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DEVELOPING A MODEL OF HOLISTIC ENVIRONMENTAL EDUCATION INCLUDING TEACHER TRAINING FOR ECO-SCHOOLS IN TAMIL NADU

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LIST OF ABBREVIATIONS

PF	Pitchandikulam Forest
TDEF	Tropical Dry Evergreen Forest
KEET	Kaluveli Environment Education Trust
NEEC	Nadukuppam Environment Education Centre
NGC	National Green Corps
ECR	Early Career Researcher
NGO	Non-Governmental Organisation
TESF	Transforming Education for Sustainable Futures
IIHS	Indian Institute for Human Settlements
EEC	Environment Education Centre
M&E	Monitoring and Evaluation
MEL Framework	Monitoring, Evaluation and Learning Framework

ABSTRACT

A holistic and place-based environmental education program that can be scaled across the state is the need of the hour (Batra et al., 2022) in the state of Tamil Nadu, India, as stakeholders devise various responses to climate change (Sundararaju, 2022). Pitchandikulam Forest is a 70-acre restored indigenous forest. Attached to this is an eponymous environmental organisation that works on research and development of the forest. For almost five decades, the organisation has been encouraging indigenous forest restoration, waterbody restoration, water retention landscapes, environmental art, environmental education, community engagement and more (Auroville, n.d.). A unit of the Auroville Foundation (Auroville, n.d.), Pitchandikulam Forest provides the crucial experience required to gain a deeper understanding of the environment in schools. Its Eco-Schools Program will transform school campuses into ecologically rich environments that set the stage for holistic environment education learning to occur (Kavita Sharma & Mamta, 2015). Teachers will be trained by educators to kindle the curiosity of students and provide hands-on, experiential learning.

THE PROGRAM V. THE PROJECT

This study will support the building of robust processes that are required to scale the existing programs of Pitchandikulam Forest (PF) to all the districts of Tamil Nadu. These learnings and methods also have the potential to be adopted in other countries. Henceforth, the Eco-Schools Program—which is yet to be implemented in the format explained above—will be referred to as the "program". "Teacher training program", "Educator training program" and other programs referred to in this document will be programs conducted under the larger Eco-Schools Program. The research aspect of the Eco-Schools Program—funded by the Transforming Education for Sustainable Futures (TESF) Network through the Indian Institute for Human Settlements (IIHS), Bengaluru—will be referred to as the "project". The project aims to understand and refine the deliverables of the program. It will aid and help PF and the Tamil Nadu government to scale the program in the coming years.

Figure 1. Pitchandikulam Forest, Auroville, Villupuram | Source: Pitchandikulam Forest, 2018

INTRODUCTION: PITCHANDIKULAM FOREST

In 1973, the forests of Auroville, including Pitchandikulam Forest, were a picture of degradation. The land was barren due to severe deforestation and the task to restore it had to be done from scratch. After many years of restoration of the native tropical dry evergreen trees, the forest flourished. Now, it is a self-regenerating forest, with the PF team doing outreach work to create similar changes in the bioregion (Auroville, n.d.).

Table 1. Restoration projects of Pitchandikulam Forest

Project	Location	Area
Pitchandikulam Forest	Auroville	70 acres
Tholkappia Poonga	Adyar, Chennai	58 acres
Nadukuppam Forest	Marakkanam	35 acres
Siruseri Twin Lakes	Siruseri, Chennai	100 acres
Panaiyur Lake	Chengalpattu	72 acres
Mugaiyur Park	Mugaiyur	88 acres
Matrikunj	Puducherry	50 acres
Nanneer–Pothur Lake	Ambattur	15 acres

Source: The author

Figure 2. Tholkappia Poonga, Adyar, Chennai
Source: Pitchandikulam Forest, 2012

Figure 3. Nadukuppam Forest, Marakkanam
Source: Pitchandikulam Forest, 2011

Figure 4. Siruseri Twin Lakes, Siruseri, Chennai
Source: Pitchandikulam Forest, 2021

Figure 5. Panaiyur Lake, Chengalpattu
Source: Pitchandikulam Forest, 2012

Figure 6. Mugaiyur Lake, Mugaiyur
Source: Pitchandikulam Forest, 2012

Figure 7. Matrikunj, Puducherry
Source: Pitchandikulam Forest, 2022

PF's skill in the restoration of forests and lakes while working with the community on health and livelihoods inspired a series of education programs. Since its inception in 1973, PF has frequently worked with children, whether it is involving them in hands-on work of restoration or in running a small school run from 1975 to early 1977 for the Tamil village children (Brooks, 2022).

Figure 8. Joss Brooks exploring the beach with a group of children, 1977 | Source: Pitchandikulam Forest, 1977

Figure 9. Joss Brooks's visit to the beach with a group of children, 1977 | Source: Pitchandikulam Forest, 1997

Later, these education programs expanded and were curated according to bioregion, working towards reviving knowledge systems embedded in rural practices. The education programs also cater to a significant gap in the current education system, on connecting theory with practice (Pitchandikulam Forest [PF], n.d.). The act of creating landscapes and learning through the process in an experiential manner is replicated in a school environment through PF's environment education programs. Over the last 30 years, many programs and collaborations have been undertaken. Some of the current projects are described below.

Nadukuppam Environment Education Centre, Nadukuppam (2002–present)

During the first reconnaissance in 2002, it was found that the Nadukuppam Government School had 520 students, two trees, no bathrooms, and overall, very poor infrastructure (figure 10) (PF, n.d.). PF began planting trees, built an environment education centre (EEC) on the campus with land provided by the community and began a much-needed literacy program. Continuing under Kaluveli Environment Education Trust (KEET), in the four years of the literacy program, educators visited the villages in the evening from 6 p.m. to 7:30 p.m., six days of the week to teach nearly 100 students (Epinal, 2022). The consistent efforts increased the pass percentage from 9 per cent to 54 per cent (Epinal, 2022). The construction of classrooms and toilets also attracted more teachers to work in the school (Epinal, 2022). This further increased the pass percentage to 94 per cent. Now, the school has over 200 trees and a localised environment education program through which the students do organic farming and go on exposure trips in the Kaluveli bioregion.

Figure 10. Nadukuppam School (the triangle boundary), 2002 v. 2022 | Source: Pitchandikulam Forest, 2022

Figure 11. Nadukuppam School: (L) A single tree in campus in 2002; (R) A water treatment facility in 2006 | Source: Pitchandikulam Forest, 2006

Figure 12. Organic farming session at Nadukuppam School | Source: Pitchandikulam Forest, 2019

Vepperi Eco-school, Vepperi, Marakkanam (2020–present)

During the lockdown, PF received an opportunity to work with the Vepperi Government Higher Secondary School near Nadukuppam, whenever the situation allowed. Now, the school has an acre of forest, a shallow pond, walls with painted information of plants, stones with artwork, a painted water tank, and a room that has been converted to a space where educational activities can occur (PF, 2020).

Figure 13. Before: Vepperi School in 2020 | Source: Pitchandikulam Forest, 2020

Figure 14. After: Vepperi School in 2022 | Source: Pitchandikulam Forest, 2022

Schools in Action for the Planet, Chennai (2020–present)

Beginning with 10 schools in 2020 and conducting engaging online sessions during the lockdown, the Schools in Action for the Planet program (PF, n.d.), funded by Tata Communications Limited, is an environment education program being run in 20 schools with a team of educators conducting in-person sessions on alternate weeks, student trips, teacher trips, setting up gardens and more. This is an offshoot of the environment education program that was run out of Tholkappia Poonga (restored by PF) even before the Poonga's opening in 2011 (PF, 2019). (Children visited the Poonga for education programs and participated in community awareness programs such as rallies for creating awareness amongst residents to stop dumping garbage and construction debris in the park. The 'Friends of Adyar Poonga' was a group formed by residents that also participated in the education programs and were active participants from the community (Madras Ramblings, 2008).

Figure 15. Gardening session in progress, as part of Schools in Action for the Planet | Source: Pitchandikulam Forest, 2022

Garden Schools, Chennai (2022–present)

Garden Schools is an Eco-Schools Program module that was put together in 2022, after assessing on the expertise and resources that Pitchandikulam Forest had to offer. It was designed to reflect the process used by Pitchandikulam Forest during their restoration projects, scaled down to the level of a school campus and school garden. Working with 12 schools situated around Tholkappia Poonga, it also included a teacher training program that worked with 26 teachers to empower them to start gardens and develop them as learning places with their students (Anbuselvam et al., 2022).

Figure 16. Garden schools: Results from the teacher training program | Source: Pitchandikulam Forest, 2022

RESEARCH CONTEXT

As PF's Eco-schools Program bridges a significant gap (Uboweja, 2022) in the current education system by connecting practice and theory through practical applications of ecology ("Ecology", 2022) the program has the potential to scale up and create an impact across Tamil Nadu. Recognising this, the incumbent Tamil Nadu government— elected in 2021, and an active participant in PF's Tholkappia Poonga project during its creation—has requested inputs from the organisation to take holistic environmental education to more districts (Sathish, 2021). Currently, the database of information and resources that Pitchandikulam Forest has accumulated over the years is specific to the city of Chennai and the Kaluveli bioregion. To work in different bioregions would require a program structure that helps consolidate baseline ecological information required for the new locality. This study asks five questions that cover the range of requirements for running such a program (curriculum, manual, training and M&E) using which it formulates a model of holistic environmental education that can be customised for place-based education to happen.

RATIONALE

The Eco-schools Program

PF currently pools its years of experience into the Eco-schools Program. Eco-schools are the schools that PF works with to transform their campuses and their engagement with students and teachers, with a sharp focus on environmental education. The program's broad deliverables are as follows:

- Eco-element: Setting up infrastructure or "eco-elements" in the schools, around which the environmental education sessions are structured. This includes tree plantations, seed forests, waste segregation systems, kitchen vegetable gardens, plans for water management and grey water management, and more.
- Eco-clubs: Forming or promoting existing eco-clubs that gather for weekly environment-themed activities, such as debates, discussions, film screenings, eco fairs, student exchange programs, establishing eco-elements and more. These clubs go on a field visit in the bioregion during the year, and adopt one community project to take action and create awareness.
- Eco-centres: Setting up rooms or spaces, known as eco-centres, in the school for activities and displaying information on the bioregion they inhabit.
- Teacher training: Training science teachers in the environmental education curriculum for classes 6–8 and adding to their knowledge of the existing state science syllabus. These trainings are organised in the EECs of Nadukuppam, Tholkappia Poonga, and Pitchandikulam Forest.
- Environment education: Conducting experiential activities that connect students and teachers with their environment.
- Program management and evaluation: Implementing a system to monitor the quality of the deliverables and conducting regular evaluations to update the program based on the analysis for high feasibility and efficiency.

Scope of the TESF Project

PF has the practical know-how to establish an eco-school. The organisation requires assistance in identifying holistic quality parameters that would make its work successful in local bioregions so that these can be scaled to larger areas. This requires research, documentation and project development that is specific to the end vision of offering the project to the state of Tamil Nadu and its various unique bioregions.

OBJECTIVES AND RESEARCH QUESTIONS

In brief, the objective of this project is to research and develop the elements required for the offering of the Eco-Schools Program to the wider state of Tamil Nadu and its various unique bioregions. The process is developed assuming that the program will be executed not only as described, but would also adapt as per change in variables, especially with regard to the funding and physical limitations of each school.

Listed below are the guiding questions arrived at after a basic analysis of PF's existing data, along with the required research and development with a tangible output produced.

Table 2. Core research questions and their outputs

No.	Research Question	PF's Existing Data	R&D Requirement	Project Output
Q1	What is the curriculum that needs to be transpired to facilitate a holistic environmental education?	PF has a basic set of topics they cover for schools	Developing a curriculum structure for statewide compatibility and tailoring the topics to incorporate them into the state science syllabus	Curriculum Design (18 topics)
Q2	What is the format in which the information will be disseminated to the stakeholders?	PF has a collection of their work in the form of raw manuals	Extensive formatting and restructuring of the manual to reflect the Eco-School Program's vision	Manual Design
Q3	How will the teachers be integrated with the vision, skills and resources needed to deliver the program to students?	PF introduces new recruits to their work in an organic process	Derive a formalised training program for facilitators and science teachers	Teacher Training

Q4	How will the educators assigned to the eco-schools be trained to carry forward the program in other districts?	PF has educators with experience in setting up multiple eco-schools	Formulate a training program for educators from other districts	Educator Training / Fellowship Program
Q5	How will the execution of the Eco-Schools Program be documented and monitored for evaluation?	PF will be executing the program using experienced educators	Standardised procedures for documentation and evaluation of quality parameters	Program Monitoring and Evaluation

Source: The author

Table 3. Project output description

No.	**Project Output**	**Description**
Q1	Curriculum Design (18 topics)	The curriculum will be a set of 18 topics designed to facilitate a holistic environment education experience for students of classes 6–8 following the state board syllabus in Tamil Nadu.
Q2	Manual Design	The manual will be a compilation of information, exercises and activities designed to train teachers in establishing eco-schools and enhancing the learning experience of science students of classes 6–8 following the state board syllabus in Tamil Nadu.
Q3	Teacher Training	Teacher training has been planned as a series of training programs that the teacher will receive in order to learn how to establish eco-schools and enhance the learning experience of science students of classes 6–8 following the state board syllabus in Tamil Nadu. It includes a three-day immersion program and a monthly curriculum training program that would be conducted over nine months.
Q4	Educator Training	Educator training will be conducted as a design activity to formulate a process by which educators can be trained for guiding and training teachers in establishing eco-schools and enhancing the learning experience of science students of classes 6–8 following the state board syllabus in Tamil Nadu.
Q5	Program Monitoring and Evaluation	Program monitoring and evaluation will be a design activity to formulate a process by which all the crucial processes in the Eco-Schools Program can be documented, monitored and evaluated.

Source: The author

METHODOLOGY

Literature Review and Case Studies

The fact that it took 34 years to update the education policy of the country through the National Education Policy 2020 (Ministry of Education, 2020) was in itself evidence of the discorded reality of the education system in the country. Tamil Nadu, since the release of the policy, has opposed some of the points in the NEP 2020 including the three-language formula, common exams for Classes III, V and VIII and four-year degrees (Raman, 2022). The state has responded by forming a 13-member panel of experts to formulate a State Education Policy that addresses the concerns and submit a distinct policy for education in the state.

The current curriculum and textbooks of the State Board Syllabus were referred before and during the project. The textbooks have interesting activities for the students that helps them learn about their locality and its environment, but still conforms to the dominant narrative of consumerism and industrialisation without providing unbiased information. Additionally, while the subject books were referred, a teacher-led mapping of the Eco-Schools Program curriculum with that of the State Board Syllabus (Department of School Education, 2019) will be conducted in the next academic year.

Nyla Coelho's work on education and land practices has greatly informed this project. The significance of student-led nature education based in the local context is well articulated and structured as a curriculum in her work '*Our Land Our Life, A curriculum for children of rural communities in India*' (Coelho, 2012). Her booklet on '*Tending a Schoolyard Garden*' was an inspiration for the *Here's Our Garden: An Experience Guide* (Coelho, 2014), which comprises of activities based on the sequential process used by the organisation for restoration.

Pluriverse: A post-development dictionary, also provided an in-depth perspective on the systemic issues and discussed transformative alternatives, globalisation and development-driven pedagogy with its roots in capitalism. (Kothari et al., 2021)

Case studies of similar initiatives in Tamil Nadu and at the National level was explored—Kalpavriksha Environment Action Group, Centre for Environment Education, Keystone Foundation and Ashoka Trust for Research in Ecology and the Environment.

Proposed Methodology

Table 4. Proposed project methodology

No.	**Project Deliverables**	**Proposed Methodology**
Q1	Curriculum Design (18 topics)	An early career researcher (ECR) will work with PF's educators and government schoolteachers to develop an integrated curriculum.
Q2	Manual Design	The formulated curriculum will be designed into a manual that teachers will use as their primary resource material. For each topic, the manual will have: • General information • Information to add value to the state's science syllabus for classes 6–8 • Cues to set the environment for activities (such as deep ecology, somatic activities, establishing connections, and defining context) • Bioregion-specific tasks and community engagement suggestions • Follow-up research prompts and real-time examples.
Q3	Teacher Training	A robust training for facilitators and science teachers from the eco-schools will be designed based on the curriculum. There will be a three-day immersion training program, and monthly curriculum training spread over nine months.
Q4	Educator Training	Based on the curriculum, an experiential training program or a fellowship program will be designed according to need.
Q5	Program Monitoring and Evaluation	The execution of the Eco-Schools Program will be followed up by the ECR and aided with the necessary documentation formats and evaluation processes for the below stages: • Selection of schools • Identifying facilitators and science teachers • Revitalising the eco-club • Setting up the eco-centre • Conducting training programs for facilitators and science teachers • Establishing the eco-elements in the school through a participatory approach and working with the community • Recording information for their bioregion in their eco-centre

Source: The author

PRELIMINARY FINDINGS AND DEVELOPMENTS

As illustrated in the introduction, the Eco-Schools Program projects currently active are context-based and vary depending on requirement.

The vision of the Eco-Schools Program is to inspire environmental action in students that is relevant to the immediate environment around them. For many years, different approaches have been used with students to explore and encourage the same. Some of the approaches have been more apparently successful than others, meaning while the impact of certain approaches might be visible immediately, others have influenced an intrinsic, intangible nature of the student.

While both types of approaches have their merits, PF's greatest strength is action with respect to lake restorations, forest restorations and creation of eco-parks (PF, n.d.). In order to best utilise the organisation's resources, the Eco-Schools Program needs to share the real-time experiences of the team on the practical how-to of restoration through practical ecology.

This was how the education program was in its beginning stages. Over time, when the program expanded, more academics became involved, which often swayed the program from the practical foundations that it had the capacity to provide. To remedy this challenge, the need for practical ecology was addressed through the module of Garden Schools.

Garden schools (Anbuselvam et al., 2022) is a module focused on empowering teachers to be able to work through the challenges that they face when wanting to start gardens in their school. It ensures that the program is built on the practical application of restoration principles at the level of a school garden, which students of classes 6–8 can relate with easily. It is around and through the garden that other larger principles related to the environment are extrapolated and explored, and actions beyond the garden itself are encouraged.

Challenges

This study traces the developments within the Eco-Schools Program, including the challenges faced, for which the strategy was changed accordingly. Below are some of the major challenges that the program encountered.

Varying interest(s) of stakeholders

Often, the school administration, the teachers and students displayed different levels of engagement with the program, thereby affecting its efficiency. As a result, a school selection process has been formulated based on the many years of experience working with schools so that some of these variables can be avoided from the start. For example, interest from the school administration is non-negotiable. For an organisation with a small team, there are simply not enough resources to fight against organised disinterest. By working with schools that are interested in the program, it becomes possible to champion PF's cause better when meeting stakeholders who display lukewarm responses. Additionally, after the start of the program, each school is engaged on the basis of their interest so that the schools that take

ownership of the program are empowered differently than those schools that find it challenging and hence require more time and space to learn and grow more interested and connected to the program.

Clarity on the impact of the program

After it was decided that the program would anchor itself to practical ecology, the next step was to find ways to identify the impact of the approach and build measures to ensure the quality of the program. It was important to have feedback loops that inform the execution of the program. From this need arose reporting and monitoring mechanisms that require keen observation and mutual interaction between educators and the school. The program currently tracks the sessions with students in a particular format, which will show the impact of the program over time. Feedback from teachers and students already indicates this impact and informs the strategies used by educators. Training for educators and teachers covers these aspects so that they will be able to notice these nuances of the program (Anbuselvam et al., 2022).

Ways to replicate the program in larger scale

One of the advantages of restructuring the program through the Garden Schools module was that the larger picture was kept in mind: How does one recreate the program in schools in different landscapes? Especially that of Tamil Nadu? Hence the curriculum, manual and training program formats include the aspect of localisation of universal principles. The efficacy of the module will require testing, which will happen in the upcoming months.

Proceeding Further

In order to ensure the implementation of the program, keeping in mind the time and resources required for the Eco-Schools Program and the TESF project, combined with the desire to ground practical ecology and participatory principles, this study will focus primarily on findings from the Garden Schools module, that engages not just students, but also teachers in creating gardens as learning spaces in schools.

RESEARCH OUTPUTS

Curriculum Design

Q1. What is the curriculum that needs to be transpired to facilitate a holistic environmental education?

Overview

The curriculum of the Eco-Schools Program is focused on structuring PF's practical ecology experience in order to work with students between the ages of 11 and 14, studying in classes 6–8, so as to guide them in exploring various actions that they can take to contribute towards the health of the environment at the individual, community, population, ecosystem and biosphere level. The curriculum will focus on the school and its surrounding locality and will guide in the collection of relevant ecological information using the principles of practical ecology employed by PF during the process of restoration.

Objectives

The formation of a curriculum was underway for the existing education projects when this study added some salient objectives:

- To ensure that the curriculum can be localised to different landscapes
- To account for its usage and adaptability throughout the state
- To refocus on practical ecology.

Research methodology

Some of the methods involved in this process included:

- Inputs from the senior educators, education managers and executives (Brooks et el., 2022)
- Group discussions with educators
- Referring to the existing manuals

Please see the section on Manual Design for details of the testing of the curriculum.

Research findings

PF, while under the umbrella of the Auroville Foundation, has its roots in the indigenous practices of the Tamil people of the region. Knowledge on the watershed, local trees and herbs, and ways of stewarding the land were majorly contributed by the local community. This knowledge was instrumental in restoring the forests through a mix of modern knowledge and rudimentary technology; the latter was preferred over larger, destructive technology. The result of these efforts can be seen in the regenerative 70-acre tropical dry evergreen forest with many rare species of trees and the conservation of fast disappearing indigenous practices.

The vision of the Eco-Schools Project is to share this knowledge, and more importantly, its underlying principles, so that such projects can be replicated across the world in tandem with indigenous communities. The following are the findings from the program.

Principles based on living with the land: The process employed by PF before beginning a restoration project involves a deep understanding of the land and its needs. It involves interacting with the landscape in quantifiable ways (biodiversity survey, topographical survey, soil testing, water testing, legal land use category, the authorising parties behind it, estimated funding required etc.) and non-quantifiable ways (feel of the land, its history, its current relevance to its immediate communities, its needs as a whole entity etc.). Over the years, the education program has created many activities to emulate the principles contextually to suit the level at which students can be engaged with. For the Garden Schools module, these activities have been tailored to garden spaces and concepts. Some of the important topics are sense of place (how students relate to the environment around them), community building (relating with the larger community through gardens), watershed, biodiversity surveys, ecosystem, indigenous species and envisioning. Many of these activities include interacting with indigenous communities and practices.

Existing roots with rural indigenous practices: During the run of the program in government schools in Chennai, it was observed that many of the stakeholders still retained a connection with their rural roots.
Teachers: As first-generation or second-generation settlers from rural towns and villages in Tamil Nadu, and working in state-run schools that have the state language (Tamil) as medium of instruction, many of the teachers could relate to the concepts of land stewardship and its importance; especially in stark contrast to their urban lives. During training programs, they recollected memories from their childhood spent on the land. They recollected names of plants and animals, their daily and seasonal activities, and the moments of joy they experienced in nature.

Students: During the sessions with students, it was observed that many of the parents of these students in state-run schools were from working-class and marginalised communities. As they were also mostly first-generation or second-generation settlers from rural towns and villages in Tamil Nadu, who worked on the land for their livelihood, their children having either seen or experienced what it is like to be dependent on their environment. These students exhibit enthusiasm, curiosity and knowledge. They are also more proactive. Some of them brought seeds from their home gardens and some led the tasks in the garden as they were already familiar with them.

The value of tending to the land and stewarding it is lost in formal education, the remnants of which are with few of the teachers and students who still have connections with traditional practices and landscapes. Acknowledging their existing connection with nature as an important factor for change-making while providing tools for further experience and engagement in their schools would create grassroots-level difference in how a sustainable future can be envisioned for all beings. (Sultana et al., 2018)

Output

- With this project, the topics of the curriculum have been compiled and briefed.
- The brochure of the Eco-Schools Program will contain the updated curriculum. This will be available on the website and will make the details of the program more accessible. It will also be shared with officials, funders, and school heads and teachers as per need.

Manual Design

Q2. What is the format in which the information will be disseminated to the stakeholders?

Overview

One of the visions of the organisation is to engage with as many diverse stakeholders as possible across different landscapes when providing practical ecology services. This requires basic understanding of the many verticals that emerge when considering a given landscape. With a curriculum, it becomes possible to comprehend what has helped the team learn about a landscape. With a manual, it becomes possible to disseminate the same to various stakeholders. As the major stakeholders who execute the program are the educators and teachers, this manual was created to support them. Since it will be available on the website, it can also be used explicitly for non-commercial purposes provided that the source is duly acknowledged.

Objective

The manual created must

- Contain the essence of the program
- Encourage exploration of the local environment
- Have activities that can be tried in any school in Tamil Nadu
- Be easy to use and portable
- Be useful to both educators and teachers

Research methodology

- Referring to the existing manuals
- Structured using the updated curriculum
- Testing of activities before compilation
- Using a framework developed based on the needs of the program (e.g. impact measurement, prompts and ways to increase or decrease the complexity of the activity).

Research findings

Over the years, there have been many attempts to collect the various activities conducted by the educators in the schools. During the lockdown, a consolidated effort resulted in a set of manuals, with the most effective being in the year 2020. A few months of effort went into collecting activities and compiling them for reference.

Table 5. List of existing non-published existing manuals

No.	**Manual Title**	**Location**	**Dated**	**Pages (incl. cover)**
1	Teacher Reference Manual, Environment and Ecology Studies, Volume 1 (PF, 2020)	Chennai Environment Education Program	1 August 2020	401

2	Teacher Reference Manual, Environment and Ecology Studies, Volume 2 (PF, 2020)	Chennai Environment Education Program	1 August 2020	240
3	Teacher Reference Manual, Environment and Ecology Studies (PF, 2020)	Nadukuppam Environment Education Program	1 August 2020	300
4	Teacher Reference Manual (Tamil version), Environment and Ecology Studies (PF, 2020)	Nadukuppam Environment Education Program	1 August 2020	155
5	Environmental Education Games (PF, 2020)	Nadukuppam Environment Education Program	1 August 2020	56
6	Environmental Education Games (Tamil version) (PF, 2020)	Nadukuppam Environment Education Program	1 August 2020	41

Source: The author

These existing manuals were shared for consultations with the principal stakeholders for review and feedback to create the final version of the Environmental Education Manual. The topics in this document are works in progress and therefore should not be distributed publicly. Selected reference material from external sources was included as reference for internal study. It was decided that after finalisation, the draft edition will be made available under a creative commons licence as part of a public participatory process.

While the existing manuals were a fruitful effort in compiling data, as mentioned, they have a few drawbacks:

- They require thorough editing and formatting.
- They are extensive and hence bulky, reducing their portability.
- They were compiled with the intention of collecting all activities for the use of educators. While they serve that purpose wonderfully, yet there is a need for more accessible manuals.

Advantages

- In the light of many projects functioning under the Eco-Schools Program (like Schools in Action for the Planet and Garden Schools), a manual can be designed to be used for both smaller and longer versions of the Eco-School Program. The activities can be done within a period, or split across many if possible.
- A new manual can be used for initiating educators, following which the detailed exisitng manuals can be used.
- Unlike the larger existing manuals, this new manual is localised to the gardens that the students will create, providing the anchor of a lived reality to observe concepts instead of having to only imagine them.

In the event that more participatory approaches are implemented, a manual suggests a more authoritative approach. Hence, the compilation will be an "experience guide": experience, because it prioritises the process of learning rather than superficial results; guide, because it provides guidance and allows room for exploration and adaptation.

What is an experience guide? An experience guide is the basic set of information that would aid the educator in setting up a space of embodying a concept. It will be a compilation of activities and questions that enable learning. It can be both used to plan for a minimum of one 45-minute session for each topic in the curriculum, and be elaborated further by educators with the opportunity to create more sessions for their students. It usually depends on the educator's disposition, the students' interest and availability of resources, especially time.

How did the team go about formulating the experience guide? The curriculum is referred to in the formation of this guide. Then, the activities which the educators experience during the course of this project (either through training or by conducting a session with students) have been collected in the *Here's Our Garden: An Experience Guide* so as to be able to guide anyone looking to recreate similar learning experiences.

How does the experience guide address practical ecology? As the decision to execute the curriculum in the process of creating a garden in schools has been made (See the section on 'Proceeding Further'), the guide will contain the experiences of engaging students in environment education through the process of creating a garden.

Table 6. List of activities and their corresponding curriculum topics in the *Here's Our Garden: An Experience Guide*

No.	**Experience**	**No.**	**Activity**	**Curriculum Topic**
Introduction				
1	We're in this together	1 2 3	Grounding ourselves Garden agreements Community with art performance	Community building Community building Community building
Opening our Senses				
2	Where are we?	4 5	Sense of place On a map	Sense of place Mapping
3	Here comes the rain	6 7 8	Watershed Water sources of your land Water retention landscapes	Watershed Watershed Watershed
4	Knock, Knock. Who's there?	9 10 11	Ecosystem Biodiversity survey Indigenous species	Ecosystems and landscapes Biodiversity Ecosystems and landscapes

5	What's this place?	12	Landscapes in Tamil literature	Ecosystems and landscapes
6	Remembering the future garden	13 14	Envisioning activity Plan of the garden	Envisioning Envisioning
Getting into Action				
7	Earth beneath our feet	15 16	Parts of soil Soil preparation	Soil Soil
8	Clock it	17 18 19	Planting calendar Garden journal Display lists	Vegetable and herbal garden Vegetable and herbal garden Vegetable and herbal garden
9	Creating our garden	20 21	Finally! A garden! Care schedule	Vegetable and herbal garden Vegetable and herbal garden
10	Closing the loop	22 23	Compost making Upcycling	Waste management Waste management
Growing with our Gardens: Learnings Inside a School Garden				
11	Green pharmacy	24 25	Harvesting health Potluck	Herbs and health Community building
12	Are you new here?	26 27	Biodiversity tracking Season watch	Animal life Biodiversity
13	Where does it hurt?	28 29 30	Garden ailments: pest control Pollution Climate change	Vegetable and herbal garden Pollution Climate change
14	Stewards of our old gardens	31 32	Indigenous wisdom Community challenges	Social ecology Culture and arts
Exploring Other Gardens				
15	Out in the urban gardens	33 34	Gardens in your community Big gardens	All

Source: The author

On-ground testing

The activities mentioned below have been conducted since the start of this project in November 2021 and compiled in the *Here's Our Garden: An Experience Guide*, 2022. Hence, the learnings reflect the outcomes of the developments till November 2022 (Anbuselvam et al., 2022).

Table 7. On-ground testing of activities and educators' feedback

No.	Activity	Schools	Students	Description	Feedback	Updation
1	Grounding ourselves	12	328	Using different prompts to begin sessions by expanding the students' sensory awareness.	The testing began with simple guided meditations that direct students to use their senses to observe things around them. Sometimes students were too restless and could not pay attention.	The activity now includes a few different versions, which can all be used in a single flow, or as individual grounding activities.
2	Garden agreements	3	58	Students discuss and formulate the rules they will follow during sessions.	Care must be taken that students make their own rules. Making the rules more visible would help as a reminder.	The students can put up the information on a chart.
3	Community building with art performance	12	~5,000	A *villupaatu* (folk art) script creating awareness and sharing the program during assembly for the entire school.	It was information that was easy for the students to grasp. A visible reminder of the program will help further register.	Posters can be put up in schools to inform everyone of the program.
4	Sense of place	3	73	Walking around the school observing where one is.	More grounding activities can be used here.	Note to be added to the activity.
5	On a map	3	73	The school is located on a map to study its spatial representation.	The maps can be displayed in the school for further curiosity.	The maps can be laminated and put up; preferably near the garden.

6	Watershed	2	43	An activity to understand flow and storage of water, and the problems caused by development.	The activity needs smaller groups of students, maximum 15.	The group can be split into smaller groups/ select fewer students.
7	Water sources of your land	1	13	Learning the sources of water for a region using maps.	The visual aids were helpful. More time was required for the session.	Use existing maps and posters, create new ones where required.
8	Water retention landscapes	1	13	Coco peat/ fine sand and water is used to show how water moves along a sloped land, creating rivers and deltas. Bunding and its purpose would be demonstrated.	The activity needs smaller groups, with maximum 5 students. It can be done when coco peat is used for gardening.	Splitting into smaller groups would ensure that all the students would grasp the many phenomena happening during the activity.
9	Ecosystem	5	133	The different things that make up a garden. Ecosystems are discussed before setting up a garden.	Writing down what is found in a garden ecosystem is useful for end-of-the-year comparison.	Worksheet to be created.
10	Biodiversity survey	4	120	Students take a walk surveying the biodiversity in their campus.	The activity needs smaller groups of students, maximum 10.	The group can be split into smaller groups.
11	Indigenous species	1	30	Students learn the native species and their role in biodiversity.	Not all schools have many native trees. It can be provided to them.	108 tropical dry evergreen trees and plants.

12	Our landscape in Tamil literature	1	30	The students connect their landscape to the literature and culture of the region.	It would be useful for the students to put up information about their landscape in their garden.	Students can make a chart that they can display.
13	Envisioning activity	11	330	Students envision their garden space by drawing and making lists of things they want to add/remove.	The photographs have to be clear. By drawing without a background, some more ideas might emerge.	Options to do the activity in different ways can be included.
14	Plan of the garden	2	43	The garden area is measured and marked for different uses	Very important to teach how to carefully handle a measuring tape.	The plan can be put up in a chart.
15	Parts of soil	1	30	The parts of the soil, its nature and the life that flourishes in it are observed	The activity needs smaller groups of students, maximum 15.	The group can be split into smaller groups/select fewer students.
16	Soil preparation	1	30	Preparing the bed, pits, compost etc., required for planting seeds	The activity needs smaller groups of students, maximum 15.	The group can be split into smaller groups/select fewer students.

Source: The author

Conclusion

The feedback from the activities has been used to edit the guide. The compilation of the guide will be a major step towards sharing the experience of PF with a wider audience. The guide will come with instructions on how it can be used in versatile ways. Majorly, it follows the growing of a garden in a school as its fundamental anchoring in practical ecology.

Output

Given that *Here's Our Garden: An Experience Guide* requires testing of the activities during and after setting up of gardens, it will take time to be fully available to the public. But the part 01, version 01 will be available.

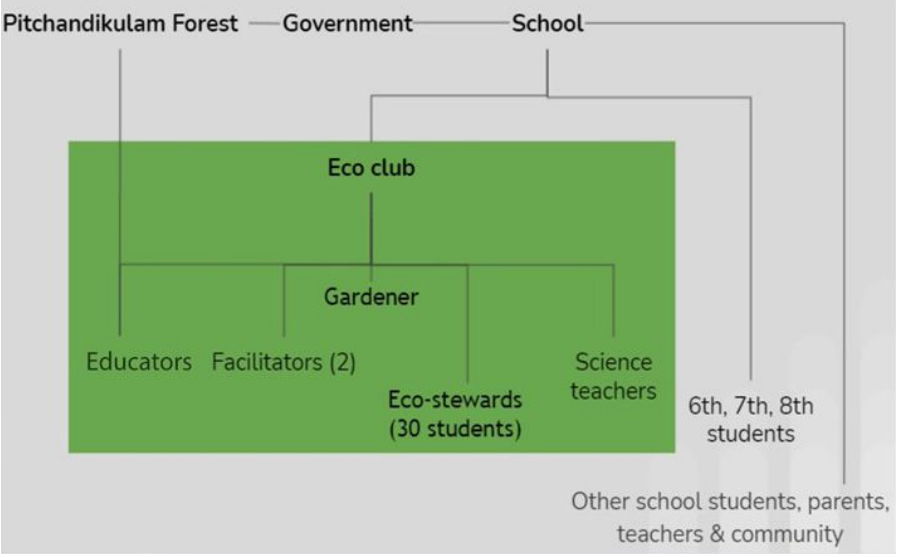

Figure 17. Activities conducted from the Eco-Schools Program curriculum and guide.
Source: Pitchandikulam Forest, 2022

Figure 18. Two sample worksheets created for activities
Source: Pitchandikulam Forest, 2022

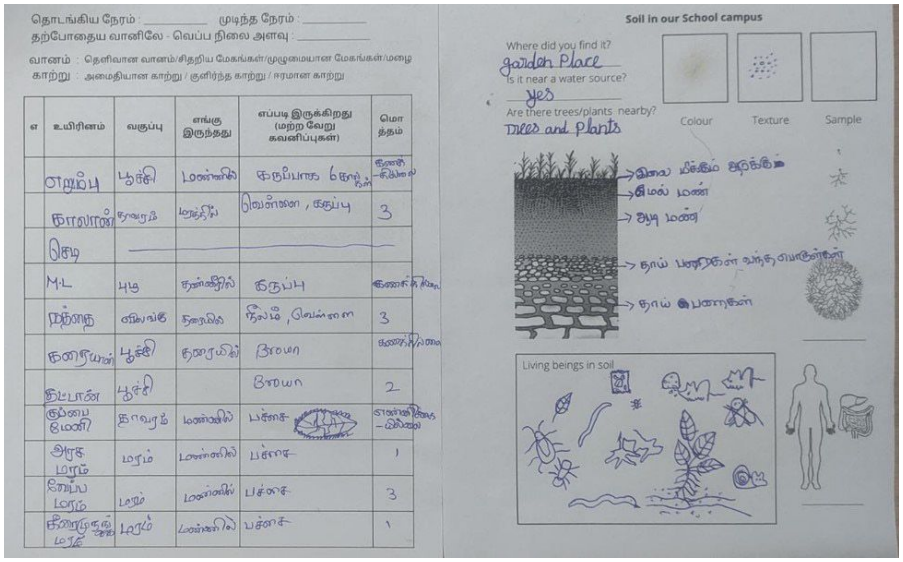

Figure 19. Front page of the guide.
Source: Here's our garden: Experience Guide, Pitchandikulam Forest, 2022

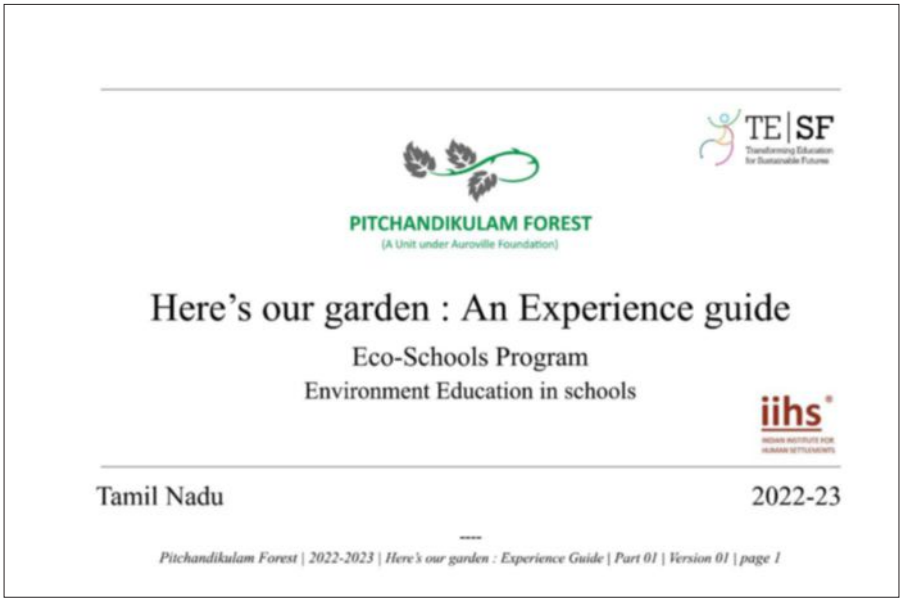

Figure 20. Sample Activity in the guide.
Source: Here's our garden: Experience Guide, Pitchandikulam Forest, 2022

Teacher Training Program

Q3. How will the teachers be integrated with the vision, skills and resources needed to deliver the program in the schools to the students?

Overview

For many years, PF has been training teachers as part of the education program offered for students. Teachers are important stakeholders and the bridge between students and their explorations in nature. Training has also been offered on request. Trips to diverse ecosystems and restoration projects expose the teachers to the possibilities that emerge from concern for nature.

This training program, designed to build a long-term relationship with teachers, is a program that will run for an entire academic year. Teachers will be guided throughout the year to initiate the process of creating the gardens, maintaining them and conducting fun activities such as biodiversity survey, food web mapping and more. Various ecological concepts such as biodiversity, bioregion, food web, pollinators and watershed will be covered.

To develop a participatory program where collaborative learning can happen, teachers will be the key decision makers and will provide regular feedback. Overlaying of the Eco-Schools Program curriculum with their school syllabus would be a co-created process, employing focused discussions with the teachers. By documenting the same, it would be possible to acknowledge their years of experience.

Objectives

- To connect with teachers over the mutual interest of nature.
- To create participatory processes wherever possible.
- To add value to the school syllabus through practical activities such as gardening.

Research Methodology

Designing a teacher training program: From discussions with the team, and other experienced teacher trainers, a training program designed with the needs of the teachers emerged as the main focus. Some important questions arose in this process:

- What support would teachers need in setting up gardens as spaces of learning?
- What skills, materials and time provisions would be required?
- What is required to ensure the sustainability of the project?

It was also advised that only teachers interested in participating be approached in order to avoid a top-down approach of project implementation. The only drawback of that being teachers taking the program for granted even before experiencing the benefits of it.

Hence, a mixed strategy of recruiting teachers was followed, with

- at least three teachers interested in setting up gardens from each school,
- through an official letter from the School Education Department of Tamil Nadu,
- combined with accepting lesser enrolment in the event of severe disinterest or the issue of under-staffing in schools,
- along with filling a detailed registration form to gauge their inclination towards the program.

The information covered in the registration form included,

- Name of the school
- Name of the teacher
- Age, gender, address
- Education, subject of teaching and standard
- Years of teaching experience
- What benefits will you gain from the training program?
- Why should students learn gardening?
- What would you need to start a garden in your school?
- What kind of garden would you like to have in your school?
- In which place would you like to set up the garden?
- Suggest two short activities for students to undertake in the garden.
- What do you like in/about nature?
- Share a childhood story about your connection with nature.
- Do you have gardening experience?
- What is the best part about gardening for you?
- Have you ever started a garden on your own? If so, describe it, including the plants in your garden.

Such a strategy ensured that teachers attended the training program and, at least, had the rare opportunity to unwind and enjoy nature, away from their hectic lives. This strategy was successful as it attracted teachers who have already set up gardens in their schools and were looking for support from those who are interested; both of whom this program looks forward to catering to. It was noted that a couple of teachers were not interested, and these were from schools who had forced their participation. A different strategy would be designed for them based on further observation as it is important to address these issues if scalability is to be achieved.

The teacher training's trial run was organised during the last few months of the project (September–November 2022), as advised by the education department. Teachers begin their academic year in the month of June and are hence busy with start-of-the-year activities. In July and August, many teachers were in training programs conducted by the education department and frequently unavailable. Concerns over the literacy gap as a result of the COVID-19 pandemic was a huge issue, combined with teacher transfers, both impending the ability of teachers to be engaged in what from their perspective is "yet another training program". By the end of the three-day training program, that perspective had definitely shifted.

Following is the program design with the implemented Chennai module.

Table 8. Three-day immersive training program

Day	Concept	Chennai Module
1 and 2	The training program would be set against the backdrop of a beautiful nature-filled space, away from the hustle and bustle of the city. Workshops and focus group discussions would be organised with experts from the organisation and from the local area, focusing on practical skills and meaningful connection with nature. The training would be more about knowledge sharing amongst participants rather than one-way lectures. The activities would draw out • Interest in the program • Major challenges • Support required (in terms of skills and materials)	The venue is Tholkappia Poonga in Adyar, an urban wetland restored by PF, where teachers will experience first-hand the beauty of restoration. They will attend workshops where they can not only learn new skills, but also share their valuable experiences through • Forest walk • Grounding activities • Focus group discussions • Practical gardening session • Insect and bird watching walk • Herbal wellness session and walk • Envisioning green school campuses
3	An exposure visit to nearby eco-spots and restoration projects that would help anchor the intention behind the program. This would also be a fun trip to unwind.	Visit to Auroville Pitchandikulam Forest, Aurolec, botanical garden and visitors centre.

Source: The author

Table 9. Monthly in-person training on curriculum

Day	Concept	Chennai Module
1 day a month	The teachers will be assisted in visualising, planning and creating gardens in their school along with their students. Focus will be on empowering the teacher to run it sustainably. Resources would be provided where possible. During these interactions, an understanding would be developed to implement the following: • At the school campus, educators will visit the teachers at school for conducting training sessions for them based on their syllabus requirement. • The sessions will integrate aspects of practical ecology through different activities that the teachers can conduct for their students.	As per concept, for any school

Source: The author

Executing the training program: The three-day immersive teacher training program was conducted from 1–3 September 2022, funded by the Direct Aid Program by the Australian Consulate-General, Chennai. It brought together 26 teachers from 12 different schools. A majority of them (24 out of 26) were women. For detailed information, refer annexure.

Research findings

The finding from the training program has been compiled below.

Table 10. Findings from the immersive training program

Day	Findings
1	Introduction circle
	Gardening training (focus group discussion, group A)
2	Childhood experiences
	Herbal wellness session highlights
	Gardening training (practical, group B)
	Teachers' presentation (highlights)
Overall (includes Day 3)	Check-ins
	October in-person training on curriculum (gardening plan)

Source: The author

Introduction circle: The teachers were asked to briefly introduce themselves and how they relate to nature. See Table 15 for a compilation of their responses.

Table 11. Teachers' comments during introduction circle

Table 15. Teachers' comments during introduction circle	
No. of Teachers*	**Comments**
2	They are part of their school's National Green Corp (NGC) program.
4	They have already visited Tholkappia Poonga before. One of them had attended its opening ceremony in 2012 with their school students.
4	Their school has construction work going on.
5	They have had gardens in their schools, but they are not maintaining it now.
6	They have active gardens.
2	Students are encouraged to plant saplings on their birthday.
4	They lost many trees on campus to Cyclone Vardha.
8	They are doing/have done tree plantations.
2	They have an eco-club program in their school.

1	They have home gardens.
2	It is nice climate now, after the rains.
4	They face difficulty in maintaining gardens, especially during the summer months of March, April and May due to school holidays.

Source: The author

Note: *The numbers are as per the real-time responses of the teachers and does not include the teachers who might have the same experience but did not share it during the session. For example, more than four teachers are part of schools which have construction going on, but some of them did not share about it during their turn.

The responses show that most of the teachers are not new to gardening or the eco-club/NGC activities. Many shared the struggles of growing gardens, such as in the summer season when the temperature is too high and schools are closed, or during natural calamities like a cyclone. Many schools also have construction work going on, with some having damaged existing gardens.

Gardening training (focus group discussion, group A): The session included experience-sharing by a resource person on her journey of becoming a passionate gardener and her learnings while creating her terrace garden. The teachers shared their experiences in creating their own gardens at their homes and raised queries about setting up gardens. The discussion covered topics such as the kinds of plants that can be grown in a school garden, the type of soil required, watering techniques, creation of compost, use of pesticides, involving students in taking care of the garden and so on. Following are details of the various topics covered, along with responses from the teachers.

How to create a garden? It was noted that one requires space to have a garden and that people with their own houses would find it easy. Landlords of rented houses usually do not allow growing of plants due to a fear of damage to property, including terrace gardens. The teachers shared how they experienced growing gardens around their homes back in their hometowns, which are not big cities like Chennai. Everyone said they would like to grow gardens in open spaces or on an open terrace. It was illustrated how using coco peat and grow bags placed above a stone or wooden plank would reduce load and prevent constant dampness of the floor slab. Overall, the idea is to find a patch of free space, which has access to water and direct sunlight for a few hours every day.

What kind of plants to grow? Various kinds of plants, vegetables, fruits, flowers and medicinal plants were discussed. The decision depends on what one would like to plant and what would grow well with the available soil and the local weather conditions.

What kind of soil is needed? The discussion went on to talk about the types of soil like clay, sandy, red soil and so on. Most vegetables grow well with clay soil and some plants like rose bushes require red soil. An issue of low quality of soil, especially in places near the seashore was discussed: how soil can be bought, and how mulching would increase the quality of soil. Everyone agreed that making sure of the availability of the right soil is the starting point for choosing which plants to grow.

How to create seedlings? A lot of care has to be taken in handling the seeds, storing them, making a tray for the seedlings and replanting them once they germinate. Some of the seeds can be sown directly in the garden beds. Here, the discussion went on about organic seeds versus other types.

How to water the plants? It is important to make sure that the water is neither salty nor very hard. Also important is knowing how to water correctly by making sure that water is not poured directly over the young seedlings so as to avoid damage to them. The resource person shared how the process of watering and having a conversation with the plants daily is more of a spiritual experience for many people.

How to make compost? Composting is highly beneficial as it provides nourishment to plants. Everything from discarded flowers to vegetable wastes can be composted by putting them in a drum or a pit in the ground. A sign of good compost is that it smells good.

How to use natural pesticides? Many types of natural pesticides were discussed. For example, using natural wood, ash mixed with water and applying them to the white patches in papaya leaves and other plants is one solution. The importance of not using chemicals and spraying substances which are not good for plant health was discussed in detail.

What are the differences between natural plants and hybrid plants? Anecdotes on how some hybrid plants do not survive more than two years and how it is better to use native seeds were shared. It was a common opinion that hybrid plants could not match up to the original taste and quality of natural plants.

Where does one create the garden in their schools? In large schools with open spaces, a well-lit area is required for the garden. In small schools, the terrace would be an ideal place to set up the garden.

How to involve students in creating a garden? The challenge is in making sure that parents are involved in this exercise and they provide consent for their children to work in the garden. The teachers said the students are always excited and they would be willing to work with them in creating the garden.

What are the tools needed for gardening? From simple tools to watering hoses, a sample worksheet that can be used with students was provided, in which there were pictures of tools against which the names should be written. Then, the teachers were asked to add any tools they felt were missing. The worksheet also had pictures of our brain (to illustrate that our biggest tool is our common sense) and our gut (as a reminder of how by keeping the health of the microbiome of our gut, considered our second brain, we can make wholesome decisions for our garden).

How to source water, seeds and various other materials needed for the garden? The materials needed for setting up the garden and the water source available at their school were discussed in detail. The teachers were well aware of the needs and challenges in getting these and expressed how it is difficult to manage without the help of external agents.

How to sustain the school garden in the long run? From the ideas of making money by selling the produce, to making alumni pay for some of the expenses, many ideas to sustain the program beyond the support of organisations like PF were discussed.

By the end of the discussion, the whole cohort was excited and looked forward to starting work with their students to create lovely gardens.

Childhood experiences: Many of the teachers belonged to rural Tamil Nadu, and hence, they shared childhood memories of time spent in their villages. The teachers felt very nostalgic and connected to nature. They enjoyed the intimacy of the smaller group discussion and really opened up. They wished they had more time to share.

Herbal wellness session highlights: This session stayed a lot with the teachers even after the session as they were very fascinated by the number of herbs and medicinal plants around them, and how much of it they remember was used in the kitchen by their mothers and grandmothers when they were young.

Gardening training (practical, group B): The group B teachers were taken to the garden patch for a practical demonstration of setting up a garden. All the necessary tools were provided, along with safety instructions. The group was divided into teams and each team worked on a mud patch of 2ft ×2ft. The area was demarcated with sticks and they were asked to dig a pit of 1.5 ft depth. The pit was half-filled with compost. The teachers took some time to get used to the digging and eventually completed it. The instruction was to mix the top and bottom soil well, then add the required quantities of coco peat and neem cakes to the soil. The teachers helped each other in the tasks and were seen to be very enthusiastic right throughout. Once the compost and other items were mixed, the dug out soil was again put back into the pit, with the top soil going in first. The soil should not be compressed so that when it is watered, it can easily percolate into the pit. Once the soil was levelled, the teachers were asked to plant brinjal seeds, holding the seeds using their thumb and forefinger. The seeds were planted approximately two inches into the soil and the hole was closed with soil. Some of them planted other vegetables as well. Then, using the watering can, water was sprinkled on the surface of the pit. There was a sense of joy and satisfaction on having done the job well. The session ended with teachers having a good understanding of starting a vegetable garden from scratch. The educators helped with the preparation and mixing of coco peat to prepare a grow bag as a demo for terrace gardening. Several questions arose in this process, such as on the need to take so much care while planting seeds, on the different layers of soil, alternatives to neem cakes and more.

Due to time constraints, group A was only able to create the terrace garden set up with coco peat, compost bio inputs and a grow bag. Since they did not have time to dig a pit, a fun activity of going through each step by acting it out was conducted.

Teachers' presentation (highlights): At the end of the second day of the training program, all the representative teachers from each school gave a presentation on what they have learnt, the scope and coverage of the training program, the quality of the resources handling the program, logistics of the program and their vision for their school garden.

The vision for their schools, as shared by the representing teacher from each school included the following:

- To bring more diverse visitors other than butterflies and dragonflies.
- To create a small pond so that excess water can be fed to the banana trees, add some creepers in and around the motor shed, and plant more vegetables near the mid-day meal centre. The hope is that by next year the school will have a thriving garden.

- To involve interested students in creating and maintaining the school garden, after safeguarding the space from outside intrusions.
- To have a kitchen and herbal garden near the mid-day meal centres.
- To create a hanging garden, rock garden, cactus garden, and so on.
- To plant more indigenous plants.
- To further support and nourish the existing plants in schools undergoing renovation.

The teacher's analysis was very thorough and covered all the aspects of the training program. The following are some of the points made by them during their presentation.

- The practical aspect of the training was very impressive, combined with the location of the Tholkappia Poonga and the effort that went into creating the eco-park, which was very energising to spend time in.
- The whole experience of learning about various trees, by looking at the leaves, then their usages and how it is important for the ecosystem was very informative and exciting.
- The concept of the food chain and how it is important to keep the cycle organic was explained in detail, and the concept of one's own kitchen being a pharmacy and how to use herbal plants for keeping the whole family healthy was amazing to know.
- It is possible to create responsible and self-disciplined students by way of making them participate in the gardening activities.
- Appreciated the role of the facilitators, their subject knowledge.
- The sessions conducted by the gardening resource person were very interesting and appreciated the fact that such inspiring persons are very rare to meet, as they are mostly confined to their schools.
- They already have many medicinal plants in the garden like tulasi and aloe vera, and vegetables like brinjal, snake gourd and spinach.
- They learnt about how to live along with nature, and teach the children about the same.
- In spite of initial skepticism about training programs, they were pleasantly surprised about how the program was the most engaging and refreshing one in her many years of attending training.
- The teacher said she usually advises her students to take care of the plants as if they are humans, even the insects, on the school premises and prompts students to take pure science courses.

Feedback from a representative from the school department under which three of the schools function:

- It was nice to see the knowledge and passion of the facilitators. The success of the program is mainly due to the energy brought by them.
- It's nice to see the impact of a hands-on training on all of the teachers.
- Impressed by how the teachers shared how they treated plants also as human beings, by taking care of them, and talking to them, which is very therapeutic.
- Each plant has its own medicinal value, and nature provides us with everything. We have destroyed most of the resources, and it's important that we need to start doing things to take care of nature. Impressed by all the plans for the gardens; hoping to visit the schools and also PF in future.

Check-ins: Teachers were invited to look inward and express in one word how they were feeling. These were called check-ins. It reflected the momentary impact of a session. Some teachers also expressed that it would be a good way to know what their students were feeling and looked forward to trying it out with them.

1.2.Garden Agreements

Description	Students are asked to prepare a list of agreements that would help them get the best out of their sessions, including safety precautions.
Duration	10 - 20 mins.
Venue	Anywhere; preferably in the view of the garden space if the set-up is ready.
Objective	To sensitize students for upcoming activities which would involve physical work. To foster their sense of agency and encourage their participation in all aspects.
Precaution	Avoid creating rules - the intention is to encourage self awareness not rigid compliance.
Resources	A list of possible agreements created by other stakeholders
Activity Flow	
Process	Prompts
Envision doing gardening activities / observe the garden	Take a deep breath. Walk along the garden space. Imagine how you would behave during the session.

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	Will there be yelling? Will there be running around? If it is a terrace garden, will there be leaning over the parapet wall? Would they be interested in hearing what the teacher/educator has to say? How will we handle the tools? How would we work together in teams? What agreements do others want? Educators/teachers? Gardeners?
Making notes	Write the list of agreements down individually (worksheet can be used), and in a chart that can be displayed.
Impact	Creates a good transition into garden activities, ensures safety of students.
Measurable Impact	Incidents of accountability for actions in the garden.
Assignment	Create drawings with motivating words which can be displayed in the classroom
Follow-up	Making sure that the agreement charts are pasted on the allotted wall space.
Level up!	Can this activity be conducted regularly to update the agreements? Can the change in agreements be documented and analyzed? Try it out.

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Figure 21. Three-day training program with 24 teachers from 12 schools | Source: Pitchandikulam Forest, 2022

See Figures 22–23 for sample drawings made by the teachers.

Figure 22. Vision drawing: Removal of waste and different types of gardens. Source: A teacher as part of the teacher training program, Pitchandikulam Forest, September 2022

Figure 23. Vision drawing: “Grow trees, get rain” in Tamil; different types of gardens with many insects; a climber on the tree. Source: A teacher as part of the teacher training program, Pitchandikulam Forest, September 2022

The check-ins were noted during the training program, and once in October 2022, using a Google form (see Figures 24–27) that was sent to keep in touch with them and to learn how they were feeling. It also helped understand what impact the training program had on them.

The check-ins showed that the teachers have had a positive impact from the training and most have already discussed the setting up of a garden in their school with their students. Two schools have also already discussed this during their school management committee meeting and in one school a parent had offered to help.

October in-person training on curriculum (gardening): As a start for the in-person training on curriculum, the garden plan was the focus of discussions. A plan for each of the 12 schools was made and the material list was provided. Then, the idea of discussing the science and social science syllabus with the

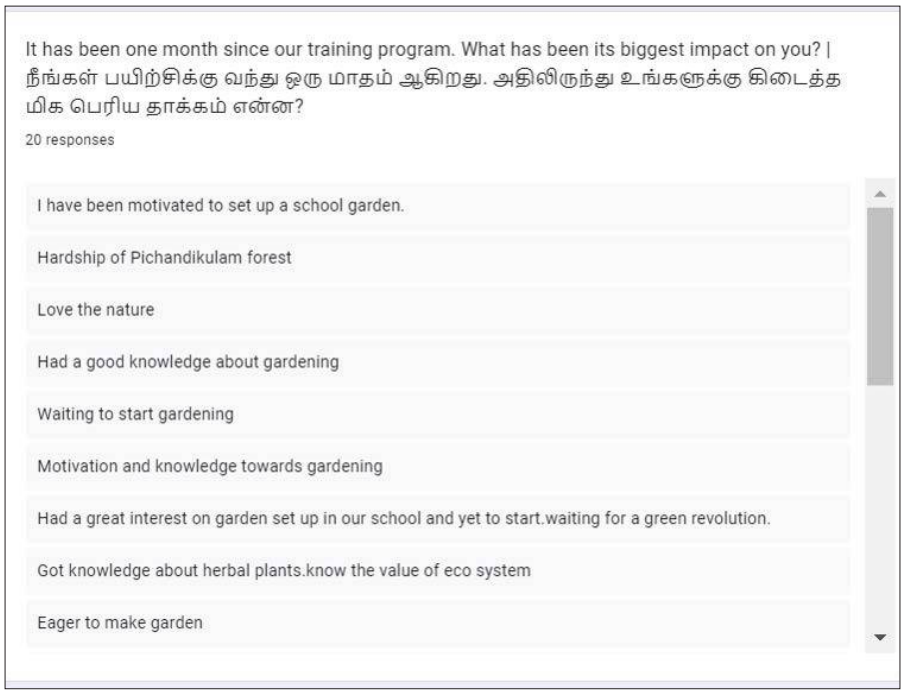

Figure 24. Feedback after a month.
Source: Oct Check-In (Google form), Eco-Schools Program: Garden Schools, Pitchandikulam Forest, 2022

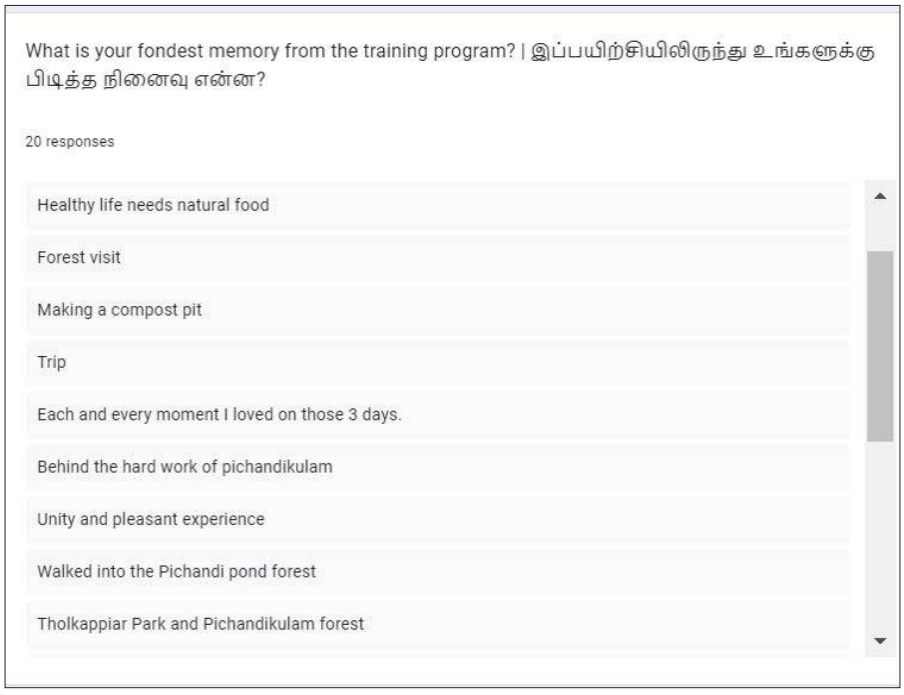

Figure 25. Refreshing memories of the training.
Source: Oct Check-In (Google form), Eco-Schools Program: Garden Schools, Pitchandikulam Forest, 2022

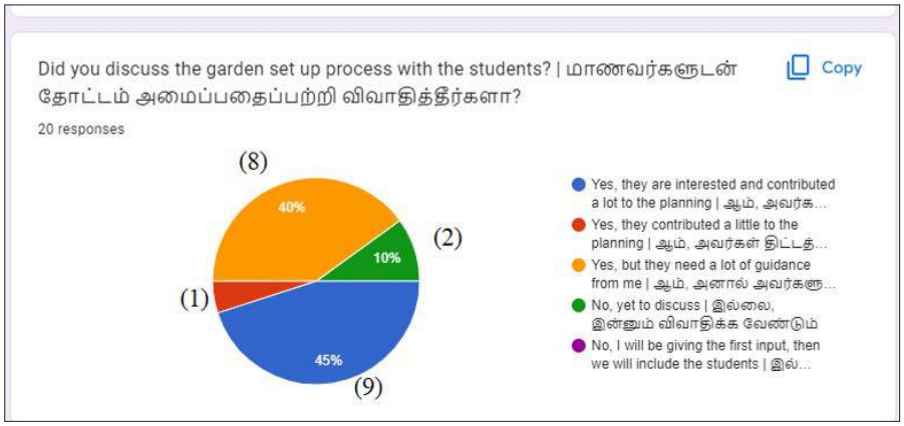

Figure 26. Questions about setting up gardens in schools.
Source: Oct Check-In (Google form), Eco-Schools Program: Garden Schools, Pitchandikulam Forest, 2022

Figure 27. Discussion during school management committee meeting. Source: Oct Check-In (Google form), Eco-Schools Program: Garden Schools, Pitchandikulam Forest, 2022

teachers to see how the curriculum can be incorporated into the sessions was initiated. The training was also used to discuss possible dates for an upcoming trip for the schools to nearby eco-parks. Also, the schedule for sessions with the teachers and students was fixed for one session per week (with some schools having one session every alternate week). Some schools requested an introductory session with their students, which was also conducted.

Figure 28. First ever brochure for Pitchandikulam Forest's Teacher Training Program | Source: Pitchandikulam Forest, 2022

Conclusion

The trial run of the teacher training program has had sufficient impact to provide skill and encouragement for teachers to start their gardens. By the end of this academic year, its full benefit would be more apparent. The findings will be published on the organisation's website.

Output

A brochure of the teacher training program (see Figure 28) containing the details and means to contact the organisation to enquire about the same has been created for the first time. This will make the program more accessible and the information will be easy to read. It will be provided to any teacher who is interested in participating as a program brief, and will also be available on the website.

Educator Training Program

Q4. How will the educators assigned to the eco-schools be trained to carry forward the program in other districts?

Objectives

- To create a training program for newly recruited educators
- To induct them into the program
- To provide them with the tools they would require to conduct the program
- To increase their environmental awareness
- To invest in the development of their individual skills

Overview

The process of recruiting has been conducted twice since September 2021. While the first set of recruits did not continue after the academic year 2021–22, the group of educators recruited between July and August have been enthusiastic participants in the Eco-Schools Program. They have been provided training throughout the year, some of which have been illustrated further in this section.

Research methodology

The feedback received from the educators during training will be used to curate training sessions. With a formulated curriculum, the training will be provided along the various topics. The training will not be limited to the activities provided in the curriculum, but also allow for a broader understanding of the subject.

Research findings

The recruited educators for environment education programs were trained by various resource persons from within and beyond the organisation. These trainings were funded by PF and Tata Communications Limited as part of their corporate social responsibility initiatives. As the training sessions are examples of how resource persons from many different fields of expertise, organisations, pedagogy and perspective can contribute to the learnings of educators, the reporting is limited to the learnings of the educators and their feedback.

Some basic findings:

- Many of the trainings also cover more than just one topic in the curriculum.
- Hands-on training for gardening and tree plantation was required multiple times.
- Trainings provided before a session has to be delivered in a school have been found to be valuable.

Here are the various topics that the training covered during the months of July to September with the current group of seven educators who have attended most of the training. Fifteen of the trainings conducted have been described below:

Table 12. Trainings conducted and their curriculum topics

No.	Date	Venue	Topic	Curriculum Topic
1	17 July 2022	PF Nursery	Tropical dry evergreen forests and nursery	Ecosystems and landscapes, biodiversity, envisioning, soil, herbs and health
2	17 July 2022	PF Eco-dorm	Awareness through body	Community building, envisioning, culture and arts
3	18 July 2022	NEEC, Vepperi	Exposure visit Puppetry training	Sense of Place, Mapping, Watershed, Ecosystems & Landscapes, Biodiversity, Soil, Waste Management, Herbs and Health, Animal Life, Pollution, Climate Change, Culture and Arts
4	18 July 2022	Nadukuppam Forest	Forest and nursery visit Training	Ecosystems and landscapes, watershed, biodiversity, soil, herbs and health
5	20 July 2022	Crocodile Bank	Reptiles training	Biodiversity, animal life
6	10 Aug 2022	School	Gardening	Ecosystems and landscapes, vegetable and herbal garden
7	11 Aug 2022	Guindy	Terrace gardening Training	Watershed, biodiversity, vegetable and herbal garden
8	20 Aug 2022	A school campus	Edible greens	Ecosystems and landscapes, biodiversity, vegetable and herbal garden, herbs and health
9	10 Sep 2022	Kotturpuram Urban Park	Tree care Volunteering	Community building, sense of place, biodiversity
10	26 Sep 2022	Chennai Trade Centre	An alternative to plastic	Waste management, pollution
11	27 Sep 2022	Semmozhi Poonga	Garden insects	Ecosystems and landscapes, biodiversity, animal life

12	27 Sep 2022	Zoom meeting	Outdoor education techniques	Pedagogy, exposure visit
13	27 Sep 2022	Tholkappia Poonga	Reptiles in the backyard	Biodiversity, animal life
14	28th Sep 2022	CPR Foundation	Environmental and outdoor education	Pedagogy, exposure visit
15	29, 30 Sep 2022	A Farm School	Alternative School Exposure visit	Community building, pedagogy, exposure visit

Source: The author

These trainings can be categorised as one of three types:

- In-house training
  - Reading a landscape
  - Forest walks
  - Herbal wellness
  - History and archaeology
  - Alternative pedagogy
  - Bodily awareness
  - Deep ecology
  - Indigenous nursery
  - Project and finance management
  - Code of conduct and other policies

- Explorations
  - Pitchandikulam Forest
  - Nadukuppam Forest
  - Nadukuppam Environment Education Centre (NEEC)
  - Vepperi School Forest and EEC
  - Tholkappia Poonga
  - Siruseri Twin Lakes
  - Pothur Nanneer Lake
  - Units in Auroville Eco-spaces/alternate schools

- Connections
  - Resources persons in Auroville and Nadukuppam
  - Resources persons in the area of the program
  - Organisations with on-ground experience in the area

Conclusion

Following are the recommendations for the educators training program:

- The training program can be made less instructive and more inclusive and participatory.
- Hands-on skills training must be imparted multiple times (e.g., in gardening/tree planting), until there is a significant improvement in skill, curiosity and awareness.
- Providing inspiration and building morale is a crucial part of the training process, and thus, a criteria for choosing resource persons.
- Resource persons belonging to the specific bioregion must be included: local community members, grassroots organisations and various experts.
- Exposure visits to places in and around the bioregion must be compulsory for educators to observe best practices.
- Trainings must be conducted regularly to encourage team building.
- Self-exploration and study groups should be encouraged.
- Summer holidays or the week off during exams are ideal to conduct training without disrupting the work schedule in schools.
- It is important to create space for participatory training, where educators also pick the resource persons they want to learn from.

Output

A brochure for the educator training program was created for the first time, containing details and means to contact the organisation. This will make the training more accessible and the information will be easy to read. It will be provided to potential educators who respond to a recruitment call. It will be available on PF's website.

Figure 29. First brochure for Pitchandikulam Forest's Educator Training Program | Source: Pitchandikulam Forest, 2022

Program Monitoring and Evaluation

Q5. How will the execution of the Eco-Schools Program be documented and monitored for evaluation?

Objectives

- To create systems to document the project in detail
- To create procedures to use the documentation to analyse and improve the project
- To keep track of the project
- To keep all the stakeholders informed about the project

Overview

One of the major challenges of an organisation as organic as PF, where many people have been involved in various explorations over the years, each with their own nuances, is that it has been difficult to create standardised documentation of the programs (Epinal, 2022). This is an attempt to understand and update monitoring and evaluation processes specific to the Eco-Schools Program derived from years of experience. With the help of the education team and a consultant experienced in setting up systems for large projects who provided valuable input, excellent progress has been made in the last few months alone in terms of tracking the work done and scaling from 10 schools in Chennai to 30 schools in Tamil Nadu.

Research methodology

This was done by observing and documenting the various processes that are required to run the program.

Research findings

Preliminary activities: Table 17 shows the different activities and their timeline in the months of 2022.

Table 13. Preliminary activities in 2022

Preliminary Activity*	**Before Academic Year Begins**			**After School Reopens**		
	Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**
School selection						
School Education Department permission						
Greater Chennai Corporation						
School Education Department, Tamil Nadu						
Private/Government-aided/Trust schools						
Recruitment						

Recruitment drive						
Hiring						
Educator training						
School visual documentation						
School registration						
Teachers' registration						
Student registration						

Source: The author

**Note: Ideally, it is best to complete all the preliminary activities before the start of the academic year, or within a few weeks of it starting.*

School selection: Schools are selected through a step-by-step process:

- Locate schools in a given bioregion.
- Based on the availability of resources, and ecological focus, select the number of schools for the program.
- Consider –
  - Time
  - Travel distance between schools
  - Funds available
- Evaluate the school based on
  - The school faculty's interest
  - Availability of a compound wall (or else animals would wander in and graze in the garden)
  - The teachers' willingness to allow students to participate in hands-on activities
  - Access to water

School Education Department permission: Once the list of schools was finalised, letters to the respective departments were drafted in English and Tamil. Once approved and sanctioned, the departments would forward the letter as a notice to the schools, formalising the program. For private schools, government-aided schools and trust schools, a letter to the school principal/correspondent would usually suffice. Ensure to also send it to the school's official email.

The process employed is briefly shared below:

- Identify the education department under which the school is functioning
- Draft letters to the head of the department (the minimum being the CEO/EO)
- Provide the letter in simple English and keep to the point
- If notice sent to schools is in the state language, use that for the letter (saves clerical time)
- Follow-up consistently until the letter is signed and notice is sent to schools

- Check with schools if they have received the notification
- Keep the education department updated about activities
- Invite them to observe sessions

Recruitment: The recruitment process involves

- A call for candidates
- A five-step application process with
  - Submission of resume
  - Call for verification
  - Submission of online form about passion assessment, willingness to travel, practical ecology skills, experience (especially working with children)
  - Online interview
  - Visit to PF
- After clearing these five levels, new recruits go through onboarding
  - Terms and conditions of the contract
  - Initiation into the program and the organisation's policies
  - Contract signing

Educators training: Educators' training includes in-house training, explorations and connections, with feedback taken from the educators at the end.

School visual documentation: Educators visited the schools and collected the data from the POC (point of contact) of the schools needed for visual and video documentation. It is also planned to have visual and video documents of the schools before and after implementing this project, so we can compare the changes which we have done through this project. Another visual aid is a marked map of the school.
The process is given below:

- Obtain permission from the school
- Take before pictures and videos of the school
- Ensure they are stored with the school name and date
- Take pictures and videos every few months to compare
- Evaluate the pictures and videos taken before the start of the program and at the year end
- Add the map of the school to the data
- Mark the entrance/exit, buildings and utilities

School registration: The school registration form is sent to schools in order to collect information on the school's campus and infrastructure, which would influence the project. It must be signed by the school head, as consent to participating in the project. Such a process formalises the school's participation. It also provides an opportunity to get to know the school heads and teachers in order to build relationships with them. The following are the list of information collected:

- Name of School
- Postal Address
- Location
- UDISE Number

- Area
- Co-ed
- English/Tamil medium
- Support from management
- Head Master/Mistress
- Contact
- In-charge Staff
- Contact
- No of buildings
- Future construction
- Compound wall
- Water facility
- Water drainage of site
- Number of toilets
- Hand wash
- Space for eco centre/ wall
- Total no of teachers
  - Science/Social teachers
  - Tamil teachers
  - PT Teachers
- Total no of students
  - 6th (Boys/Girls/Dif. Abled)
  - 7th (B/G/DA)
  - 8th (B/G/DA)
  - 9th (B/G/DA)
  - 10th (B/G/DA)
  - 11th (B/G/DA)
  - 12th (B/G/DA)
  - NGC
  - NSS
  - NCC
- One class a week/two weeks
- Will students be allowed to do gardening work?
- Gardener
  - Contact
- Tree plantation
- Composting
- Nursery
- Herbal/veg garden
- Waste management
- Water harvesting structure
- Grey water treatment
- Kitchen (No. of students)
- Trips

- Teacher Training
- Eco Club
- Scouts/Guides
- Notable eco-spots in the region

Teachers' registration: The school heads from the selected schools are asked to engage in consultation with their teachers and select interested teachers for the project. The detailed process is covered in the Teacher Training Program section of this report, including:

- Request enrolment of teachers *interested* in the program and setting up of gardens
- Share the permission letter from education department with them
- Ask teacher to fill registration form (that is formulated according to need)
- Use analysis of data to design training program

Student registration: A common issue with engaging students in practical work is the stigma associated with manual labour when creating a garden. Hence, it makes good practice to obtain permission from parents before students join the session. Also, as the quality of sessions has been ideal when the group size is 15, and maximum 30, students interested in the environment and up to doing physical work can join the program. This place-based program is also beneficial for students staying in the school locality. It is unfortunate that entire classes will not be able to join, and students who do not get to join will feel left out, but it is better than compromising the quality of the session as the consequences of that are more severe—a momentary lapse of supervision can cause injuries when working in a garden.

The steps followed during this process are:

- Select interested students
- Provide parent consent form
    - Student name
    - Standard, Section
    - Gender
    - Age
    - House area
    - No of members in family
    - Parent name
    - Parent number
    - E-mail
    - Parent signature
- Register the student
- Ensure their attendance

Execution of the program: After the preliminary activities are completed, the program moves into the execution stage, where the daily nuances of the program are worked on. The following procedures require regular maintenance, some more than the others.

Allocations for educators: Based on the availability of resources, sessions for each school, the timing and duration of each session, and the intensity of the Eco-Schools Program are decided. The educators' and school's time, travel time between schools, availability of funds and ecological focus are crucial to this.

Daily meetings: To run the program effectively, from experience, it is important for the team of educators executing the Eco-Schools Program in the schools assigned to them to have daily meetings where they

discuss their day's work with a coordinator/manager, and share it with other educators. They would also be involved in updating the list of tasks, tackling challenges, innovating on processes and identifying requirement of resources.

Monthly record: Every month, a plan is outlined according to which sessions are conducted. At the end of the month, the daily work done is compiled, against any expenses (like travel and materials). Every educator tracks their work and expenses and hence, by default, their attendance.

Program documentation and evaluation: The documentation of the session so far has been basic, covering the details of the session in brief. This would suffice to provide a logistical overview of the project, but does not provide much insight into the impactful nuances of the project. Since the program can create qualitative and behavioural changes that empower students and teachers, it becomes important to collect evidence of the same. To resolve this, not only is the session report filled, but also other documentation tools have been created. The previous efforts were focused on qualifying data in ways that are very academic and would not be familiar to more practical on-ground educators and resource persons (e.g., a gardener). Since the vision of the organisation emerges from practical ecology, a different way of M&E is being formulated.

Impact assessment: During the previous academic year, when a questionnaire was formulated and students were asked to fill it, the most common drawback was that the questions were too complicated. Students could not understand them and required the educators to explain it. They often took to copying the answers of their friends as they would for a test. Hence, the need for a simpler and more consistent way of measuring qualitative indicators was recognised. It was also observed that many complications rose from using technology to document, the primary of which were digital literacy and lack of accessibility. To make the process more inclusive, physical means of tracking will be developed.

This is a very crucial upgrade required to establish evidence of the various benefits of the program, and to identify and improve upon areas where gaps exist. It is especially required to support the expansion of the program since it will help project a probable impact. This would help recruit more people, get support of officials, and extend the scope for funding.

School visual documentation (sessions): More practical visual based M&E is being tried out, for example, comparing before and after pictures for gardens. This is a very simple but effective way to measure a change.

- Obtain permission from the school
- Take pictures and videos of the garden area before starting gardening activities
- Ensure they are stored with the school name and date
- Take pictures from the same angle, in regular intervals
- Evaluate by comparing them with the pictures and videos taken before
- Use the analysis to inform decisions

Worksheets: As part of providing a physical means for the students, teachers and educators to document their progress, worksheets have been created. These are tailor-made for each activity and can be used by educators to prepare for their session, for students to aid their learning, and for teachers to learn and imagine similar

activities. If resources are available, files can be provided in which these worksheets can be stored. They will double as nature journals for teachers, students and educators. Providing student journals has helped students to start keeping track of their learnings, and the worksheets for different activities (tried during the three-day teacher training program) has helped the teachers understand how they can engage with their students.
Session report: The educators are familiar with documenting the basic details of a session. However, there are few other parameters that can be tracked during every session such as students' reactions, their response to worksheets, educators' feedback of the session, and soon.

For the qualitative analysis, four reactions that were common when an impact was made in students was selected. These will be anecdotal evidence of reactions. While they denote simple impact when evaluated at the level of a single session, over a few months, it would be possible to note trends. There is a need for educators to be trained in M&E, which will be included in their training.

Given below are the different information that will be recorded for each session

- Session details
  - Session name
  - Session number
  - Session flow
- Attendance
- Students' reaction
  - Curiosity
  - Empathy
  - Excitement
  - Reflection
- Worksheet response highlights
- Homework given
- Homework response
- Feedback
  - Change in activity
  - Feedback for experience manual
  - Feedback, Challenges, Risks and Child Safety Policy

Conclusion

The procedures required for running the basics of the program have been covered. The implementation of this has improved the scalability of the program, and with time can be even more decentralised and streamlined.

Output

The procedures have been formulated in the research findings of this section and the program monitoring and evaluation has been built into all the outputs so far generated. These procedures will help run the program, and will be updated as experiences emerge.

CONCLUSION

The project has documented the current practices of the organisation for the Eco-Schools Program through the five research questions, drawing out processes and how they came to be. It has also structured the foundational processes that will enable the organisation to further develop a model of holistic environmental education program for the state of Tamil Nadu. The status of the research questions and their outputs are provided below.

Table 14. Status of outputs

No.	Research Outputs	Documents	Status
Q1	Curriculum Design	Report	Covered in this report
		Brochure	Available for website
		Curriculum brief	Available for website
Q2	Manual Design	Report	Covered in this report
		Here's Our Garden: An Experience Guide (Full version 1)	Available for website
Q3	Teacher Training	Report	Covered in this report
		Brochure	Available for website
Q4	Educators Training	Report	Covered in this report
		Brochure	Available for website
Q5	Program M&E	Report	Covered in this report

Source: The author

Outcomes

The set-up of environment education and the eco-schools' research and development of the same aided the analysis of the outcomes of this TESF India project (see Table 19).

Table 15. Analysis of the outcomes of the TESF India project

Expected Outcomes	Evaluation	Status	Next Steps
Awareness and connection with nature	Appreciation and concern for nature has been established during training programs for teachers and educators, who have then shared this with their students.	Achieved	To continue the process till the end of the year and analyse the impact

Training in environment education	Training for students, teachers and educators have been formulated and conducted.	Achieved	To continue the process till the end of the year and analyse the impact
Compilation of bioregion-specific resources	The activities have been compiled for some of the topics.	In progress	To compile all the information collected at the end of the year
Network of resource people in a bioregion	The activities in the guide have to be shared with other practitioners.	In progress	Start building a community network
Skill development in sustainable livelihoods contributing to sustainable and just communities	The activities encourage enquiry into sustainable livelihoods, and develops gardening skills.	In progress	To progressively increase the impact and skills developed.
Understanding climate change and the ability to take positive climate actions	The activities explore complex topics more easily and provides avenue for action.	Achieved	To progressively increase the impact radius of the project the longer it is able to work with a group of students

Source: The author

Beneficiaries

Table 16. Beneficiaries of the TESF India project

Participants Expected	Evaluation	Status
Students, teachers and schools currently engaged with PF: 10 schools in Chennai, more than 10 schools in Marakkanam – around 750 students minimum	The impact of the project was felt in all the 32 schools in Chennai. Schools: 32 Teachers: 24 Students: 750+	Achieved
Students, teachers and schools that will be engaged with PF shortly: 6 eco-schools in Chennai, 6 eco-schools in Villupuram, 1 eco-school in Thoothukudi, 1 eco-school in Mannargudi	The process of adding 4 more schools in Chennai is underway. The other projects are currently on hold.	Partially achieved
PF's current environmental educators, management team and future team members	The impact of the project has benefited the entire team. The outputs from the project are serving the new recruits and will do the same for future team members.	Achieved
Parents and the communities around the schools	The impact is only beginning. When the program proceeds further with creating gardens, parents and the surrounding community would be more involved.	In progress
The environment	More schools have gardens than when the project began. More students and teachers are aware and participate in activities that benefit the environment.	Achieved

Source: The author

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ANNEXURE

Activities conducted during the three-day immersive training program on 1st, 2nd and 3rd of September 2022

Table A1. Day 1 of the three-day immersive training program

Activity	Description	Execution
Team huddle, Registration desk	To know which teachers are attending, and to give them ID and stationery	A short briefing was given. Materials were gathered by the team. The first teachers began to arrive. The PF team arrived from Auroville.
Under the Marutham Tree, welcome circle, intro, silent walk	To begin the day with a song standing around the tree	Tender coconut water was distributed, teachers were given pens, pencils and ID tags. Most of the teachers had arrived and by that time it began to drizzle.
Introduction Film on PF	To give an understanding of the organisation	As it began raining, the group could not gather under the tree for the welcome circle. Instead, they began the silent walk towards the education building. Once arrived, they were assembled in a circle and given a verbal introduction to Pitchandikulam Forest. Then, the teachers were asked to introduce themselves. Once everyone had their turn, they were provided with a worksheet file. They were asked to check in about how they were feeling at the time and asked to write it down in one of the sheets. Then, using the printout in the worksheet, the Garden Schools project was explained. After a short tea and snack break, and another check-in, the teachers were separated into two groups and ushered for the next activity locations. By now, it was raining heavily.
Garden Schools Introduction	To give an understanding of the project	
Q&A	To clarify	
Group Formation	To divide the teachers into two groups, according to the location of their school to ensure smaller training groups and network formation	
Short break	Tea and Snacks	
Buffer	Assemble for gardening activity	
Gardening Training (Group A)	Practical gardening session in the windmill garden	Group A - The practical gardening discussion session became an FDG due to rain.
Insect Walk (Group B)	Experiential walk in the forest	Group B – A PPT about insects was shown as the TV was not working, and the walk could not be conducted due to rain.
Lunch	Served in the open hall	The food was served by the educators and volunteers.
Tree & Birds walk (Group A)	Experiential walk in the forest	Group A - A lecture on the story of the Poonga was followed by a 30-minute walk in the end after the rains stopped.
Gardening Training (Group B)	Practical session in the windmill garden	Group B - Gardening FDG. Last 15 minutes was a walk after the rains stopped.
Short break	Tea and Snacks	Tea and Snacks Break.
Reflection Session	Recap of the day, and briefing for the next day	Teachers shared their feedback for the day. The engaging activities, the pleasant weather and the beautiful forest were the highlights.

Table A2. Day 2 of the three-day immersive training program		
Activity	**Description**	**Execution**
Under the Marutham Tree, welcome circle, intro, silent walk	To begin the day with a song standing around the tree	The day was sunny and welcoming as the teachers assembled in a circle around a tree, and briefly listened to the sounds of nature with their eyes closed. A song invoking nature was sung. They then began the silent walk towards the education building. Once arrived, they were assembled in a circle and given a guided meditation to ground themselves and be more aware. A check-in was done.
Break-out groups	Discussion in smaller groups	5 teachers in a group shared their childhood experiences of nature. At the end, another check-in was done.
Herbal Wellness	Walk in the forest identifying herbs	A herbalist from Pitchandikulam Forest conducted an interesting session on herbal wellness, half of which was a walk through the forest identifying herbs.
Short break	Tea and Snacks	The teachers enjoyed the ambience of the forest and some birds that they could spot.
Gardening Training (Group A)	Practical gardening session in the windmill garden	Group B - The practical gardening discussion session where the team dug two pits and prepared a bed and made a growbag using cocopeat for terrace garden.
Insect Walk (Group B)	Experiential walk in the forest	Group A - Insects were explored using a PPT and a short walk towards the end.
Lunch	Served in the open hall	The food was served by the educators and volunteers.
Tree & Birds walk (Group A)	Experiential walk in the forest	Group A - As there was no rain, the story of the Poonga was shared during a walk. The Australian Consul-General arrived towards the end of it and conversed with the group.
Gardening Training (Group B)	Practical session in the windmill garden	Group B - With time running low, this group made a growbag using cocopeat for terrace garden, and through a fun activity, understood the preparation of a bed. In the middle, they were visited by the Australian Consul-General who eagerly enquired about their training.
School Vision	Envisioning activity	Pictures taken around their school gardens were provided, over which the teachers were asked to draw how they envision their school garden. Teachers had fun using crayons and sketches. They had tea and snacks while working on their drawing.
Short break	Tea and Snacks	
Teachers Presentation	Teachers present their garden vision and feedback of the training so far	A teacher representative from each school presented their vision for their school, to the whole group including dignitaries present online and offline. The session ended with herbal gift hampers distributed to all teachers.

Table A3. Day 3 of the three-day immersive training program		
Activity	**Description**	**Execution**
Travel to Auroville. Reaching Pitchandikulam Forest	Travel by bus	After breakfast at a highway restaurant, the group reached Pitchandikulam Forest. They were given a brief orientation of the forest and shown where they can refresh themselves.
Pitchandikulam Forest	Forest walk, meeting Joss Brooks	The group went on a walk around the forest, visiting the nursery, seed room and museum. The steward of the forest, Joss Brooks addressed them with anecdotes about his life, restoring forest and lakes from degradation.
Lunch	Aurolec	The group had the experience of eating food made using mostly local ingredients (like red rice and *varagu*)
Auroville Botanical Gardens	Forest walk	The teachers had a very informative tour of botanical plants, where they saw different types of gardens— cactus garden, Japanese garden, maze garden
Visitors Center	Information Center	A very brief visit to the information center in the visitors center was provided so that the teachers can get a basic overview of Auroville

Table A4. Schedule of the monthly in-person training on curriculum			
Month	**Activity**	**Description**	**Execution**
October	Garden Planning	Initiation of the garden plan and a brief discussion of the curriculum and syllabus, followed by list of materials required and an introductory interaction with students selected for the program if necessary	All the schools have been covered.
November	Syllabus Study	Allocate teachers for each term of science and social science for 6th - 8th standard syllabus and discuss the topics thoroughly and develop a plan for training sessions	In the process. Teachers have been allocated, discussion will be done by the end of the month.

MEL FRAMEWORK

For the project - Developing a Model of Holistic Environmental Education Including Teacher Training for Eco-Schools in Tamil Nadu

Table B1: MEL framework: knowledge

MEL Ambitions Statement	Progress and Initial Findings	Challenges and Changes	Future Plans
The MEL ambition statement(s) for Knowledge in your project is/ are: A curriculum based on Pitchandikulam Forest's work will be formulated for the Eco-Schools program at the middle school level.	What learning and knowledge has been generated with respect to each of your project research questions, your aims/objectives? Q1, Q2: The curriculum has been modified to the strategy of increasing practical ecology aspects. Q3, Q4: Training based on practical ecology has been included. Q5: M&E for regular activities have been formulated and refined.	What challenges have you experienced in following your research design/approach and research methods? What challenges have you experienced while trying to make meaning of your field, your data and in generating insightful knowledge? • Q1, Q2: It was a challenge to emphasise the practical ecology aspects of the vast existing Eco-Schools Program curriculum. • Q3, Q4: Educator training cannot be a one-time training as the local and environmental context evolves constantly. • Q5: Some of the M&E procedures created for the use of educators were too extensive. The use of digital means for some monitoring sessions are proving to be difficult. • How have you responded to these challenges? • Q1, Q2: It was decided that the curriculum and its manual would be structured around the creation of gardens in schools. • Q3, Q4: It was decided that educator training would be undertaken regularly throughout the year, whilst the basics are covered early in the training. Teacher training has covered both participatory and skills-based training. • Q5: Physical means of conducting M&E have been developed. What support did you draw upon/would you like to receive to overcome existing challenges? • Q1, Q2: The process of setting up a garden was used as a structure for the curriculum. • Q3, Q4: Many external resource persons have been instrumental in increasing the impact of the training, as were the exposure trips. • Q5: The educators will have to continue providing feedback on the M&E process. Are you using the research design/approach and methods as outlined in your accepted proposal? No, most of the methods required more time and networking than allowed by various factors such as the pandemic, change in team members, skill gaps and redefinition of program's core execution strategy at the organisation. The basics of it are retained in the modified processes. If not, what is now different? • Q1, Q2: The basic activities have been designed around the school garden. • Q3, Q4: Participatory methods have been employed, open to improvements. • Q5: Physical means of monitoring have been developed.	What will you be doing in the next months to continue addressing/ answering your research questions? Feedback from this academic year will be incorporated in an updated version of the output and made available on the organ-isation's website.

Source: The author

Table B2: MEL framework: capacities

MEL Ambitions Statement	Progress and Initial Findings	Challenges and Changes	Future Plans
The MEL ambition statement(s) for capacities in your project is/are: Training programs will be developed for mentors and teachers of the Eco-Schools Program at the middle school level.	What capacities have been drawn on and strengthened within your own team in the project? • The principal investigator has gained experience in leading a team. • The team's capacity has been advanced through the many training sessions that were conducted. • Many collaborations came to fruition towards the end of the project. In relation to research participants, what capacities, if any, have been drawn on and strengthened during the project? • The organisation's capacity has been documented, and this has increased clarity of its vision and rejuvenated the project. • The emphasis of the role of practical ecology has been the foundation of the team since April, and it has positively impacted the progress of the project.	What challenges have you experienced with respect to capacity strengthening/ mobilisation? Recruitment was carried out. While the process has improved, not many experienced educators applied. How have you responded to these challenges? It was used as an opportunity to strengthen the training program for new recruits that would make it likely for more experienced candidates to apply. What support did you draw upon/would you like, to overcome existing challenges? Continue running the training program consistently. What support did/would you find beneficial? Collaborating with other organisations to fill the knowledge gap.	What will you be doing in the next months to strengthen and/or mobilise capacities for transforming education for sustainable futures? The educators would continue executing the program in schools and providing feedback, based on which the training would be structured.

Source: The author

Table B3. MEL framework: people and relationships

MEL Ambitions Statement	Progress and Initial Findings	Challenges and Changes	Future Plans
The MEL ambition statement(s) for relationships in your project is/are: The Eco-Schools team will experiment tools to enhance the quality of work relationships.	How has your project been working to strengthen working relationships, within the team, the organisation where the project is located, if any, research participants or the network of community and researchers that existed before your project commenced? • The project has significantly streamlined the role of the principal investigator in the organisation. • It has assisted in the implementation of monitoring and evaluation processes. How has your project been working to create new working relationships? It has supported the expansion of the program from 10 schools to 32 schools through the implementation of monitoring and evaluation processes	What challenges have you experienced with respect to relationships? Initially, it was difficult to mobilise complete support from the organisation as there were many variables involved, including introduction of new team members, many of whom did not continue beyond their probation period. With the drop in team members, more new educators were recruited. How have you responded to these challenges? The TESF project helped anchor the transition period as the organisation recruited newer members. It has supported the organisation in refining the recruitment process and modes of execution. What support did you draw upon/would you like, to overcome existing challenges? What support did/would you find beneficial? The structure of the project covered almost all the aspects of running the program, hence was a useful structure to draw upon. Are you still working with the same organisation as in your accepted proposal? Please skip this question if you are an independent researcher. Yes. Are you working with the same number of individuals as in your accepted proposal? The number of beneficiaries remain same, but the processes in the work plan involved lesser people due to time constraints, smaller team of educators and change in team members within the organisation.	What will you be doing in the next months with respect to relationship building within the team, the organisation where the project is located, if any, research participants or the network of community and researchers? Training of the educators will continue, as will forming collaborations. The educators will be exposed to diverse perspectives in the field of environment and education.

Source: The author

Table B4. MEL framework: outputs and sharing

MEL Ambitions Statement	Progress and Initial Findings	Challenges and Changes	Future Plans
The MEL ambition statement(s) for dissemination in your project is/are: A manual based on PF's work will be formulated for the Eco-Schools Program at the middle school level.	At what stage are you with respect to developing your planned outputs? The guide is under formulation, along with the detailed brief of the curriculum. They are a starting version, and will be updated frequently. The training programs have been conducted (educators, teachers) What, if any, early dissemination activities have you been able to achieve? Activities compiled in the guide are being tested in schools.	What challenges have you experienced with respect to output development and/or knowledge dissemination? The year-end review of the environment education program conducted by PF highlighted many points that required a change of strategy in schools. • Q1, Q2: Lesser number of theory classes will be possible and more classes on gardening will be focused upon (practical ecology). • Q3: Educator training is now being regularised. • Q4: Teachers are now slowly being engaged in the curriculum training. • Q5: Some of the procedures require further testing. How have you responded to these challenges? • Q1, Q2: The curriculum is now structured around practical ecology. • Q3: Educator training is being conducted frequently. • Q4: The teachers are being engaged frequently. Their input on how the syllabus can be overlapped with the eco-schools curriculum is underway. • Q5: Students are filling worksheets for better M&E, and physical records are being tested for feasibility. Could you use some support in overcoming existing challenges? If yes, what would you find beneficial? Are you intending to produce the same kind of outputs and undertake the same dissemination activities as in your accepted proposal? If no, what is now different? No, the process now does not include as many resource people or other NGOs as envisioned. This has been addressed by focusing on practical ecology which is a major strength and offering of the organisation.	What will you be doing in the next months with respect to developing your outputs and disseminating new knowledge? Educators will continue executing the guide with students and provide feedback. Teachers will continue to be engaged.

Source: The author

Table B5. MEL framework: legacies

The MEL ambition statement(s) for legacy in your project is/are: Document the Eco-Schools Program at the middle school level to aid the adoption of its elements at policy level.	What changes do you hope to see in policies and practices as a direct result of your project? • Increase in the number of schools that are part of the Eco-Schools Program. • Provision for an environment education mentor, practically trained teachers, and gardeners for a school/school cluster, among others. • Provision for training interested teachers on practical ecology. • Provision for strengthening eco-club programs in schools. What impact do you hope that your project might create at different levels - at the local, regional, national and international levels? • Local level: By transforming schools, students will be more aware of the environment. • Regional level: The networking between the schools will enhance the impact on students. • National and international level: In the long run, schools can become hubs of environmental awareness and skill development (such as gardening).

Source: The author

TE|SF

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