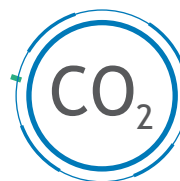
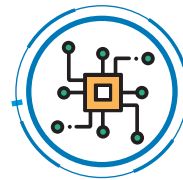




# CONNECT TREE

## Citizen-Enabled Digital Monitoring of Sapling Plantations and Carbon Stock Estimations



### Partners and Stakeholders

Govt. bodies



R & D, Academia



NGOs





# ConnecTree

**Citizen-Enabled Digital Monitoring of  
Sapling Plantations and Carbon Stock Estimations**



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# 1. Background

The Indian government has undertaken significant efforts such as the National Afforestation Programme (NAP), Green India Mission (GIM), and Urban Forestry schemes under Smart City missions, etc. to address environmental concerns and promote sustainable development. The Forest Department within the Government of Maharashtra has also undertaken initiatives to increase forest cover from 22% to the nationally mandated 33% of Maharashtra's geographical area. These initiatives usually centre around improving city-wide plantations through structured programs. Organizations working in the sector, including academic institutions, NGOs and Corporates (through their CSR initiatives) are also involved in implementing such programs. Pune, as well as other cities within Maharashtra have seen a surge in such plantation initiatives, especially in the monsoon season.

However, factors such as urban encroachment, climate change, cattle grazing, pests can impact the survival of the planted saplings, and hamper not only the enhancement of the forest cover, but also the development of a potential knowledge base for understanding biodiversity of the region. Thus, there is a need to systematically track, monitor & demonstrate successful plantations.

## 2. Introduction to the ConneCTree Program

ConneCTree is a technology driven program for monitoring the growth of planted saplings. The program brings about a synergy and efficiency in monitoring the urban tree cover, by drawing from databases related to urban morphology, land records, climate, soil types, vegetation, tree census and groundwater etc. as well as crowd-sourced information obtained through citizen volunteering efforts. Central to the program is a web-based IT platform, which is an open-access platform, which records real-time observations regarding the growth of saplings. These observations can be undertaken by any interested citizen, thereby making the ConneCTree program a largely citizen-driven initiative.

ConneCTree leverages the learnings from ongoing global initiatives such as 'Adopt a Tree' by WWF-India, and uses geo-spatial technology to enable scaling and focus on the surviving phase (first 2-3 years) of saplings, when they are the most vulnerable. Through digitization, the platform augments and hence 'maintains' the sapling census. It provides a platform to demonstrate the carbon sequestration potential of the plantation. In addition, it could be used to quantify & demonstrate other ecosystem service benefits from planted trees

The initiative aligns with Mission LiFE and Sustainable Development Goals 11, 13, 15 and 17.



**SDG11- Sustainable cities and communities:** which aims at developing intelligent urban planning strategies that create safe, affordable and resilient cities with green and culturally inspiring living conditions.

**SDG13- Climate action:** which aims to strengthen the resilience and adaptive capacity (of transport systems) to climate-related hazards and natural disasters in all countries and to integrate climate change measures into national policies, strategies and planning.

**SDG15- Life on Land:** which aims at protecting, restoring and promoting sustainable use of terrestrial ecosystems, managing forests, combating desertification and halt as well as reverse land degradation and halt and reverse land degradation and biodiversity loss.

**SDG17- Partnerships for the Goals:** which aims at revitalizing global partnerships for sustainable development.

## 3. Program Structure & Operating Model

### 3.1. Program Partners

1. **Government Bodies:** The Pune Municipal Corporation (PMC), Pune Smart City (PSCDCL), Pimpri Chinchwad Municipal Corporation and Pimpri Chinchwad Smart City
2. **NGOs:** Environment Conservation Association (ECA) and Centre for Environment & Education (CEE)
3. **Academia:** HV Desai College, D.Y. Patil College of Arts, Science & Commerce, MIT-ADT College

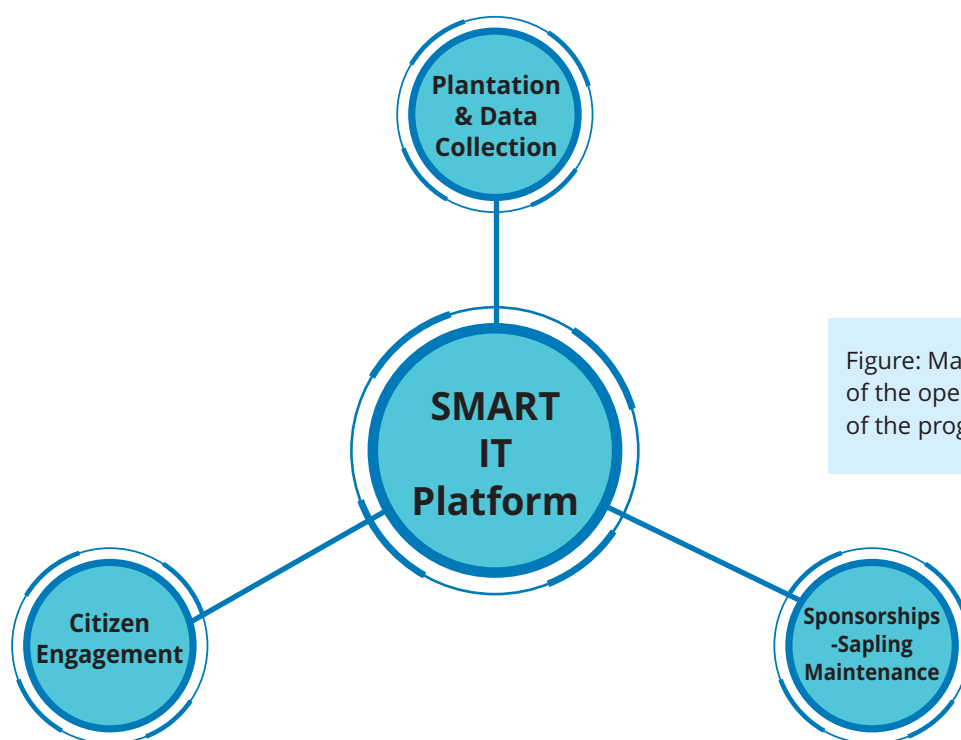


Figure: Main components of the operating model of the program

### 3.2. Components of the operating model

#### SMART IT Platform:

The ConneCTree platform shows the saplings on the map using their GPS location. It also provides a mechanism to record the growth of these mapped saplings through regular (i.e yearly, say) observations.

#### Plantation & Data Collection:

The plantation activities are carried out in collaboration with government bodies and local volunteer groups. Government bodies allocate specific budgets for the preparation of saplings and the execution of plantation initiatives. These activities are typically undertaken along roadsides, medians, parks, gardens, public spaces, and government premises. Additionally, volunteer groups engage in greening efforts in public open areas, including hill slopes, riparian zones, and other open spaces.

Basic data for saplings – e.g. species, location / landmark, photo depicting current state, GPS location as well as landmark - is collected after plantation activity. Student volunteers and local citizens are involved in the sapling mapping exercise.

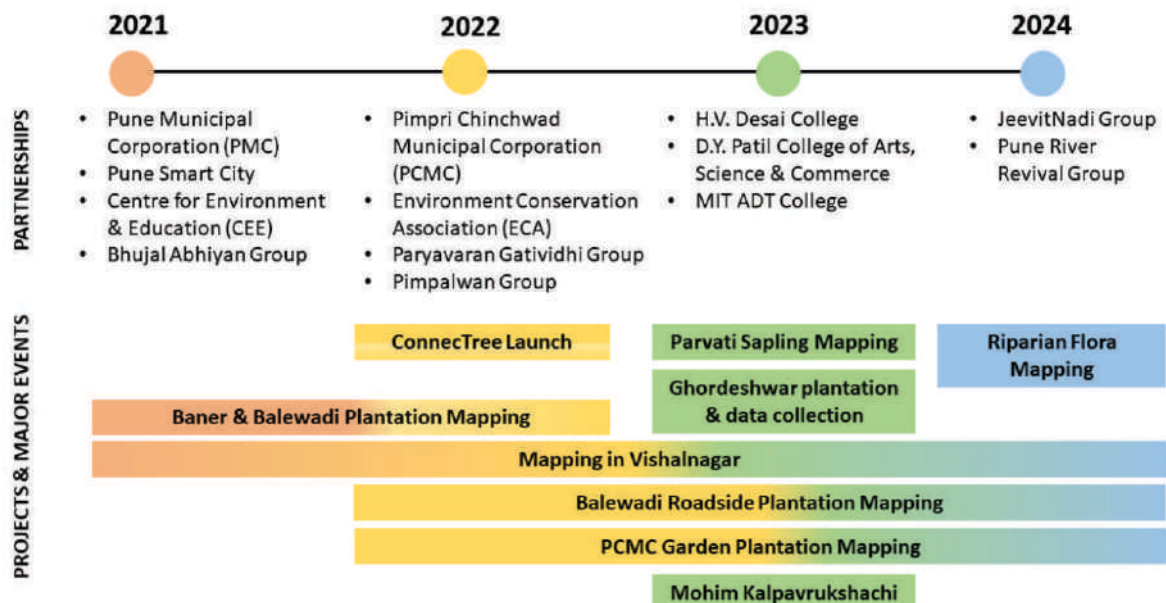
#### Citizen Engagement:

Nature walks and similar other activities are conducted on plantation sites to educate citizens about the biodiversity and encourage them to volunteer for sapling maintenance

#### Sponsorships- Sapling Maintenance:

Sponsors are typically institutions such as corporations, non-governmental organizations (NGOs), and similar entities and the sponsorship primarily focuses on the maintenance of saplings and also includes support for plantation activities

## 4. Milestones:



## 4.1. Milestones in 2021

- **Partnership with PMC, Pune Smart City & CEE:** PMC and Pune Smart City issued letters of support for the program (May 2021). CEE joined as a program partner for ConneTree.
- **Partnership with Bhujal Abhiyan:** PKC and Bhujal Abhiyan surveyed the Aundh-Baner-Balewadi area with the Pune Smart City team and identified two sites – 1 in Baner, 1 in Balewadi - for avenue plantation by smart city and for mapping and tracking these saplings on the PKC platform.

### Under these partnerships, the following events were organized:

- In July 2021, 50+ saplings were planted on the footpath in front of **Oakwood Hills, Baner** and the data was collected.
- In August 2021, a plantation event was organized in **Balewadi** along the medians at the Madhuban Society junction

## 4.2. Milestones in 2022

- **ConneTree Launch:** In February 2022, the ConneTree platform was officially launched in an event in a public garden near Oakwood Hills, Baner. Local residents participated in the event which included nature walk, environment games and mapping exercises. Over 200 saplings were mapped on the platform as part of the launch event.
- **Partnership with Paryavaran Gatividhi:** Paryavaran Gatividhi came forward to look after the saplings planted at Madhuban Society.
- **Partnership with Pimpri Chinchwad Municipal Corporation:** PCMC conducted an Innovation Conclave in July 2022 and through a systematic process selected ConneTree. A partnership with PCMC was thus established.
- **Partnership with Environment Conservation Association (ECA):** PKC and ECA agreed to work together for mapping of the saplings planted within the PCMC region. ECA and PCMC have a partnership for environment conservation
- **Partnership with Pimpalwan Group:** Pimpalwan is a volunteer group that is actively greening the area in and around the defense land at Vishalnagar-Pimple Nilakh

### Under these partnerships, the following events were organized:

- In July 2022, a plantation and mapping activity was conducted in Balewadi (Paryavaran Gatividhi)
- Training program for PCMC staff and student volunteers for mapping on ConneTree platform (ECA)
- In August 2022, saplings on the Vishalnagar road were mapped to ConneTree platform (Pimpalwan Group)



### 4.3. Milestones in 2023

- **Partnership with H.V. Desai College & D.Y. Patil College of Arts, Science and Commerce:** Both colleges signed an MOU with PKC in 2023.
- **Partnership with MIT-ADT College**

**Under these partnerships, the following events were conducted:**

- Students were trained for sapling mapping activity on ConneCTree
- In January 2023, a sapling mapping event was carried out at Parvati Hills (H.V. Desai students)
- In July 2023, ECA volunteers were trained for data collection
- In August 2023, Ghordeshwar plantation and data collection was undertaken (D.Y. Patil students)
- In September 2023, an event called 'Mohim Kalpavrukshachi' was carried out for mapping of plantations (MIT-ADT students)

### 4.4. Milestones in 2024

- **Partnerships with JeevitNadi and Pune River Revival groups:** JeevitNadi and Pune River Revival are volunteer groups that are actively monitoring and nurturing the river basins and biodiversity of riparian zones in Pune

**Under these partnerships, the following events have been conducted:**

- Students and citizen volunteers were trained for sapling mapping activity on ConneCTree



## 5. Details of Projects under the ConnecTree initiative

As part of the various projects conducted under this initiative approximately 1,000 saplings and trees have been mapped to the ConnecTree platform from 2021 to 2024.

### 5.1. Pune Smart City Collaboration [May 2021 to January 2022]

#### Short description of the project:

PKC and Pune Smart City agreed to work together on the sapling plantation & monitoring activity in May 2021 with a focus on the Aundh-Baner-Balewadi (ABB) area. Bhujal Abhiyan and CEE were also collaborators for this project.

- PKC, Bhujal Abhiyan and Pune Smart City representatives did a survey in ABB and identified three road segments for plantation and citizen engagement events.
- An event with plantation and mapping activity with the involvement of the local residents was conducted on 12<sup>th</sup> July 2021. Adequate precautions were taken to follow norms during the pandemic period.
- Pune Smart City managed the sapling plantation activities i.e creation of tree pits, digging, arranging for saplings, watering etc. for 70+ saplings on the road stretch.
- PKC team mapped the saplings and invited the citizens to look after the saplings. Citizen volunteers and nature enthusiast students have been monitoring this 400 meters stretch of a patch of a road in Baner collecting sapling plantation information.
- The next event was planned in August 2021 in the Balewadi area. This was plantation at the road median.

#### The project benefits:

Roadside vendors, cyclists, walkers

Partnerships: [Pune Smart City](#)

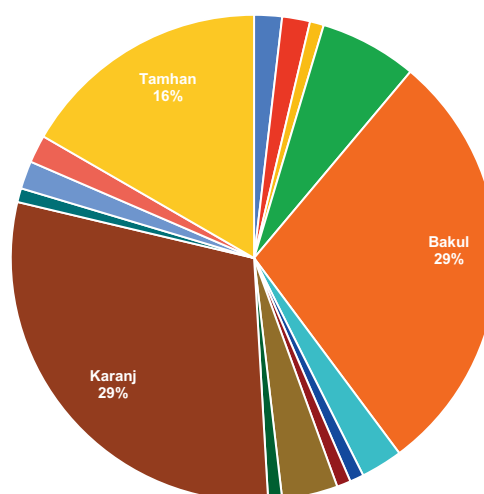
#### Result:

A total of 108 saplings have been mapped, with Simpson's diversity index of 0.837

#### Stakeholders/Beneficiaries:

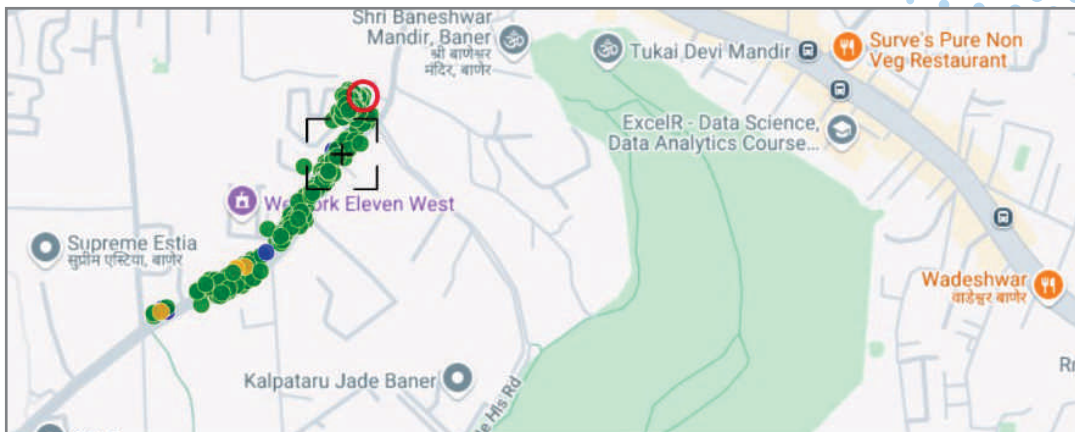
20 citizen volunteers from RWAs. Residents from housing societies along the road

#### Species mapped



Total Saplings Recorded: 108  
Top 3 species: Karanj, Bakul, Taman

Snippets from the project:



## 5.2. Demonstrating Successful Plantation of Pimpalwan Group [September 2021 – ongoing]

### Short description of the project:

Plantation & nurturing saplings in and around the Pimple Nilakh area is one of the activities of a nature lover's group named Pimpalwan.

- Pimpalwan volunteers planted saplings on the footpath along the road stretch in Vishalnagar in 2021. Most of the saplings were more than 5ft tall, when planted. Tree guards were also installed around the saplings. The trees were tagged with labels.
- These saplings were mapped onto the ConnecTree platform in 2022. Saplings have been planted along the road, covering a length of ~800 meters.
- PKC organized an event in 2024 to record observations of this plantation with support from Fergusson College interns.
- A number of saplings have grown into trees.
- 102 saplings are surviving after 3 years and the survival rate is 92%.

#### The project benefits:

Providing shade to Roadside vendors, cyclists, walkers

**Partnerships:** Pimpalwan group

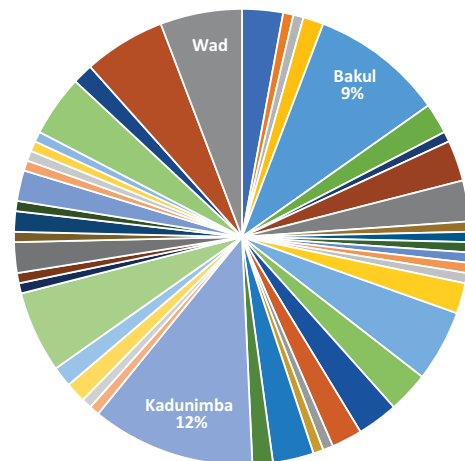
#### Result:

A total of 137 saplings have been mapped, with Simpson's diversity index of 0.049

#### Stakeholders/Beneficiaries:

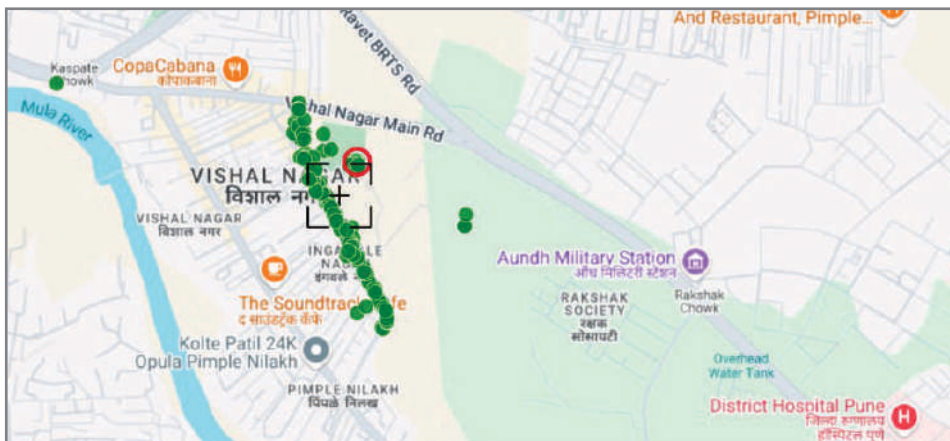
10 students from Environmental Science Dept of Fergusson College, 15 citizen volunteers from Pimpalwan

### Species mapped



Total Saplings Recorded: 137  
Top 3 species: Bakul, Kadunimba, Wad

### Snippets from the project:





### 5.3. Mapping with Environment Conservation Association (ECA) [September 2022 - ongoing]

**Short description of the project:**

Once PCMC selected ConneCTree during their Innovation Conclave, they introduced ECA to PKC. PCMC and ECA have an MOU for environment conservation. ECA and PKC agreed to work together in PCMC and surrounding villages. ECA has a large community of volunteers who are school teachers, senior citizens and nature lovers

- ECA carries out regular plantation activity in different areas within PCMC each year. For two consecutive years they have been planted mango saplings within the protected area of the PCMC gardens. The idea behind mango plantations is to have plentiful fruit produce that will be made available to marginalized communities and future generations.
- They came forward to use ConneCTree for nurturing these Mango saplings.
- An instruction manual in Marathi was prepared to facilitate correct use of the ConneCTree platform.
- Enthusiastic senior citizens coming from all strata of society have been contributing in the data collection activity, using this Marathi manual and feeding information in Devanagari Script.
- They have also been paying attention to recording the rampant growth of invasive species such as Lantana.

**The project results in:**

Provision for food for the marginalized communities

**Partnership:**

Environment Conservation Association

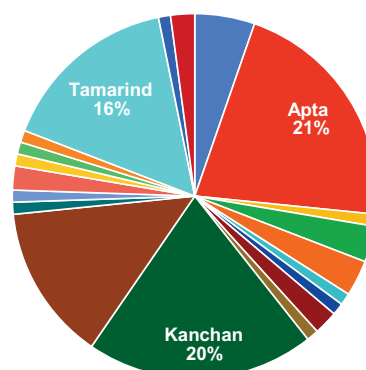
**Result:**

A total of 91 saplings have been mapped, with Simpson's diversity index of 0.921

**Stakeholders/Beneficiaries:**

10 senior citizen volunteers from Environment Conservation Association

**Species mapped**



Total Saplings Recorded: 94  
Top 3 species: Apta, Kanchan, Tamrind



## 5.4. Mapping with Paryavaran Gatividhi

[Feb 2022 – Dec 2024]

### Short description of the project:

Paryavaran Gatividhi came forward to nurture the saplings planted by the Pune Smart City along the roads leading to the Madhuban Society junction. They are connected to a number of citizens with positive attitude towards greening, in the Balewadi area.

- Citizens from neighbouring RWAs and nature lover groups collected data during morning walks and strolling around the common areas of the area such as gardens and footpaths, dividers.
- Many citizens uploaded selfies with saplings, indicating their personal connect and sense of responsibility towards healthy and unhindered growth of the sapling.
- Some plantation activity was also carried out in Balewadi with Paryavaran Gatividhi.

#### The project benefits:

Citizens from RWAs in the neighbourhood

#### Partnership:

Paryavaran Gatividhi

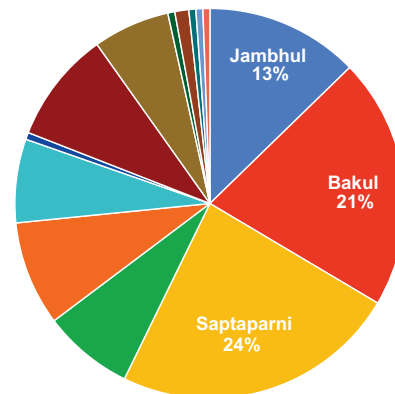
#### Result:

A total of 173 saplings have been mapped with Simpson's diversity Index of 0.859.

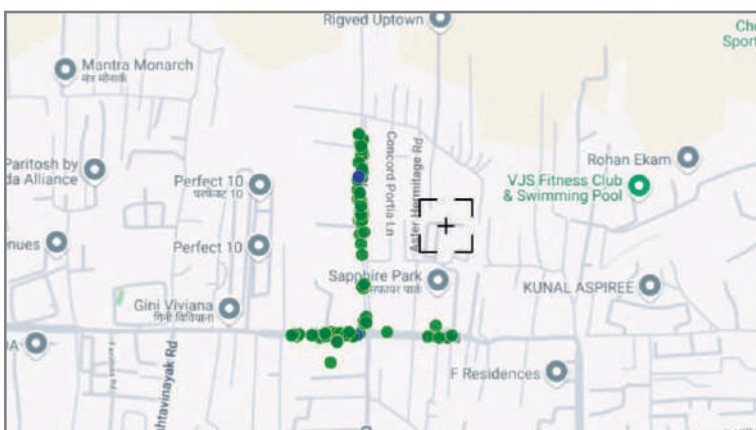
#### Stakeholders/Beneficiaries:

10 citizen volunteers from Paryavaran Sanrakshan Gatividhi

### Species mapped



Total Saplings Recorded: 94  
Top 3 species: Apta, Kanchan, Tamrind



## 5.5. Riparian Flora Mapping [June 2024 – ongoing]

### Short description of the project:

Citizen volunteers and nature enthusiast students from JeevitNadi and Pune River Revival have been scanning the riparian zone of Mula River near Aundh collecting native species information.

- JeevitNadi and Pune River Revival volunteers recorded grown trees along the Mula riverfront from September 2024. Most of the trees are well grown with more than 5ft height.
- 300+ trees have been mapped, covering a length of ~1 km.
- PKC organized an event in 2024 to record observations of this plantation with support from environment enthusiasts and nature lovers from the two groups.

### The project results in:

Protection and monitoring of the green cover in the Riparian zone

### Partnerships:

Jeevit Nadi, Pune River Revival

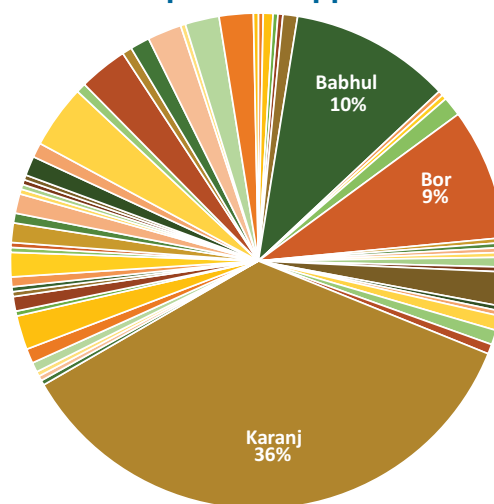
### Result:

A total of 200+ saplings have been mapped, with a diversity index of 0.85

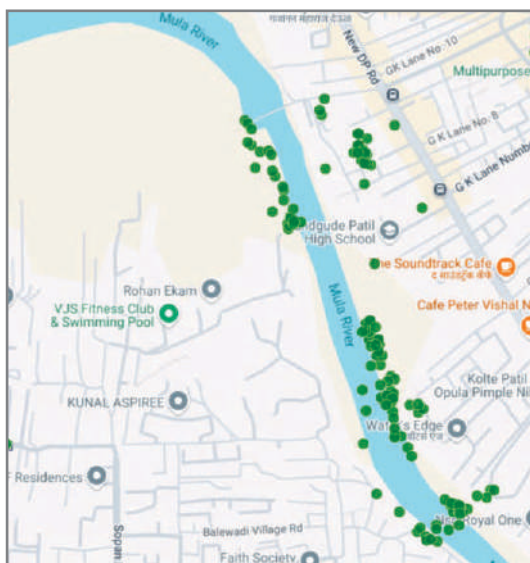
### Stakeholders/Beneficiaries:

15 student volunteers from IISER Pune and 20+ citizen volunteers from Jeevit Nadi & Pune River Revival

### Species mapped



Total Trees Recorded: 200+  
Top 3 species: Karanj, Bor, Babbul







## 6. Outcomes and Impact

ConneTree has catered to the diverse needs of Civic bodies, NGOs, Corporates, RWAs and individual citizens and resulted in the greening of a few barren footpaths (within xyz area). The saplings mapped on the platform are being tracked by the local community and the senior citizens as well as cyclists are seen to avail the benefits from the shade of the fully-grown trees. Through the saplings mapped in this platform, the ConneTree platform hopes to contribute towards sequestration of 60,000 KG carbon and creation of 18,000 KG carbon stock in the upcoming decade.

### Impact Metrics (can be converted into a graphic):

- Local Civic Bodies Partnered: 4
- Knowledge & Implementation Partnerships Built: 5+
- Community Activities Conducted: 20+
- Total Saplings and Trees Recorded: ~1200
- Native Species recorded: 35+
- Students Engaged: ~150
- Beneficiaries: ~5000 households.

## 7. Future Roadmap

- Demonstration of ecosystem services starting with carbon sequestration potential followed by thermal comfort
- Developing a business model to run ConneCTree as a social enterprise. In the current phase, we are working towards identifying the core costs of maintaining the platform (and its future evolution) and a subscription model with different slabs (e.g. up to 1000 saplings, or 10000 saplings) and offerings for different client types (e.g. citizens groups, NGOs, educational campuses, corporates and CSR projects, government). We will monitor the costs of platform maintenance, usage approaches by different client types, and customization. We expect to balance paid and subsidized subscriptions.
- We also expect to integrate partnerships with nurseries and other actors in the plantations sector.

## 8. Media Coverage



## Leadership



**Anita Kane**  
Senior Advisor



**Shirish Kantikar**  
Consultant

## Execution and management



**Disha Sawant**  
Program Manager



**Nikhil Sheth**  
Web Developer



**Atharva Pathak**  
Software Engineer



**Snehal Sadalage**  
Project Associate



**Atreyee Saha**  
Data Analyst

