९,२९३
१०	९४,८२२
१५	९४,८२२

विजेच्या मोबदल्यात मिळेल वीज...

१ एखाद्या ग्राहकाने छतावर तीन किलोवॅटपर्यंत सोलर रुफ टॉप प्रकल्प बसविल्यास त्याला आपल्याला हवी तितकी वीज वापरून उरलेली वीज महावितरणला विकता येते.

२ ग्राहकाने किती वीज महावितरणला दिली याची नोंद सोलर नेट मिटरिंगद्वारे ठेवली जाते. पावसाळ्यात सोलर प्लॉटद्वारे वीजनिर्मिती न झाल्यास महावितरणकडून त्या ग्राहकाला विजेच्या मोबदल्यात वीज दिली जाते.



महादरेचे रंगवैभव



अशी आहे फुलपाखरांची समृद्धता...!

सुमारे १०५ हेक्टर व परिसरात पसरलेल्या महादरेच्या जंगलात पश्चिम घाटात आढळणाऱ्या ३४१ प्रजातींपैकी १७८ प्रजाती आढळतात. यामध्ये क्रिमसन रोज, मलाबर बॅंडेड पिकॉक, तमिळ स्पॉटेड फ्लॅट, सदरन बर्डविंग ही प्रदेशनिष्ठ फुलपाखरे, सर्वात छोटे स्मॉल ग्रास ज्वेल तर सर्वात मोठे सदरन बर्डविंग व ब्ल्यू मॉरमॉन फुलपाखरु या परिसरात आढळते. वन्यजीव कायद्यांतर्गत वाघाच्या बरोबरीने संरक्षण असणारी ऑर्किड टिट व व्हाईट टीपड लार्डन ब्ल्यू ही दुर्मिळ व वैशिष्ट्यपूर्ण फुलपाखरे या ठिकाणी आढून येतात.

देशातील पहिले
फुलपाखरु राखीव क्षेत्र
म्हणून दरे खुर्द महादरे
जाहीर झाले आणि जैवविविधतेने
समृद्ध असलेल्या साता याचा
डंका देशपातळीवर पुन्हा एकदा
वाजला. महाराष्ट्र राज्य वन्यजीव
मंडळाच्या बैठकीत घोषणा
झाल्यानंतर त्याचा आनंदोत्सव
साजरा झाला. महादरे
इकोलॉजिकल रिसर्च
इन्स्टिट्यूटच्या वतीने
वनविभागामार्फत हा प्रस्ताव सादर

एकूण क्षेत्र	: १०५ हेक्टर
उपलब्ध वनस्पती	: ४६७
फुलपाखरु प्रजाती	: १७८
रानभाज्या	: ४७
सस्तन वन्यप्राणी प्रजाती	: २०
पक्षी प्रजाती	: ११८
सरपटणारे उभयचर प्रजाती	: १६
मासे	: २२
सहस्रपाद प्रजाती	: ३
पतंग प्रजाती	: ८०
कोळी प्रजाती	: ११०

समृद्ध जैवविविधतेच्या दृष्टीने

ग्रामस्थांची भूमिकाही आदर्शवत

गावाने निसर्गाशी दोस्ती करून
रहायचं ठरवलं तर काय होऊ
शकते याचे मुर्तीमंत उदाहरण
म्हणजे सातारा शहराजवळील
महादरे. निसर्गाचा वरदहस्त
लाभलेल्या जंगलाचे
प्राणपणाने केलेले रक्षण,
आधुनिकता कितीही आली
तरी त्याचे ओरखडे निसर्गात न
ओढण्याचा ग्रामस्थांनी केलेला
निश्चयाचा परिपाक म्हणजे
देशातील पहिले फुलपाखरु

‘महादरे फुलपाखरु संवर्धन राखीव’वर उमटली मान्यतेची मोहर..

लोकमत न्यूज नेटवर्क
सातारा : साताराच्या उगाला असलेल्या महादरेच्या तनडोवला सोमवारी मुंबईत झालेल्या राज्य वन्यजीव मंडळाच्या बैठकीत ‘फुलपाखरु संवर्धन राखीव’ म्हणून मान्यता मिळाली. केवळ महाराष्ट्रातीलच नव्हे तर भारतातील हे पहिले फुलपाखरु संवर्धन राखीव क्षेत्र ठरलं आहे.

बिबटबागमूल फुलपाखरांपेक्षा वन्यजीवांचा मुक्त विहार, निखळ पाण्याचे झरे, पाठीशी वनदेवचरचा झोंगर, हिरवीकच्य जंगल झाडी, कोणालाही भोवित पाडव्यां, असे महादरेचं जंगल राजवठ्यापासून अकरा अटींचे किलोमीटर अंतरावर आहे. महादरे येथील जैवविविधता अत्यंतिक आहे. पश्चिम घाट आणि पूर्वेकडील दख्खनचे घाट यांना

स्थानिकांच्या कोणत्याही हक्काला बाधा नाही

- दलेश्वर घाटाच्या माथ्यापासून भेटोवा टेकडीपर्यंत सुमारे १०० हेक्टर वनक्षेत्रावर वनविभागाची मालकी आहे.
- तेवढ्याच क्षेत्राला संघटित राखीव क्षेत्राचा दर्जा मिळाल्याने स्थानिक ग्रामस्थांच्या कोणत्याही हक्काला बाधा नाही.
- उलट या क्षेत्राचे संरक्षण, संगोपन आणि नैसर्गिक विकासासाठी मनुष्यबळ व आर्थिक प्रयत्न राखून ठेवले जाईल असे उपअवसरक महादेव मोहिमे यांनी स्पष्ट केले.

सोवणरा प्रदेश म्हणून महादरेच्या जंगलाची ओळख आहे. त्यामुळे महादरे मध्ये पश्चिम घाट व दख्खनच्या पठारातील दोन्ही



यापुढे जाऊन महादरे राखीव क्षेत्राचा दर्जा वर्षाचा व्यवस्थापन आराखडा केला जाईल, अधिकांस विकास, पाणवटे व पुरवण विकासाला कावे होतील. महिती वेद, निरीक्षण मनीरे यांची उभारणी, निरुपद्रवातचा विकास करून निजर्ण पर्यटकात घालण मिळेल. प्रमखांच्या सहभागाने व्यवस्थापन समिती काम पाहिल. त्यातून स्थानिकांच्या रोजगारास रूची निर्माण होईल.

- डॉ. व्हेलेमेंट बेन,
अपर प्रधान मुख्य वनसंरक्षक

जैव विविधतेत मानाचा तुरा

मालणी पक्षी संवर्धन राखीव होण्यासाठी लोकमत ने पाठपुरावा केला होता. त्यात या जंगलामात महादरेतील जैव विविधताविषयी लोकमतने अद्यतन उठविला. फुलपाखरु संवर्धन दर्जा महादरेला मिळाला, याकरीताही या माहितीच्या माध्यमातून लिखाण केले होते. आता महादरे फुलपाखरु राखीव झाल्याने सत्तापदाच्या जैव विविधतेत मानाचा तुरा रोवला गेलाच.

मिळाला. यातील ऑर्किड टिट आणि व्हाईट टिट लाईन ब्ल्यू ही दोन फुलपाखरु परिशिष्ट १ (संरक्षित १) मध्ये गणली आहेत. याचा परिशिष्ट १ मध्ये समावेश आहे. ही दोन्ही वैशिष्ट्यपूर्ण फुलपाखरे वाघाच्या पोमतीत जाऊन बसली आहेत. प्राधान्यक्रमाने या वनस्पती अगर वन्यजीव जपण्याची गरज आहे. त्यांच्यासाठी विविध परिशिष्टांची रचना करण्यात आली आहे. एक प्रकारे त्यांना संरक्षित दर्जा देण्यात आला. परिशिष्ट एक मधील २ व परिशिष्ट तीन व चार मधील ५६ फुलपाखरे एकट्या महादरेत आढळतात.

महादरे येथील वन्यजीवांसह पर्यावरणाचे संरक्षण करण्यासाठी या राखीव क्षेत्राला संवर्धन राखीव दर्जा देण्याची गरज पुढे आली. महादरे

इकोलॉजिकल रिसर्च इन्स्टिट्यूट (मेरी)चे अध्यक्ष व साताराचे मान्य वन्यजीव रक्षक सुनील भोईट, प्रा. डॉ. प्रतिभा पवार व प्रा. डॉ. मेधा बेंडे आणि त्यांच्या टीमने अभ्यासासाठी वनविभागामार्फत एक प्रस्ताव केला. आज त्यावर फुलपाखरु संवर्धन राखीवची मोहर उमटली. बिबट्या, गवे, रानवृकडे, मोर, गरुड, आदी पक्षुपक्षांचा मुक्त संघार असलेले सातारा व्हडतराच्या हद्दीवर असलेल्या महादरेच्या जंगलात फुलपाखरु संवर्धन राखीवचा दर्जा मिळणार आहे. किरी जंगलात पक्ष्यांच्या किलबिलटात निमरठ्या पावसाटा तुडवत जंगलपंथी अनुभवण्याची संधी निरनैपर्यटकानां याविमितीने घालून आली आहे. त्याचबरोबर स्थानिकांना याबातच रोजगाराचे साधन उपलब्ध होणार आहे.

प्रकारच्या जैवविविधता यांचा मिलाफ पाहण्यात मिळते.
मान्य वन्यजीवरक्षक व फुलपाखरांचे अभ्यासक सुनील भोईट

‘लोकमत’शी बोलताना म्हणाले, ‘पश्चिम घाटत उद्गो प्रजातींची फुलपाखरे आढळतात. त्यापैकी ५८२ प्रजाती एकट्या महादरे मध्ये पाहण्यात



सातारा नगरपालिकेच्या सोनगाव येथील घनकचरा व्यवस्थापन प्रकल्पात सौरऊर्जा प्रकल्प कार्यान्वित केला जाणार आहे. सौर पॅनल लावण्यासाठी डेपोतील शेडवर अशा प्रकारे स्ट्रक्चर तयार करण्यात आले आहे. कर्मचाऱ्यांकडून हे काम प्रगतिपथावर सुरु आहे. (छाया : जावेद खान)

सातारा पालिका : १ हजार ५०५ किलो वॅट प्रकल्पाच्या कामाला गती कचरा डेपोत तयार होणार वीज

सचिन काकडे

लोकमत न्यूज नेटवर्क

सातारा : सातारा शहराचा विकास साधून खर्चात बचत करण्यासाठी सातारा पालिकेकडून नवनवीन योजना राबविल्या जात आहेत. त्याचाच एक भाग म्हणून पालिकेने सोनगाव कचरा डेपोत १ हजार ५०५ किलोवॅट (दीड मेगावॅट) क्षमतेच्या सौरऊर्जा प्रकल्पाचे काम हाती घेतले आहे. या प्रकल्पामुळे शहापूर पाणीयोजनेवर दरमहा येणाऱ्या लाखो रुपयांच्या खर्चात मोठी बचत होणार आहे.

सातारा पालिकेचा कारभार सध्या प्रशासकीय राजवटीत सुरु आहे. असे असले तरी प्रशासनाने वर्षभरापासून शहर स्वच्छता, नावीन्यपूर्ण योजना तसेच शहरासह हद्दवाढ भागातील पायाभूत प्रश्न मार्गी लावण्याचा धडाका सुरु केला आहे. हे करत असताना प्रशासनाने उत्पन्नवाढीचे

खर्चात होणार
मोठी बचत



- पालिकेला उरमोडी धरणातून दररोज पाणीउपसा करावा लागतो.
- पुढे जकातवाडी येथील शुद्धीकरण केंद्रात पाणी शुद्ध करून ते नागरिकांपर्यंत पोहचविले जाते.
- या प्रक्रियेसाठी लागणाऱ्या विजेवर पालिकेला महिन्याकाठी २५ ते २८ लाख रुपये खर्च करावे लागतात.
- सौर ऊर्जा प्रकल्प कार्यान्वित झाल्यानंतर हा खर्च सुमारे ८० टक्के कमी होणार आहे.

स्रोत निर्माण करून दैनंदिन खर्च कमी करण्यावरही भर दिला आहे. सातारा शहराला पाणीपुरवठा करणाऱ्या शहापूर योजनेच्या वीजबिलावर पालिकेला महिन्याला सुमारे २८ लाख रुपये खर्च करावे लागतात. हा खर्च



शहापूर योजनेच्या वीजबिलावर पालिकेला भरमसाठ खर्च करावा लागत आहे. तो खर्च कमी करण्यासाठी प्रशासनाने सोनगाव डेपोत सौर ऊर्जा प्रकल्पाचे काम हाती घेतले आहे. या प्रकल्पामुळे वीजबिलात मोठी बचत होईल.

- अभिजित बापट, मुख्याधिकारी

७ कोटी सौरऊर्जा
प्रकल्पाचा खर्च

२८ लाख मासिक
पाणी योजनेवर सध्या येणारा खर्च

१,५०५ किलो वॅट
सौर ऊर्जा प्रकल्पाची क्षमता

६०२० युनिट
दररोज तयारी होणारी वीज

१,८०,६०० युनिट
महिन्याला तयार होणारी वीज

कमी करण्यासाठी प्रशासनाचे सोनगाव डेपोत १ हजार ५०५ किलो वॅट क्षमतेच्या सौर ऊर्जा प्रकल्पाचे काम सध्या प्रगतीपथावर आहे.

या कामी मक्तेदाराची नेमणूक करण्यात आली असून, डेपोतील

शेडवर सौर पॅनल लावण्यासाठी स्ट्रक्चर तयार करण्यात आले आहे. हे काम जवळपास ४० टक्के पूर्ण झाले आहे. एप्रिल २०२३ पर्यंत हा प्रकल्प कार्यान्वित करण्याचा पालिकेचा मनोदय आहे.

फुलपाखरांचे आश्रयस्थान

देशातील पहिलाच अनोखा प्रयोग

■ फुलपाखरू संवर्धनाची गरज... ■

- महादरे गाव व परिसरात बायो डायव्हर्सिटी असून फ्रेश झोन आहे
- हा मायग्रेशन कॉरिडोर आहे
- मर्यादित जागेत आढळणारी विपुल जैवविविधता
- इकोलॉजिकल इंडिकेटर स्पेशिज
- भविष्यकाळात अतिक्रमणामुळे फुलपाखरांच्या अधिवासास धोका

● राखीव क्षेत्र झाल्यानंतर होणारे फायदे ●

- जैवविविधता संवर्धन व पर्यटनासाठी भरपूर वाव व संधी
- निसर्गप्रेमी, विद्यार्थी व संशोधकांसाठी जैवविविधता अभ्यास केंद्र
- गृहपर्यटनातून स्थानिकांना रोजगार निर्मिती
- महादरे तलाव येथे पाणपक्षी पर्यटन
- अनुकूल हवामान पध्दतीमुळे गेहू गेरवा व भात संशोधन केंद्र होण्यास मदत
- बांबू लागवडीस अनुकूल क्षेत्र
- श्यामप्रसाद मुखर्जी जन-वन योजना व इतर योजनांचा लाभ होणार
- वन्य प्राण्यांसाठी पुनर्वसन केंद्र होणार

फुलपाखरांचा अधिवास आहे. त्यामुळे या जंगलाला अधिक महत्त्व प्राप्त झाले आहे. फुलपाखरांसाठी विशेष जंगल ही एक नवीन संकल्पना असून देशातील हे



पहिलेच अशा प्रकारचे जंगल असणार आहे. महादरे जंगलाचा सर्व्हे व अभ्यास केल्यानंतर फुलपाखरांसाठी हा भाग राखीव करण्याबाबत प्रस्ताव

● राखीव दर्जा प्राप्त झाल्यानंतर होणाऱ्या सोयी ●

- पर्यटन विकासाच्या अनुषंगाने दहा वर्षांचा व्यवस्थापन आराखडा होणार
- फुलपाखरू व वन्यजीवांच्या अधिवासाचा विकास होणार
- पाणवठा व कुरण विकासाची कामे
- निरीक्षण मनोऱ्यांची होणार उभारणी
- निसर्गवाटांचा विकास करून पर्यटनाला चालना

वाघांच्या परिशिष्टातील फुलपाखरांचे वास्तव्य

ऑर्किड टिट आणि व्हाईट टिप्प लाईन ब्ल्यू ही दोन फुलपाखरे परिशिष्ट १ मध्ये गणली जातात. वाघांचा परिशिष्ट १ मध्ये समावेश आहे ही दोन्ही वैशिष्ट्यपूर्ण फुलपाखरे वाघांच्या पंगतीत जाऊन बसली आहेत. प्राधान्यक्रमाने ज्या वनस्पती व वन्यजीव जपण्याची गरज आहे. त्यांच्यासाठी विविध परिशिष्टांची रचना करण्यात आली आहे. एक प्रकारे त्यांना संरक्षित दर्जा देण्यात आला आहे. परिशिष्ट एकमधील २ व परिशिष्ट तीन व चारमधील १६ फुलपाखरू एकट्या महादरेत आढळतात.

तयार करण्यात आला. नुकत्याच झालेल्या एका बैठकीत कोल्हापूरचे मुख्य वनसंरक्षक डॉ. व्ही. क्लेमेंट बेन यांनी प्रस्ताव मंजूर करत राज्य सरकारकडे पाठवण्याच्या सूचना दिल्या आहेत. त्यामुळे आता केवळ राज्य सरकारच्या मंजूरीची

प्रतिक्षा वन विभाग करत आहेत. हा प्रस्ताव मंजूर झाल्यानंतर या राखीव क्षेत्रासाठी निधी मिळणार आहे. त्यानंतर इतर पर्यटनस्थळांप्रमाणे संयुक्त वनव्यवस्थापन समितीची निर्मिती करून या भागाचा विकास केला जाणार आहे.

सातारा नगरपालिका : कचरा डेपोत सौरऊर्जेवर साकारला सोनखत निर्मिती प्रकल्प

मैल्यालाही आलाय सोन्याचा भाव!

७ स्पेशल रिपोर्ट

सचिन काकडे

लोकमत न्यूज नेटवर्क

सातारा : स्वच्छतेत राज्य व देश पातळीवर नावलौकिक मिळविण्याच्या सातारा नगरपालिकेने आता मैल्यापासून खत निर्मिती प्रकल्प साकारून स्वच्छतेच्या दृष्टीने आणखीन एक पाऊल पुढे टाकले आहे. सोनगाव कचरा डेपोत सौरऊर्जेवर उभा राहिलेल्या या प्रकल्पात दररोज २०० किलो खत तयार होत असून, असा उपक्रम राबविणारी सातारा ही जिल्ह्यातील पहिलीच पालिका ठरली आहे.

सातारा शहरात पूर्वीपासूनच मैला व्यवस्थापनाचे काम केले जात आहे. खासगी कंपनी, मिलकती, हॉटेल, शाळा, महाविद्यालये आदी ठिकाणांहून संकलित होणाऱ्या मैल्याची शोषखड्ड्यात विल्हेवाट लावली जात होती. ही पारंपरिक पद्धत बंद करून मैल्यापासून सोन खत निर्मिती करण्याचा निर्णय मुख्याधिकारी अभिजीत बापट यांनी घेतला आणि सोनगाव कचरा डेपोत हा प्रकल्प उभा राहिला. सी वॉस (सेप्ट युनिक्सिटी) कंपनीच्या माध्यमातून हा प्रकल्प चालविला जात आहे.

प्रकल्पातील मशिनरीसाठी सौर पॅनल बसविण्यात आले आहेत. शहरातून संकलित होणाऱ्या मैल्यावर या प्रकल्पात नै प्रक्रिया करून खत तयार केले जाते. तयार होणारे सोनखत शेतकरी विकत घेऊन शेती समृद्ध करीत आहेत. पारंपरिक ऊर्जेचा वापर करून उभारण्यात आलेला हा प्रकल्प अन्य पालिकांना पथदर्शी ठरणारा आहे.



सातारा पालिकेने सोनगाव कचरा डेपोत मैल्यापासून खत निर्मिती प्रकल्प साकारला आहे. तयार झालेले खत सुकविण्यासाठी डेपोत सोलर बेड देखील तयार करण्यात आले आहेत. (छाया : जावेद खान)

सौरऊर्जेवर चालते काम

खत निर्मिती प्रकल्पाचे संपूर्ण काम सौरऊर्जेवर चालविले जाते. यासाठी डेपोत ३० किलो वॅट क्षमतेचा सौर प्रकल्प काढावित करण्यात आला आहे.



मैला व पाणी वेगवेगळे करण्यासाठी सोनगाव कचरा डेपोत अत्याधुनिक डी वॉटरिंग युनिट मशीन बसविण्यात आली आहे.

सातारा पालिकेच्या सोनगाव डेपोत सोलर प्रणालीचा वापर करून खत निर्मिती प्रकल्प साकारण्यात आला आहे. सोलरमुळे विजेची मोठ्या प्रमाणात बचत होत असून, अन्य पालिकांसाठी हा प्रकल्प निरिचितच पथदर्शी ठरेल.

- अभिजीत बापट, मुख्याधिकारी

आधुनिक पद्धतीचा वापर करून मैल्यापासून सोनखत तयार केले जात आहे. हे खत ऊस, बाखू पिकाला लाभदायी ठरत आहे. मैल्यातील पाण्याचा झाडांना पुनर्वापर केला जात आहे.

- जिनल घेडा, रिसर्च असोसिएट

अशी होते खत निर्मिती

- १ सातारा शहरातून संकलित होणारा मैला कचरा डेपोतील प्रकल्पात आणला जातो.
- २ या ठिकाणी बसविण्यात आलेल्या डी वॉटरिंग युनिटमध्ये मैला रिकामा केला जातो.
- ३ मशीनमध्ये पॉलिमर टाकले जाते. ज्यामुळे पाणी वेगळे व मैला वेगळा होतो.
- ४ वेगळा केलेला मैला उन्हात सुकण्यासाठी ठेवला जातो.
- ५ डी वॉटरिंग युनिटमधून बाहेर पडणाऱ्या मैल्यापासून २ ते ४ दिवसांत सोनखत तयार होतो.
- ६ नैसर्गिक पद्धतीने खत तयार होण्यासाठी सुमारे पंधवीस दिवसांचा कालावधी लागतो.

१५०००	२००	८०	९०
लिटर मैला दररोज डेपोत येतो	किलो रोज तयार होणारे खत	टन खत तयार झाले	टन खताची विक्री



सोलर बेडचाही उपयोग

खत निर्मिती प्रकल्पात खत सुकविण्यासाठी तीन सोलर बेड उभारण्यात आले आहेत. यातील तापमान सामान्य तापमानाच्या तुलनेत कितीतरी जास्त असते. बाहेर जर ३५ डिग्री तापमान असेल तर सोलर बेडमधील तापमान त्याच वेळी ५० ते ६० डिग्री इतके असते. जसे तापमान जायेल तसे खतही वेगाने सुकते.

सातारा पालिका : अपारंपरिक ऊर्जेचा वापर करणाऱ्यांना लाभ

..तर नागरिकांना मालमत्ता करात वीस टक्के सवलत !

सचिन काकडे

लोकमत न्यूज नेटवर्क

सातारा : पालिकेला मालमत्ता कर माफ करता येत नसला तरी शासनाच्या 'स्वच्छ सर्वेक्षण २०२२' अभियानांतर्गत करात वीस टक्के सवलत देण्याचा निर्णय पालिका प्रशासनाने घेतला आहे, परंतु हा लाभ स्वच्छ सर्वेक्षणाचे सर्व निकष पूर्ण करणाऱ्या मिळकतदारांनाच घेता येणार आहे.

पालिकेने नुकताच 'कचरामुक्त' शहराचा बहुमान मिळविताना राज्यात चौथा तर देशात १५ वा क्रमांक पटकविला. ही मोहीम यशस्वी झाल्याने आता पालिकेने 'स्वच्छ सर्वेक्षण' अभियान प्रभावीपणे राबविण्यासाठी कंबर कसली आहे. याअंतर्गत पालिकेने घनकचरा व्यवस्थापन, स्वच्छतागृहांची उभारणी, वृक्षारोपण तसेच विविध स्पर्धांचे आयोजन करून नागरिकांमध्ये जनजागृती सुरू केली आहे.

दरम्यान, या अभियानाला बळकटी देण्यासाठी अपारंपरिक ऊर्जेचा अधिकाधिक वापर करणारे, ई-बाईक



चालविणारे, पाण्याची काटकसर करून त्याचा पुनर्वापर करणारे व रेन वॉटर हार्वेस्टिंग प्रकल्प राबविणाऱ्या मिळकतदारांना मालमत्ता करात वीस टक्के सवलत देण्याचा निर्णयही

प्रशासनाने घेतला आहे. सर्व निकषांची पूर्तता करणाऱ्या नागरिकांनाच संपूर्ण सवलतीचा लाभ घेता येणार आहे. जर कोणी रेन वॉटर हार्वेस्टिंग प्रकल्प राबविला असेल अथवा कोणी ई-बाईक

नागरिकांना मालमत्ता करात थेट सवलत देता येत नसली तरी पाण्याची काटकसर व पुनर्वापर, वृक्ष संवर्धन तसेच अपारंपरिक ऊर्जेचा वापर करणाऱ्यांना मात्र सर्व निकषांची पूर्तता करून सवलत मिळवता येते. प्राप्त अर्जांची पथकाकडून पाहणी करून पात्र लाभार्थ्यांना पुढच्या वर्षाच्या करात मालमत्ता करात निकषाप्रमाणे सवलत दिली जाईल.

- अभिजित बापट, मुख्याधिकारी

नागरिकांना मालमत्ता करात सूट देण्याचा निर्णय पालिका प्रशासनाने घेतला आहे. त्यामुळे अधिकाधिक नागरिकांनी स्वच्छ सर्वेक्षण अभियानातील निकषांची पूर्तता करून या सवलतीचा लाभ घ्यावा.

- मनोज शेंडे, उपनगराध्यक्ष

वापर असेल तर अर्शानाही प्रत्येकी पाच टक्के कर सवलतीचा लाभ घेता येऊ शकतो. हे उपक्रम राबविणाऱ्यांना पालिकेत तसा लेखी अर्ज सादर करावा लागणार आहे.

सोनगाव कचरा डेपोत सांडपाण्यावर बहरतेय हिरवाई

लोकमत न्यूज नेटवर्क
सातारा : सातारा पालिकेचा सोनगाव कचरा डेपो आता हिरव्यागार वृक्षांनी बहरू लागला आहे. पालिकेने या डेपोत चार हजारांहून अधिक देशी वृक्षांची लागवड केली असून, खत निर्मिती प्रकल्पातील सांडपाण्याचा या वृक्षांसाठी पुनर्वापर देखील केला जात आहे.

सातारा शहर व परिसरातील वनसंपदा टिकून राहावी यासाठी सामाजिक संस्था, प्रयत्न करीत असताना आता नगरपालिकेने देखील वृक्ष संवर्धनासाठी एक पाऊल पुढे टाकले आहे. पालिकेने डेपोत चार हजारांहून अधिक देशी वृक्षांची लागवड केली आहे. या वृक्षांच्या संगोपनाचे काम सी वॉस या कंपनीकडून केले जात आहे.



सातारा पालिकेने सोनगाव कचरा डेपोत विविध प्रजातीच्या वृक्षांची लागवड केली आहे. (छाया : जावेद खान)

पालिकेने कचरा डेपोचे रूप बदलण्यासाठी याविकाणी वृक्षलागवड मोहीम हाती घेतली आहे. या पर्यावरणपूरक उपक्रमामुळे डेपोचे सुशोभीकरण तर होईलच, शिवाय वृक्षलागवड व संवर्धनाचा उद्देशही सफल होईल.

- अभिजीत बापट, मुख्याधिकारी

वृक्षांसाठी ठिबक सिंचन

- पालिकेने कचरा डेपोत मेल्यापासून खत निर्मिती प्रकल्प साकारला आहे. या मेल्यातून बाहेर पडणाऱ्या पाण्यावर पहिल्या टप्प्यात प्रक्रिया केली जाते.
- या प्रक्रियेमुळे मूला आणि पाणी येऊन होते. दुसऱ्या टप्प्यात मेल्याचे शुद्धीकरण होऊन वापरायोग्य पाणी साठवण टाकीत संकलित केले जाते.
- हे पाणी पुढे ठिबक सिंचनाद्वारे वृक्षांसाठी वापरले जात आहे.



या वृक्षांची लागवड

डेपोत आवळा, जाम्बूक, लेवगा, लिंबू, काटेसवर, कुंती, अडसुका, निरगुडी, पिवळा कांचन, तगर, शतावरी, पेखंड, गुळवेल, कोकणी, कुण्ठकमळ, सोनचापा आदी प्रकारच्या फळांच्या व फुलांच्या झाडांची लागवड करण्यात आली आहे.

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पुतली शहर-जिल्हा

महादारे होणार दुर्मिळ फुलपाखरांचे आश्रयस्थान

संवर्धन राखीव दर्जा लवकरच : देशातील पहिलाच अनोखा प्रयोग

पुतली शहरात होणारा महादारे फुलपाखरांचे आश्रयस्थान बनवण्याचा प्रयोग देशातील पहिलाच असेल.

पुतली शहरात होणारा महादारे फुलपाखरांचे आश्रयस्थान बनवण्याचा प्रयोग देशातील पहिलाच असेल.

पुतली शहरात होणारा महादारे फुलपाखरांचे आश्रयस्थान बनवण्याचा प्रयोग देशातील पहिलाच असेल.

पुतली शहरात होणारा महादारे फुलपाखरांचे आश्रयस्थान बनवण्याचा प्रयोग देशातील पहिलाच असेल.

पुतली शहरात होणारा महादारे फुलपाखरांचे आश्रयस्थान बनवण्याचा प्रयोग देशातील पहिलाच असेल.