



Urban Farming

*TERI's initiative under the
Navi Mumbai Eco-City
Project*

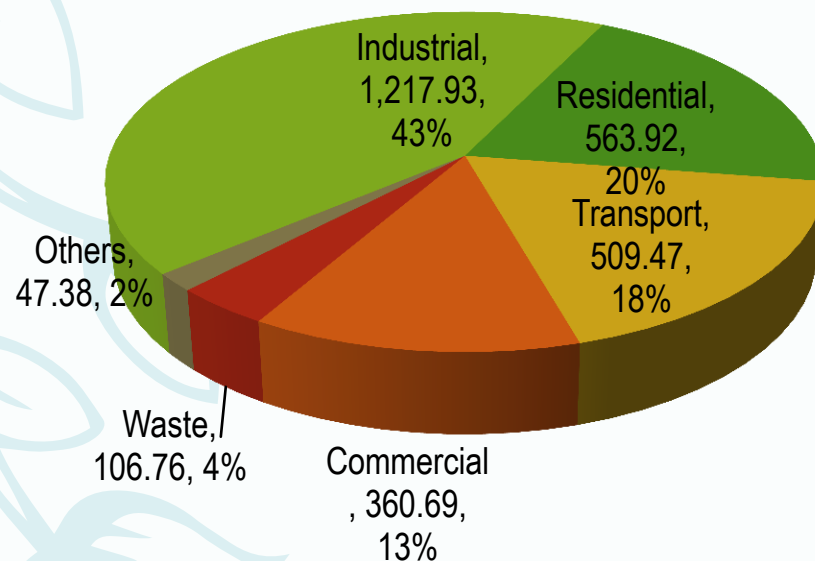
Why we need an Eco-city?

- India's urban population is expected to increase by 10% (over 12crore) in 2030
- Impose a stress on natural resources like land, water and energy
- Cities responsible for majority of GHG emissions:
Residential buildings: 30-40%(1) Transport sector: 30%
(2)

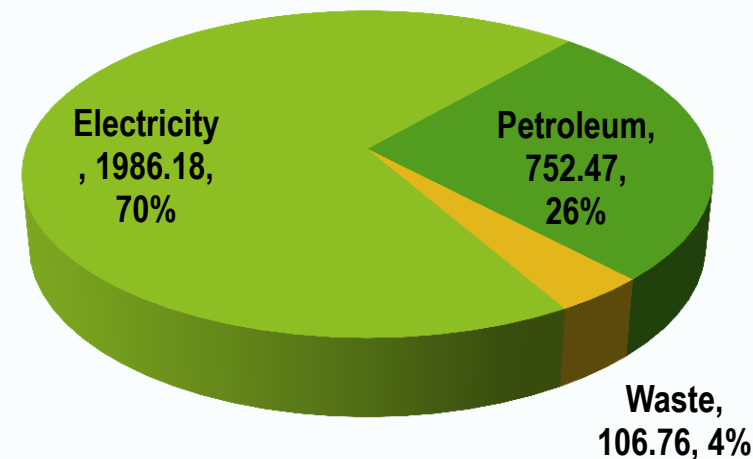
Carbon baseline inventory of Navi Mumbai (August 2012)



Sector wise share of emissions in Navi Mumbai city
(Thousand tCO₂e, %)



Share of emissions from usage of electricity and petroleum
(Thousand tCO₂e, %)



	Total GHG emission (Million tCO ₂ e)	Per capita CO ₂ emissions (tCO ₂ e)	Population
Navi Mumbai	2.65	2.36	~11.19 lakhs

Navi Mumbai- Eco City

- Developed on the lines of integrated planning and management programs that addresses social, ecological health of the city.
- Measures to be adopted:
 - Green construction practices,
 - Application of new and renewable energy resources and
 - Energy efficient technologies,
 - Training and capacity building programs and so on

High fuel consumption, Carbon emission for transportation of food

Food statistics for MMR (Mumbai Metropolitan Region)

- Population of MMR: 23 million
- Vegetables required per year: 180,000 tonnes
- Fuel required for transportation: 18 million L
- **(Half million trips between Mumbai and Pune -250km)**
- CO₂ emission per year: 68,000 tonnes CO₂



CO₂ emissions will double in the next 10 years taking into account the growth of population, migration and increase in resource demand in MMR. Hence there is a serious need to reduce the carbon footprint to help reduce future damages.

Eco City: Approach



Renewable Energy Applications



Green Buildings

Scientific Disposal of Waste



Conservation of Lakes



RE based mass transport



Resource Efficiency

Biodiversity Conservation



Public Awareness



Focus Areas for project Implementation



**Energy
Conservation**



**Green
Buildings**

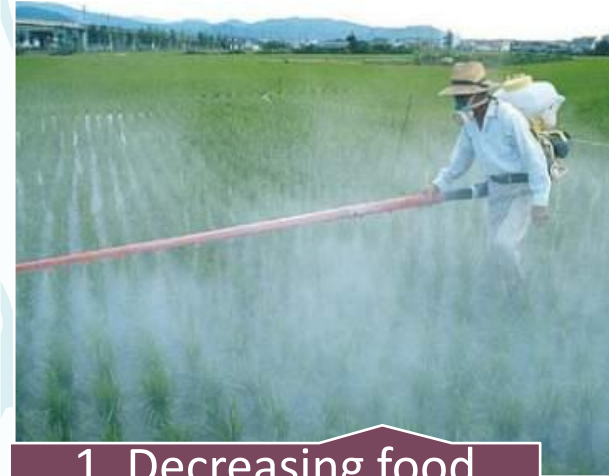
**Urban
Farming**



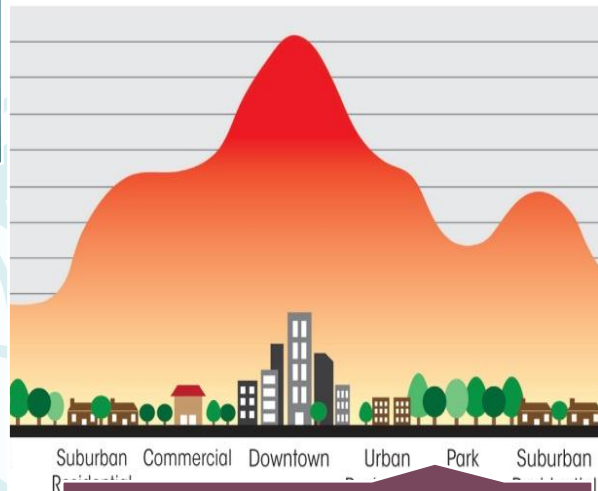
**Water
Conservation**



Why Urban farming?



1. Decreasing food quality, more pesticides



2. Increasing urban temperature



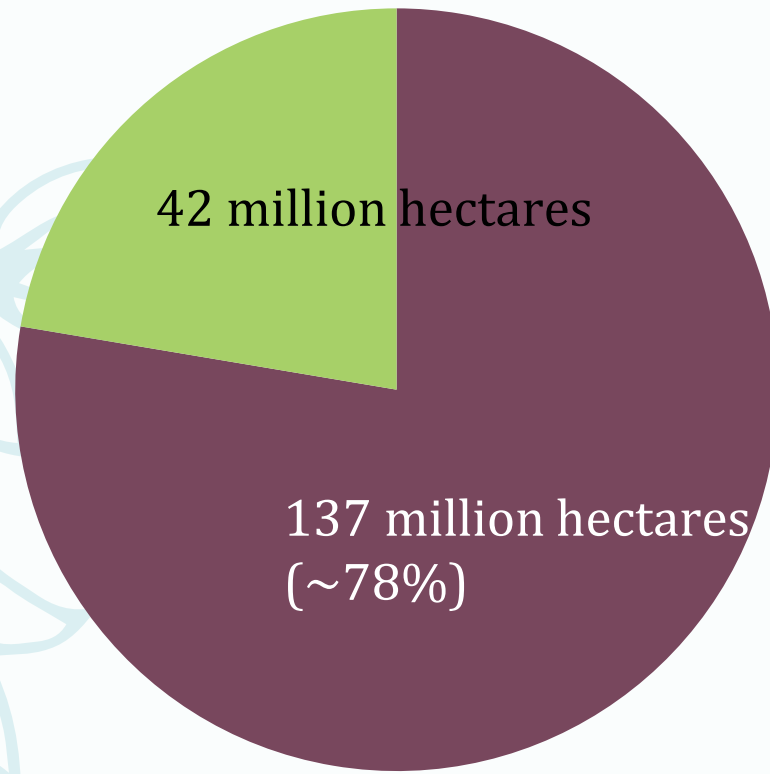
3. Change in LULC Patterns



4. High fuel consumption, Carbon emission for transportation of food

1. Decreasing Food Quality

Total Agricultural land in India



Total land = 179 million hectares

■ Pesticide used

■ Pesticide not used

Pesticides in 87% of the vegetables we consume daily!!!

AINPR (All India Network on Pesticide Residues) carried out a research in 2008-09 in more than 20 institutions across India

Samples of fruits, vegetables, spices, pulses and milk products tested	167
Samples with pesticide residue	146
Most common vegetables being affected	Ladyfinger (Okra), Brinjal, Onion, Cabbage, Tomato, and Potato

Various pesticides and their ill effects on health

- All of the above are **Endocrine disruptors** i.e. they affect the functioning of hormone releasing glands in the body
- Dicofol and Carbaryl are possible **carcinogens** too, while Endosulfan is **toxic** when inhaled
- Most common pesticides being used: Dicofol, Carbaryl, Quinaphlos, Trichlorfon, Endosulfan, Carbofuran

Pesticides in our vegetables

87% vegetable samples studied had detectable residue levels.*

The following exceeded **Maximum Residual Limits:**



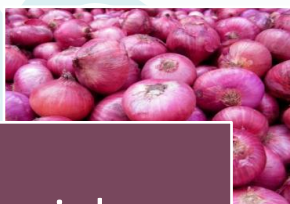
Chlorpyrifos: 2.5x
Aldrin: 2x



Chlorpyrifos: 9x
Aldrin: 4x



Monocrotophos: 4.5x
Chlorfenvinfos: 8x



Chlorpyrifos:
2x



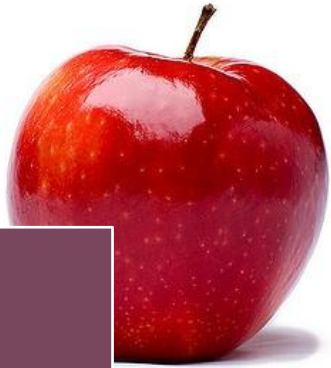
Heptachlor: 10x,
Aldrin: 1.5x



Heptachlor: 10x,
Aldrin: 1.5x

Name of the pesticide	Tolerance limit (mg/kg.ppm)
Aldrin	0.1
Chlorpyrifos	0.01-0.2
Monocrotophos	0.2
Chlorfenvinfos	0.5
Heptachlor	0.05

Pesticides in fruits



Aldrin: 4x
Chlordane: 9x



Dichlorvos: 2.5x



Aldrin: 2.5x

Name of the pesticide	Tolerance limit (mg/kg.ppm)
Aldrin	0.1
Chlordane	0.1
Dichlorvos	0.1

Not only pesticides, we are consuming heavy metals in our diet too...

According to a study carried out at [MS University of Baroda, Gujarat](#)
Levels of heavy metals exceeding the FSSAI limits

Arsenic: 5x



Cadmium: 1.5x
Arsenic: 5x



Arsenic: 5x



Arsenic: 4.5x



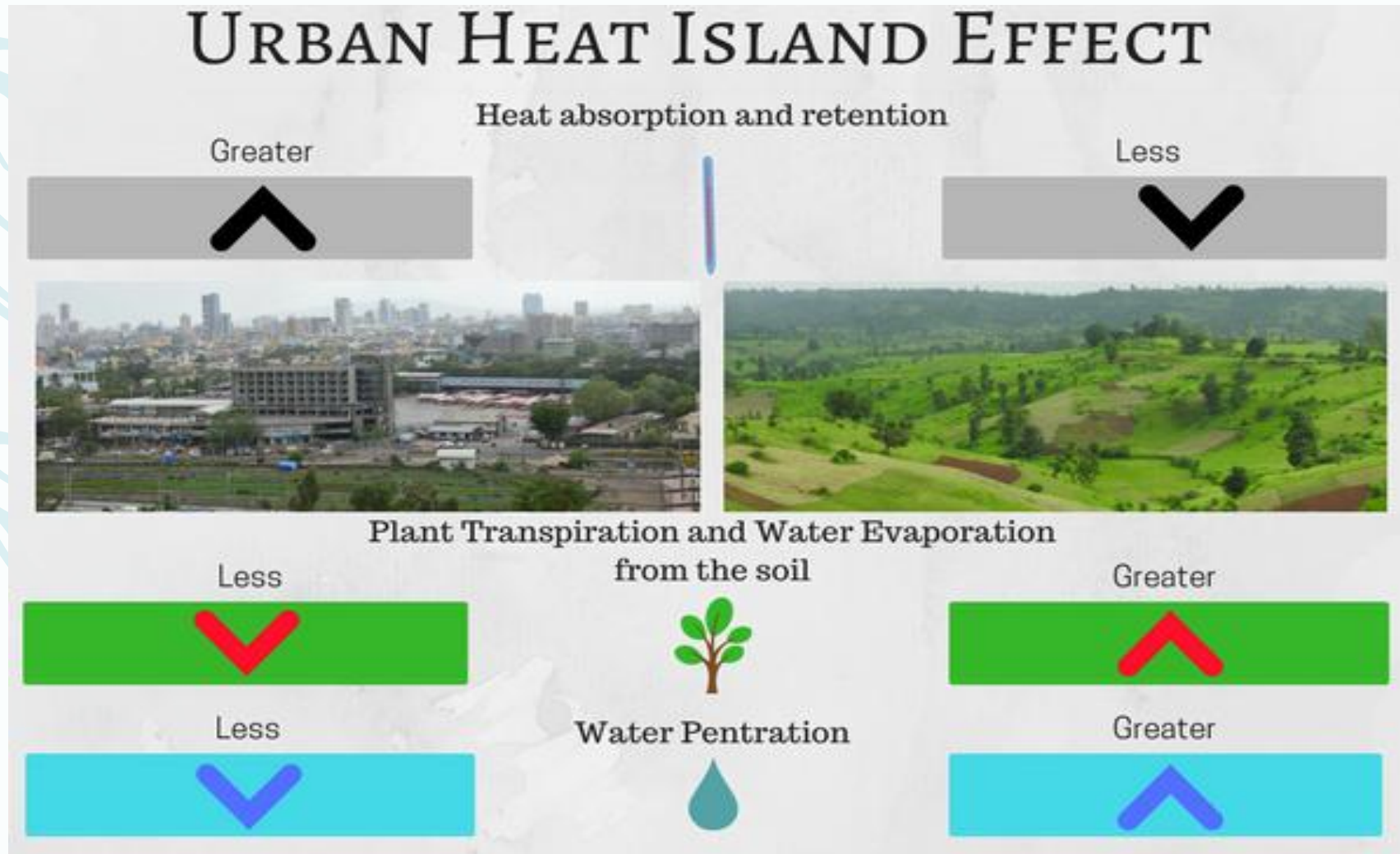
Cadmium: 2x
Arsenic: 5x

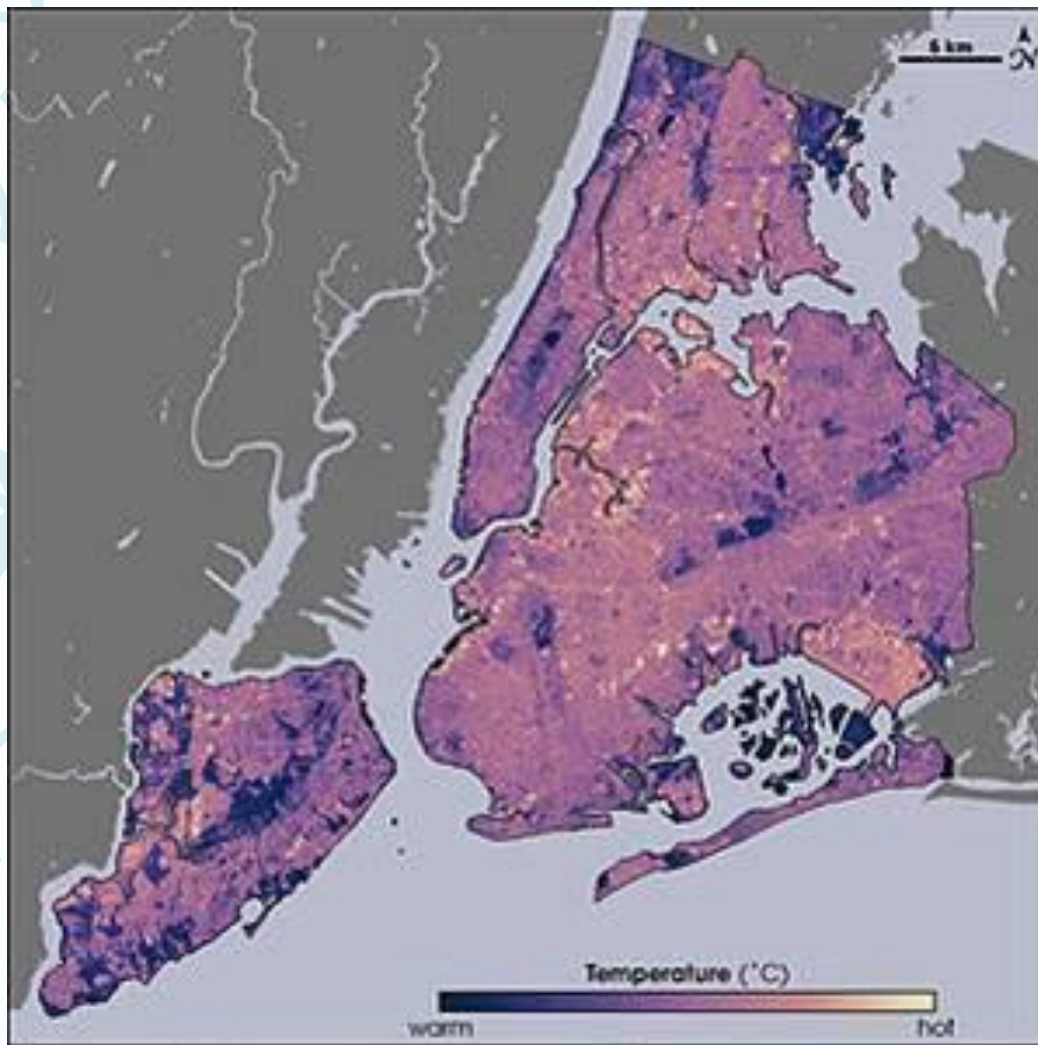


Arsenic: 5x



2. Increasing temperatures: Urban Heat Island (UHI) Effect



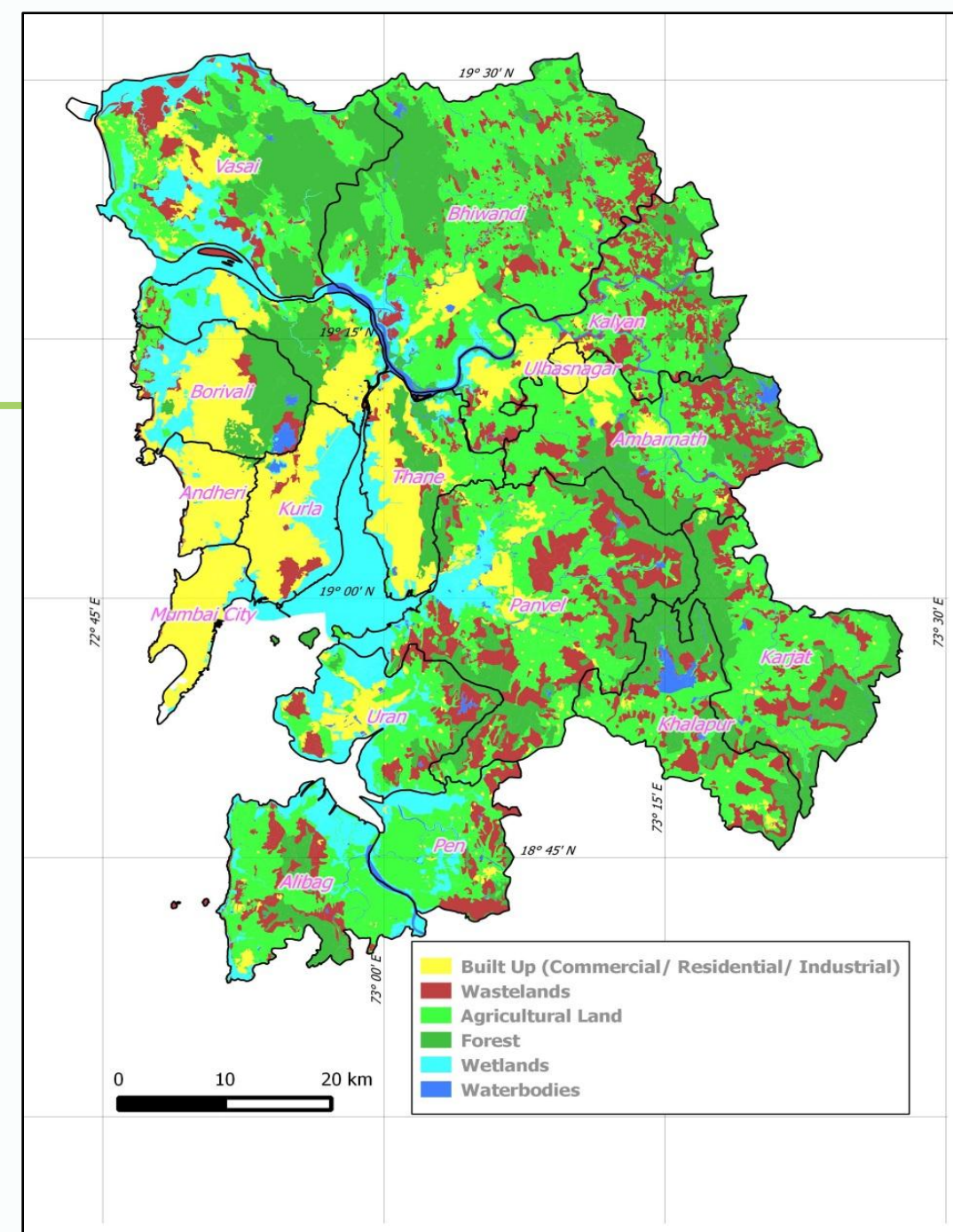


Thermal and vegetation locations around New York City via infrared satellite imagery. A comparison of the images show that where **vegetation is dense**, **temperatures are cooler**.

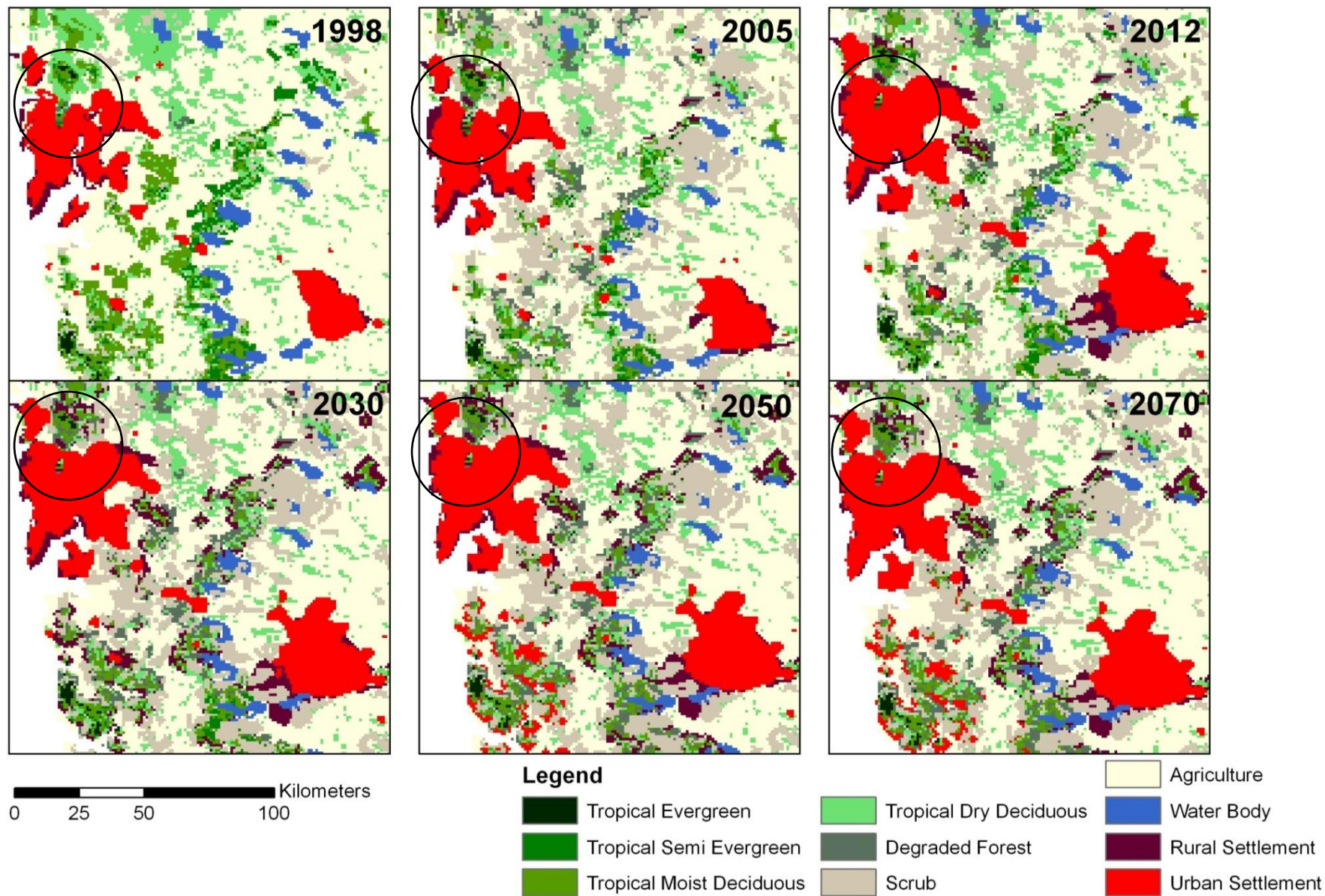
3. Loss of habitat

Spatial representation of existing land use in MMR (2006)

- Increase in built up area: 9.1% in 1991 to 27.8% in 2011
- Decrease in forest cover: 26% in 1987 to 21% in 2006
- Decrease in agricultural land: 42% in 1987 to 35% in 2006
- As a result:
 - Loss in habitat of helpful biodiversity
 - A need to transport more food from outside



Fragmentation captured by land use land cover model for parts of the Western Ghats.



How can Urban farming help?

Local cultivation of **vegetables, fruits, herbs and medicinal plants** in urban and peri-urban areas using local resources .

- Better Health and Nutrition
- Social Conditioning
- Environmental and Ecological Stability
- Economical Gain

Better Health and Nutrition

Direct link to production of food, ensuring food and nutritional security

Growing locally: Easily accessible rich nutrients and fresh produce on your plate

Guarantee of no harmful chemicals and pesticides in locally grown products

Better tasting fruits and vegetables

Eat what is appropriate...



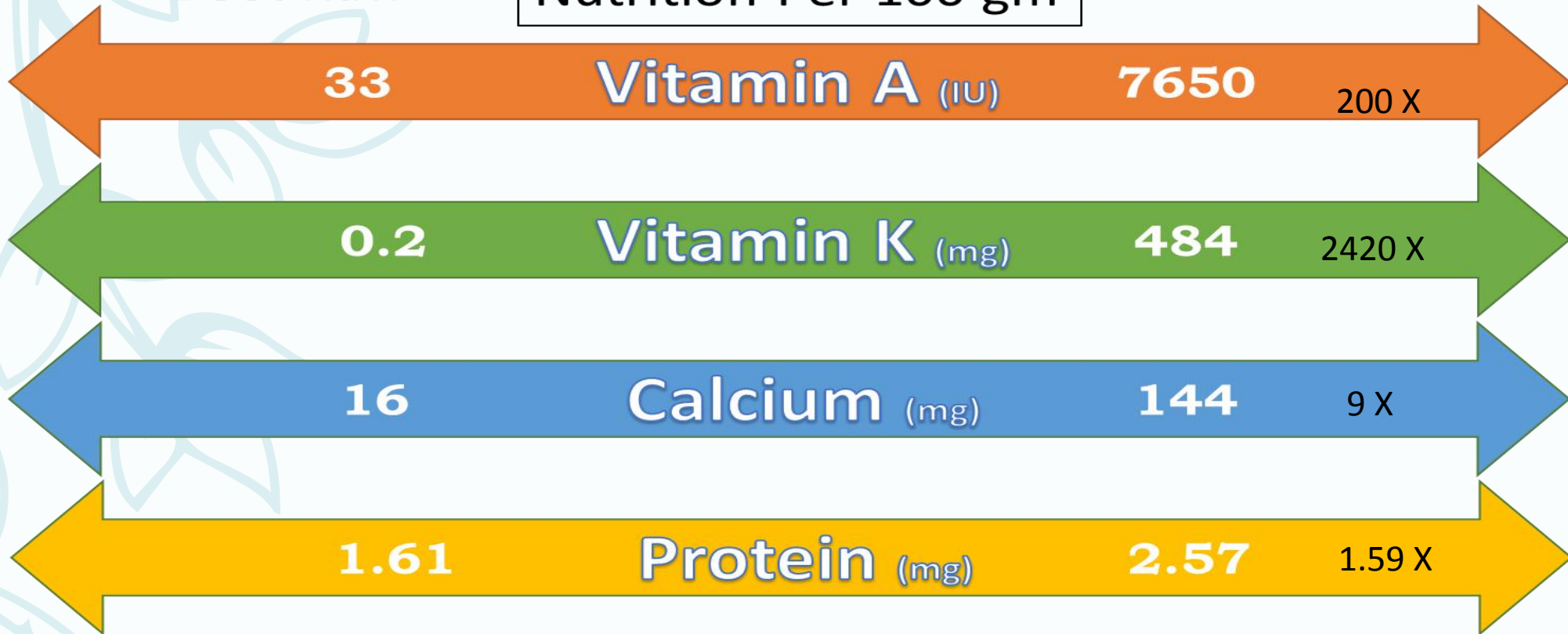
Beet Raw

Based on a 2,000 calorie diet,
daily values of beet green:
220% of vitamin A, **60%** of
vitamin C, **16%** of calcium, and
15% of iron.



Beet Green

Nutrition Per 100 gm





Organic produce at Organic Farmers' Fest, Norita Ground, Powai



Environmental and Ecological Stability

Yielding **zero-kilometer produce**: lesser Carbon emission and fuel consumption for transportation of food

Reducing Urban Heat Island effect, that is, lowering the temperature of a locality by introducing more plants

Recycling and reuse of food and other solid waste

Conserving water through rainwater catchment and reusing grey water

Social conditioning

An interesting and engaging activity for **all age groups**

Bringing communities together and infusing a sense of joy in people

Educating more people about the **benefits of growing their own food**

Socio-economical Benefits

Urban farming may provide employment opportunities to communities with agricultural skills

The produce, if in abundance, could be sold to a local vendor

Reduction in household expenditure

Produce could be exchanged or sold at an Urban Farmers' Market

Objectives of TERI's Urban Farming initiative

- To develop a **strong network** of Urban Farmers/ Like minded enthusiasts.
- To promote consumption of **healthy and nutritious food** products
- To help maintain **food and nutritional security** in the city
- To **reduce the carbon footprint** from transportation of food products
- To introduce people of all ages to the **joy of growing** their own produce



Through the Urban Farming Forum we wish to...

- Demonstrate technologies, products, innovation, training and capacity building
- promote urban farming activities, and exchange ideas,
- reach out to various stakeholders of urban farming: residential, commercial, governmental, and NGOs.

The momentum is building up...

THE TIMES OF INDIA
CITY

City ▾ Mumbai Crime Civic Issues Politics Schools & Colleges Events

News Home » City » Mumbai

‘Grow own veggies to fight climate change’

Chittaranjan Tembhekar | TNN | Aug 1, 2016, 01:37 AM IST

✉ 🖨 A- A+

MUMBAI: The growing risk of climate change in the Mumbai Metropolitan Region (MMR) due to ever-increasing carbon emissions and fast-depleting agricultural and forest land can be curtailed provided state and local bodies and people participate in urban farming reforms, says a TERI study.

According to TERI's associate director for western region, Anjali Parasnis, around four lakh truck trips are made per year from Nashik, Pune and other parts of western Maharashtra, Gujarat and Konkan to supply eggs, milk and vegetables in MMR.

The trucks consume nearly 400 lakh litres of fuel, leading to 1.71 lakh tonnes of Co2 emissions besides frequent fatal mishaps. This, the study says, can be avoided by

Homepage > Lifestyle > Grow Veggies to Fight Climate Change – TERI

Grow Veggies to Fight Climate Change – TERI

August 2, 2016

SHARE     



depleting agricultural and forest land.

The risk can be curtailed if state and local bodies along with public participation. This is the finding of a study by The Energy and Resources Institute (TERI).

According to TERI's associate director for western region, Anjali Parasnis from Nashik, Pune and other parts of western Maharashtra, Gujarat and Karnataka, "This is a study of this region."

"These trucks consume nearly 400 lakh litres of fuel, leading to 1.71 lakh tonnes of CO2 emissions besides frequent fatal mishaps," she adds to her comment.

The study says, "All this wastage can be avoided by promoting urban farming."