Chennai Urban Horticulture and rooftop gardening initiative

Project overview

As one of India's largest and most populous metros, Chennai exhibits all the traits and vulnerabilities inherent to a developing, high-density city. Rapid urbanization has led to solid waste pollution in our streets and waterbodies, poverty, and energy and water scarcity. A locality based urban horticulture programme can help address these challenges and calls for a green infrastructure strategy to create healthier urban environments and induce behaviour change by encouraging citizens to compost for use in their vegetable gardens, thereby reducing the waste that goes into landfills. In the short term, at the neighbourhood/ locality scale, urban horticulture could[1] have the following benefits (figure 1):

-   provide access to fresh, nutritious, organic produce and increase the urban poor's access to food.
-   provide vulnerable groups (especially women) with food, income and a focus for shared enterprise
-   encourage citizens to engage positively and proactively with civic issues and allows young people to channel their energy constructively
-   keep the environment clean and consequently reduce health hazards
-   lower temperature and reduce the need to transport produce, thereby saving fuel and lowering CO2 emissions
-   provide a lab for innovative approaches to urban development by showcasing good governance in action.

Figure 1: Benefits and linkages of urban horticulture

What we propose

To increase environmental education and awareness, improve civic participation and consciousness, and address challenges such as solid waste management, Chennai's Urban Horticulture Project will be developed to address three goals.

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[1] Food and Agriculture Organization. (2010). Growing Greener Cities, Rome, Italy.

Goal 1: Utilize thousands of acres of rooftops to scale-up vegetable gardening through a citywide strategy involving stakeholders such as residential welfare associations (RWAs). Resilient Chennai aims to scale-up vegetable gardening in a manner that is practical, cost effective and efficient to establish on flat terrace spaces available in residential neighbourhoods, especially apartment buildings. Initially, the goal is to work within two localities with strong RWAs.

Goal 2: Encourage students of 200 corporation schools to take up vegetable gardening and rooftop farming in order to promote a value-based education and supplement the Government of Tamil Nadu's Nutritious Meal Program. The initial goal is to work with 15 Greater Chennai Corporation (GCC) Schools.

Resilient Chennai's "Growing Resilience Gardens: The 2030 Vision" is as follows,

We see a Chennai where every terrace has a vegetable garden;
Where concrete spaces blossom into green spaces cooling the city;
Where rain water harvesting results in mitigating the effects of water scarcity;
Where our citizens learn to be responsible for their city and start believing that they too can make a positive difference;
Where 'reduce, reuse and recycle' becomes a way of life;
Where we work together and join hands to create a better, more liveable, RESILIENT Chennai!

Objective and contribution to city's resilience

The overall objective of this project is to cultivate ownership and engage meaningfully with Chennai citizens including GCC school children on civic issues and increase environmental education and awareness by encouraging rooftop vegetable gardens to be set up across the city. Through rooftop vegetable gardening, the project seeks to create awareness of the values and benefits of waste segregation at source (composting, recycling) and water conservation (drip irrigation, rain water harvesting) and, to grow vegetables and fruits for local consumption.

Chennai joined the 100 Resilient Cities Network in 2014 with the aim of building resilience to urbanisation and climate induced shocks (floods, cyclones, earthquakes) and stresses (e.g. solid waste management, encroachments, traffic, droughts, sea level rise). Consequently, one of Chennai's resilience goals is to take an integrated approach to addressing environmental concerns through policy and design. While another seeks to encourage citizen engagement in civic issues by bringing citizens, government and corporates together, to co-build the city. The urban horticulture project will showcase green urban design and foster much needed civic consciousness and responsibility among city residents.

Precedents
Several 100 RC member cities including Cape Town, Addis Ababa, Buenos Aires, Paris and Accra have initiatives around urban horticulture. For instance, Paris aims to set up vegetable gardens in schools that will be designed as cooling islands, owned and managed by the students. While, in Buenos Aires

plans more than 580 schools are involved in the 'School Gardens' educational project which promote the creation and enhancement of school green spaces. They are also used as a teaching tool to stimulate the incorporation of environmental education at school[2].

Even within Chennai, there are examples of rooftop gardens set up by the state and private actors. Select schools in Chennai such as the Government Girls Higher Secondary School in Ashok Nagar and Lady Willingdon Higher Secondary School in Triplicane, have been growing vegetables on their premises to cook food under the noon-meal scheme[3].

Linkages with existing projects or policies and strategies and dependence on projects

a. *Nutritious Meal Programme***:** The Nutritious Meal Programme or Mid -Day Meal Programme as it was called earlier, was introduced in the 1960s by the Government of Tamil Nadu to encourage children between the ages of 5 and 15 years to attend school through the provision of hot, cooked nutritious meals for five days a week.[4]This project is in sync with the Nutritious Meal programme and would include growing spinach along with vegetables to increase nutrition content of the meals. Importantly, in July 2018, GCC announced that nearly 100 city corporation schools would soon be equipped with vegetable gardens for their mid-day meal scheme.[5] Chennai is the first city in India to make such an announcement.

b. *Solid Waste Management Rules, 2016, GCC's Solid Waste Management By-laws, State's Solid Waste Management Policy 2018*: This project strongly aligns with the 'The Solid Waste Management Rules, 2016'[6], the draft city By-laws and the 'State Policy on Solid Waste Management 2018'. These policies promote source segregation and composting of solid waste and call for active citizen participation to follow the Zero Waste concept. Further, Rules 4 (6), (7), and (8), of the Solid Waste Management Rules, 2016, and the draft city By-laws, require all resident welfare and market associations, gated communities and institutions with more than 5,000 sq. m. area and all hotels and restaurants, to ensure source segregation, processing, treatment and disposal of bio-degradable waste through composting or bio-methanation within the premises as far as possible. Compost from bio-degradable waste would be a valuable resource for rooftop gardens.

c. *Government of Tamil Nadu Initiatives*: The Government of Tamil Nadu is also encouraging urban vegetable gardening through its agencies. The Tamil Nadu Department of Horticulture and Plantation

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[2] Resilient Buenos Aires. 2018. Resilience strategy. 100 RC. Accessed from;
http://www.100resilientcities.org/strategies/buenos-aires/
[3] Kanthimathi. L. (July 14 2017). Government schools raise kitchen gardens. The Hindu. Accessed from:
https://www.thehindu.com/news/cities/chennai/government-schools-raise-kitchen-gardens/article19279263.ece
[4] Social Welfare and Nutritious Meal Programme Department. (2018). Policy Note 2018-2019. Government of Tamil Nadu.
[5] The Times of India. (July 3, 2018). Chennai: 100 Corporation schools to grow vegetables for noon meal. Accessed from: https://timesofindia.indiatimes.com/city/chennai/100-corporation-schools-to-grow-vegetables-for-noon-meal/articleshow/64834787.cms
[6] Ministry of Environment, Forest and Climate Change. (2018). Accessed from:
http://www.moef.gov.in/sites/default/files/SWM%202016.pdf

Crops provides a subsidized kit for purchase to citizens to grow their own vegetables on the roof top or common open space[7]. The Tamil Nadu Corporation for Development of Women maintains a model rooftop vegetable garden that is fully organic and grows 22 different types of spinach, apart from other vegetables like ladies finger, brinjal, and tomato[8]. They have also trained over 200 women to setup urban vegetable gardens[9]. In addition, Tamil Nadu Agricultural University maintains the TNAU Information and Training Centre to provide training and consultancy on roof garden, kitchen gardening, production of edible mushroom and vermicomposting, among other programmes[10].

Implementation

Resilient Chennai has conducted a survey to understand citizen interest in rooftop vegetable gardening and carried out stakeholder engagement activities with members from the private sector, civil society, NGOs, government and academia to identify ideas, gaps, challenges and solutions in urban gardening. Based on the survey, inputs from stakeholders and desk research, the three goals of this project were identified.

For implementing goal 1 (setting up rooftop gardens in households across the city) Resilient Chennai will identify two localities with strong RWAs and work with them to develop a cluster of adoption within those neighbourhoods. The sites will be identified with GCC's support based on certain criteria such as, activeness of RWAs,

Resident urban gardening survey results:

Resilient Chennai engaged students from the Global Network for Advanced Management, University of British Columbia, to formulate an online survey consisting of 18 questions, which were targeted towards the lower/middle income groups. Reaching a sample size of 304, some of the key observations include:-

- 5 out of 6 residents surveyed would prefer to spend time growing produce instead of shopping for vegetables at the local market.
- 61% residents surveyed currently garden at least once a week.
- 83% residents surveyed would like to maintain a rooftop garden.
- 72% residents surveyed said that they would need training on terrace gardening.

willingness of residents, existence of GCC compost pits and neighbourhoods should consist of people from mixed economic and socio-economic backgrounds. This activity could take up to six months with a commitment of all residents.

For implementing goal 2 (setting up vegetable and rooftop gardens in 15 Corporation schools), Resilient Chennai will work with GCC to select the schools, hire gardening staff. The gardens will be initially setup by small business offering such services, NGO or a local nursery. School selection will be based on a

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[7] Directorate of Horticulture and Plantation Crops. n.d. Roof top/ kitchen gardens. Accessed from: http://tnhorticulture.tn.gov.in/horti/do-it-yourself-kit
[8] News Today. (August 4 2018). Roof-top gardening trend picks up in Chennai. Accessed from: https://newstodaynet.com/index.php/2018/08/04/roof-top-gardening-trend-picks-up-in-chennai/
[9] Aditi. R. (May 21 2018). Want to grow your own garden? Help is at hand. The Hindu. Accessed from: https://www.thehindu.com/news/cities/chennai/want-to-grow-your-own-garden-help-is-at-hand/article23945085.ece
[10] http://agritech.tnau.ac.in/about_us/abt_us_research_chennai.html

number of criteria including, adequate ground and terrace space and interest from school principals. Each school would decide what vegetables to grow based on the Nutritious Meal programme, and which students to involve. The produce would be used within the school for the Nutritious Meal programme, with composting practiced onsite. The timeline is 3 months once government or the school principal grants permission.

Support and guidance would be sought from, the State Horticulture Department for identifying subsidies for gardening; the Tamil Nadu Corporation for Development of Women for providing trained staff; Tamil Nadu Energy Development Agency for setting up rooftop solar plants; and the Rain Centre for setting up rainwater harvesting systems.

Implementing Partners

Resilient Chennai will lead the project by working with other actors and its primary role would be to coordinate between all stakeholder groups, to advise/ supervise project actors to ensure project timeline and objectives are met and to facilitate access to funds. Table 1 provides details of possible stakeholders.

Table 1: Potential actors that would be involved in the project

Stakeholders	
Owners	- The Greater Chennai Corporation (GCC) - The Tamil Nadu Horticulture Department - Tamil Nadu Corporation for the Development of Women - Chennai Smart City Ltd. (CSCL)
Approvers	- The Greater Chennai Corporation - The Tamil Nadu Horticulture Department - The Tamil Nadu Slum Clearance Board. (For when we adopt a resettlement area) - The Chennai Metropolitan Development Authority (CMDA)
Partners	- Chennai City Connect - M.S. Swaminathan Research Foundation - NGOs such as The Magic Bean, Indra Gardens, My Harvest - Future Farms: Hydroponics - TNCDW / National Urban Livelihoods Mission - University of British Columbia
Beneficiaries	- The urban poor (especially women and children) - Citizens of Chennai - City and state government departments dealing with water and solid waste management

Costs

Project costs per garden have been highlighted in table 2. Fixed cost of setting up both – the school and rooftop gardens would include include costs of compost, organic manure and organic pest control. While recurring, monthly costs would include maintenance activities.

Table 2: Tentative costs

Description	Fixed costs	Recurring costs (per month)
cost of setting up the school gardens (1500 - 2000 sq. ft.)	₹2,00,000	₹30,000
Chain link fencing cost to protect students	₹50,000	
cost of setting up rooftop gardens (1500 - 2000 sq. ft.)	₹150,000	₹15,000

Risks and challenges

Potential challenges associated with the project include; infrastructural challenges as most roofs in Chennai are permeable, inducing behaviour change among citizens on civic consciousness, poor water quality and water shortage and getting appropriate technical support and guidance to sustain the project.