Green Magic

A Gardening Kit for Kids

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Acknowledgement

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Prof. Binita Desai made me explore various subjects directly or indirectly related to the project. It helped open up so many exciting areas I had not explored earlier. She encouraged me to think outside the box and see the problem in a larger context. I have learned various essential skills as a designer with her, which I hope to apply in my future design career.

I am also grateful to Prof. Anirban for sharing his feedback and suggestions that have greatly enriched my work. I am thankful for the support from the DAIICT staff and the admin department. Also, I would like to acknowledge the children who participated in this project and shared their experiences, insights, and ideas. Their enthusiasm and willingness to learn have been a constant source of inspiration.

Finally, I would like to extend my heartfelt thanks to my family and friends for their unwavering encouragement and support.

Once again, thank you to everyone who has helped me in this project.

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1. Introduction:

1.1 Background and motivation

The earth's climate is rapidly changing due to various human activities, including deforestation, fossil fuel burning, and industrial activities. These changes have caused significant environmental problems such as global warming, sea level rise, and extreme weather events. The condition is even worse in urban cities because of the shrinking of green space due to a significant increase in the demand for housing and infrastructure. In this context, there is an urgent need to promote sustainable lifestyles and encourage people to adopt environmentally friendly practices. Many designers and architects have been exploring innovative ways to integrate greenery into the built environment.

One of the ways to tackle climate change is by promoting gardening and encouraging people to grow their plants and vegetables. Gardening has numerous benefits, such as reducing the carbon footprint, improving air quality, enhancing biodiversity, promoting a healthy lifestyle, and reducing the urban heat island effect.

Gardening can also be fun and engaging for children, as they can learn about plants, insects, and the natural world. This project aims to develop an interactive gardening kit that will facilitate children to generate their interest in gardening and make them experience nature closely. It also helps to teach children about sustainability. The project will also address the various challenges children face when it comes to gardening, such as limited space, lack of access to soil and water, and the need for

maintenance and care while away from the garden. The kit will solve these challenges by using innovative approaches such as creating a small-scale garden using recycled materials, providing organic alternatives to chemical fertilisers and pesticides, and teaching children about composting.

Overall, the project aims to generate interest in gardening among children and promote sustainable practices with an engaging and enjoyable experience that can help mitigate the impact of climate change. By introducing children to gardening, we hope to inspire them to become environmentally conscious and responsible individuals who care about the planet.

1.2 Objectives and scope of the project

- Objectives:
  - To generate interest in gardening among children and promote environmentally conscious habits.
  - To educate children on the importance of sustainable living practices and reducing carbon footprint.
  - To provide an opportunity for children to learn about plant growth and the natural environment.
  - To encourage children to make their compost and use sustainable gardening practices.
  - To demonstrate that gardening can be done in small spaces and with limited resources.
  - To create a safe and enjoyable learning experience for children that incorporates physical and mental activity.

- Scope:
  - The project will involve teaching children about plant growth, soil health, and composting.
  - Children will be given an opportunity to plant and care for their own small gardens using sustainable practices.
  - The project will focus on teaching children how to garden in small spaces.
  - The project will incorporate the use of recycled materials to create garden pots and other gardening materials.
  - The project will involve the creation of a composting system that can be used to generate organic fertiliser for the gardens.
  - The project will include regular monitoring and maintenance of the gardens, as well as opportunities for children to harvest and enjoy the fruits of their labour.

1.3 Methodology and Approach:

- Methodology:

  The methodology used in this project consists of a combination of research, experimentation, and observation. The research was conducted on topics related to gardening, sustainability, interest, and problems faced in pursuing gardening. Hands-on experiments were carried out on children to test their level of interest and commitment towards gardening and tree/plant care. The observation was also a key part of the methodology as it helped in identifying the challenges faced by the participants and in evaluating the effectiveness of the project.

- Approach:

  The approach for this project is to engage children in the process of gardening by providing them with hands-on experience and guidance. It encourages them to ask questions and explore the natural world around them. The project focuses on promoting sustainable and organic gardening practices, which can have a positive impact on the environment. The children are taught how to grow and care for the plants. The project also emphasises the use of composting and recycling to reduce waste and promote sustainability. By involving children in this project, the hope is to inspire the next generation to become more environmentally conscious and take action towards a sustainable future.

2. Problem Statement:

Keeping the climate change issue in mind, as part of a broader picture, I want urban children to understand and engage in gardening by creating awareness and interest in them to learn the practical aspects of plant and tree growth.

Despite the numerous benefits of gardening, such as reducing carbon footprint, improving biodiversity, and promoting sustainable lifestyle choices, various challenges hinder people from practising it, especially children.

The lack of space, soil, water, and knowledge of gardening techniques are some barriers that discourage children from taking up gardening.

Moreover, there is no significant role from the parents, teachers, or the education system to support, guide and create a pleasant experience and interest in gardening.

In addition, using chemical fertilisers and pesticides and improper waste management practices in gardening can negatively impact the environment and human health.

Therefore, there is a need to develop an innovative approach to address these challenges and promote gardening as an effective tool to mitigate the impact of climate change and promote sustainable living.

3. Research and Analysis

The research was critical in the development of this project. It was essential to engage with the user at this stage in order to better understand them. To get the 360-degree viewpoint, user research covered the children, parents, and teachers.

3.1 User research 1 – Children

The study involved children between the ages of 11 and 14 who were selected from private and government schools located in various parts of the city. Schools affiliated with the GSEB board, both Gujarati and English mediums are covered. The data collection involved semi-structured interviews, which were conducted in townships, schools, and public gardens. The process was documented using images and audio recordings. During the conversational interviews, the students were asked a variety of open-ended and close-ended questions to gather information.

- Goals of the research:
  - To understand the background of children.
  - To gain insights into how children are taught lessons and practical skills in their classroom environment.
  - To determine whether children can directly or indirectly relate their school learning to their daily lives.

- To assess the depth of children's understanding of the environmental crisis and current issues and willingness to contribute to the solution.
- To assess whether children prefer to learn theoretically/ practically.
- To understand if they like visiting places like gardens or any natural places and what makes them visit it often, what do they like the most about that place.
- To get the idea about do they enjoy being in nature surrounded by birds, trees, flowers, butterflies etc.
- To assess whether children have a basic understanding of how their favourite flowers or vegetables grow and whether they are interested in learning how to grow them at home (if possible).
- To get an idea about the plants they have at home (if any) and their involvement and interest in the maintenance of the home garden.
- To understand the readiness to try and experience new things and do DIY projects.
- To understand the problems and concerns they have related to the home garden or any past bad experiences with it.

➢ Number of children interviewed: 7

Name: Divyaraj Vaghela
From: Adipur, Kutch
School: Amba School for Excellence, Adalaj
Medium: English (GSEB)
Standard: 8th

Name: Darshan Vandra
From: Ahmedabad
School: Amba School for Excellence, Adalaj
Medium: English
Standard: 8th

Name: Vrinda
From: Surat
School: Amba School for Excellence, Adalaj
Medium: English
Standard: 6th

Name: Kaksha
From: Surat
School: Amba School for Excellence, Adalaj
Medium: -
Standard: 6th

Name: Esha Vaghela
From: Ghee Kaanta, Ahmedabad
School: -
Medium: -
Standard: 6th

Name: Maahi
From: Morbi
School: School of Achiever, Kudasan, Gandhinagar
Medium: -
Standard: 7th

Name: Urmila Parthbhai Hingoda
From: Dholakuwa village, Gandhinagar
School: Government school, sector 2, Gandhinagar
Medium: Gujarati
Standard: 8th

- Images of Amba School of Excellence, Adalaj:

3.2 User research 2 – Parents

Parents living in an apartment and a bungalow are covered and have come from different parts of the state and settled in the city. Amba Township Pvt. Ltd. (ATPL) is a township in Adalaj where people from different parts/ states and countries live together. So, ATPL and sectors in Gandhinagar were chosen to conduct interviews to get views from people having different backgrounds and demographics.

- Goals of the research:
  - To understand the background of parents, their families, and hobbies.
  - To access their view on having a garden at home.
  - To access their awareness of the importance of the garden in an environmental context.
  - To determine if they have a garden (big or small) at home, and if yes, what kind of plants they prefer.
  - To get an idea about their experience and constraints in order to maintain the garden.
  - To check if they are willing to try newer methods of gardening.
  - To determine their views for their children on connecting with nature directly and what they are willing to do to make it happen while being in the urban space.
  - To understand if they involve their children to help them in gardening and do their children enjoy activities related to gardening.
  - To know if they like their children to learn about gardening from a very young age and their willingness to help in their child's journey in gardening.
  - To understand their lifestyle and practices on disposal of waste generated at home.
- Number of parents/ elders interviewed: 7

Name: Manisha Patel
From: Sector-2, Gandhinagar
Location: Public Garden, sector-2, Gandhinagar

3.3 User research 3 – Teachers

Teachers from private and government schools in different parts of the city, covering the GSEB board with Gujarati medium, are included in the study.

➢ Goals of the research:

- To understand the role of environmental education in the school curriculum and how it contributes to making children environmentally conscious and responsible citizens.
- To access what small changes they emphasise or implement for students to practice in their everyday lives so that it can be beneficial for society.
- To determine the practical curriculum for a subject like science/ biology in order to get an idea about the kind of hands-on experience a child may have.
- To investigate if teachers organise extra-curricular activities, events, or field trips that help students connect with nature and understand the importance of biodiversity conservation.
- To understand teachers' views on urban children regarding their awareness and direct connection with nature and what possible solutions can be to make that happen.

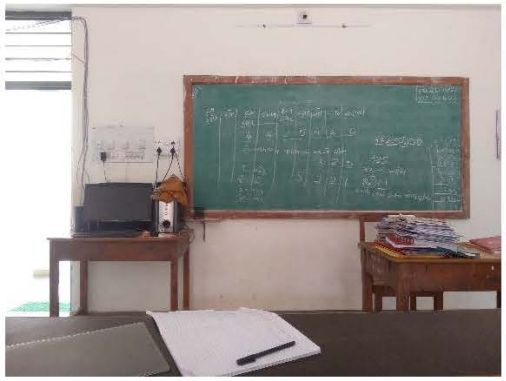
➢ Number of teachers interviewed: 3

Name: Krishnaben
Role: Science Teacher in the 8th standard
Medium: Gujarati
Location: Chaudhary Highschool, Sector 7. (Private school)

Name: Pankajbahi Patel
Role: Principal and Maths teacher (std. 6-8)
Medium: Gujarati
Location: Sardar Vallabhbhai Patel Vidhyalaya, Sector 7. (Govt. school)

- Images of Chaudhary Highschool, Sector 7, Gandhinagar (Private school):

- Images of government school, Sector 2, Gandhinagar:



- Images of Sardar Vallabhbhai Patel Vidhyalaya, Sector 7, Gandhinagar (Govt. school):

3.4 Other cases:

- During the research, I found one family who had tried hydroponics by importing the equipment from the United States of America since the couple was a working couple living in an apartment. However, they failed in that, and they thought it was because of the quality of the water in the area since they lived in Adalaj.

- In contrast, found one working couple living in Bangalore and growing vegetables through the hydroponics method successfully. They are growing Spinach, two varieties of Lettuce, Bok choy, Coriander, and Kale successfully.

Images 3.4: Hydroponics system setup at home

3.5 Analysis and conclusion of the survey:

➢ **Urban Children and Connection to Nature:**

- Urban children lack a real connection to nature, and that is more prevalent in the children of middle-class families. Low-income family children in urban cities are primarily from the village and have connect with nature through farming.

- Children have theoretical knowledge of the subject and some practical aspects, but that is insufficient to experience a direct connection with nature and lack the practical know-how of the subject.

➢ **Interest in Gardening and Nature:**

- Children love doing practical things and experiencing them directly rather than just studying on a board, as it gives them hands-on learning.

- Children are interested in experiencing gardening if someone teaches/guides them appropriately through a group activity or other possible modes.

- Children are interested in gardening if they see positive results (like growth) in their plants.

- Not only girls but boys are also almost similarly interested in learning and indulging in related activities.

- **Importance of Plantation:**

  - Children are aware of the environmental issues, know their moral duties to combat them, and agree with the idea of the plantation.

  - Schools teach children about the importance of plantation and conduct plantation drives and related events, but those are limited to planting trees and watering them or basic science experiments. However, the subject has more to it than that. A more comprehensive and engaging curriculum is required to develop children's interests and knowledge.

- **Gardening in Urban Spaces:**

  - Most people grow the Tulsi plant at home due to religious significance. The second most common type of plant is flowering plants.

  - Space constraints in apartments pose a challenge for many families who are interested in gardening.

  - Most of the children and elders lack knowledge of hydroponics. However, they are willing to try and curious to know more about it.

  - As human beings, both elders and children like spending time in nature and at places where there is less air pollution/noise pollution and more greenery and biodiverse place.

- **Practical Knowledge of Gardening:**

  - Almost all children help water the plants, but they do not have any practical knowledge apart from that.

  - Some are not involved in gardening because of space and time constraints and past bad experiences where their plant died due to lack of water when they were away from home for a few days.

- **Interest in DIY:**

  - Most of the children love doing Do It Yourself (DIY), making the best out of waste and crafts.

Overall, the analysis provides valuable insights into the need for practical knowledge of gardening for children and the importance of plantation beyond just tree planting. It also suggests that children are interested in gardening and nature, but space constraints and lack of practical knowledge can be barriers to involvement.

4. Literature Survey

4.1 School Curriculum:

I tried to analyse the school textbooks of Gujarat State Education Board from std.5 to std.9. An analysis was conducted on the topics covered, the style of presentation, the kind of language used, the increasing complexity with successive standards, and potential knowledge gaps. Below is the range of topics and chapters covered in the textbooks:

- Chapters related to - Water, Petroleum, Soil, Fertilizers, Forest
- Chapters related to agricultural practices – Stages, Irrigation, Fertilizer, Weed, Harvesting, Storage, Instruments
- Chapters related to plants and their functions – Food, Respiration, Transpiration, Transportation, Reproduction
- Chapters related to environmental changes – Global Warming, Climate Change, Greenhouse Gases, Deforestation
- Chapters related to the conservation of plants and animals – Reserves, Sanctuaries, Parks
- Practical Activities:
  - Sprouting activity with seeds and analysis of their height, growth, number of leaves, days required to germinate, changes in stem etc.
  - Growing onions and checking the layers and size of the bulb.
  - Tree plantation

4.2 Research Papers:

I conducted a literature review to gather information about the benefits of gardening and its impact on the environment, analyse the environmental impact of traditional gardening practices and the use of chemical fertilisers and pesticides, promote sustainability in gardening practices, the effects of gardening on children, etc. Below are the takeaway points from the research:

- Contact with nature is vital to the health, happiness, and well-being of both adults and children. Most children in developed countries live in urban areas, and globally the proportion of people in urban areas is expected to rise to 83% by 2030.

- Immersion in nature enhances children's development, providing them with access to physical activity, improved psychological well-being, education, and an opportunity to develop social skills (Gundersen, Skår, O'Brien, Wold, & Follo, 2016).

- Pre-adolescent time spent in nature is also related to attentiveness to environmental concerns in adulthood (Wells & Lekies, 2006). The last decade has witnessed a significant decline in the time that children spend outside and in nature, attributable in part to increased technology (Holloway & Mahan, 2012).

- Richard Louv labels the growing separation of children and nature as "nature-deficit disorder": a non-medical condition that describes the relationship between reduced experiences in nature and negative impacts on children's educational and personal development. The nature-deficit disorder is characterised by "diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses" (Louv, 2005, p. 34).

- Youth are increasingly becoming disconnected from where and how foods are grown, processed, and prepared into meals. To combat these generational changes, programs targeting youth development of gardening and cooking skills may be extremely important. Such programs can provide youth with constructive activities that help them develop a sense of responsibility and pride, as well as the opportunity to eat more fruits and vegetables.

- Studies have found an association between gardening and fruit and vegetable consumption, even when the gardening activity occurred in the past (Alaimo et al. 2008; Devine et al. 1999)

- Gardening activities provide hand on study of science concepts as well as range of other subjects like history, mathematics, arts, etc. (Passey, Morris and Reed 2010). It offers the chance for children to develop a personal connection with their food. Some evidence suggests that garden-based education may be an effective method to improve students' learning outcomes, for example, in science (Klemmer, Waliczek and Zajicek 2005).

- Gardening may be a tangible activity that families can do together and in a meaningful way. Those working in health promotion may look for ways to enable families with the resources and opportunities to engage in gardening.

- Hydroponics system uses a minimal amount of water, are more productive, and gives an average 20% to 25% higher yield than

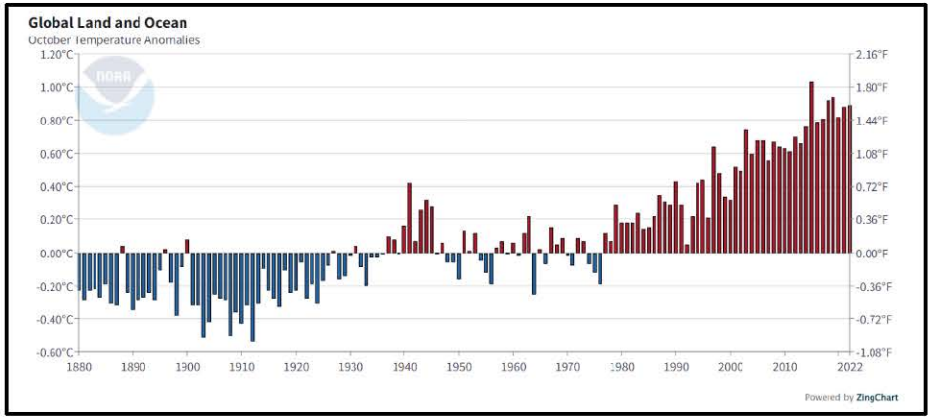
conventional soil cultivation. It is a sustainable crop production practice as the perlite and vermiculite used in soil cultivation take many years to decay and return to the environment. Improved and consistent vegetable quality can be achieved through hydroponics, and it eliminates the use of pesticides and herbicides.

- Gardens are very heterogeneous in their size and structure, varying widely in the provision of features that may promote biodiversity (Gaston et al. 2005, Smith et al. 2005). As a major component of green space, they have tremendous potential for supporting biodiversity, providing biodiversity benefits (Goddard et al. 2010), and improving the connectivity of populations of native species that are currently largely limited to remnants (Doody et al. 2010).

4.3 News articles

We know that changes in the earth's climate due to greenhouse gases severely affect our environment. Climate change directly or indirectly affects almost a range of issues like pollution, drought, flood, soil erosion, sea level rise, heat waves, wildfires, changes in biodiversity, food quality, health, diseases, and poverty. Fossil fuels are the main contributor to raising greenhouse gas emissions.

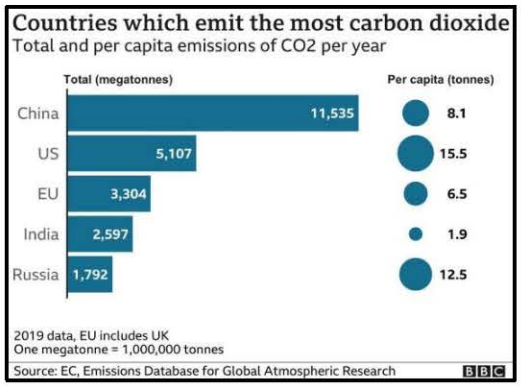
Even a 1-degree centigrade rise in temperature above what it was before the industrial era is already affecting the environment and people worldwide. Hence during the 2015 Paris climate summit, world leaders agreed to limit temperatures to below 2 degrees centigrade and 1.5 degrees centigrade if possible. There is a significant rise in the earth's surface temperature compared to the 20th century, as shown in the below graph.



***Graph 1**: Yearly surface temperature compared to the 20th-century average from 1880–2022. Blue bars indicate cooler-than-average years; red bars show warmer-than-average years. (Source: National Centers for Environmental Information)*

Recently 27th Conference of the Parties (COP27) was held in Egypt's coastal city of Sharm el-Sheikh, where more than 200 governments were invited. As part of that, developed nations, which are the major contributor to climate change, help to generate loss and damage funds for developing countries like Africa for the damage and economic losses caused by climate change. As shown in Graph 2, India is also a significant contributor, emitting the most carbon dioxide as per 2019 data.

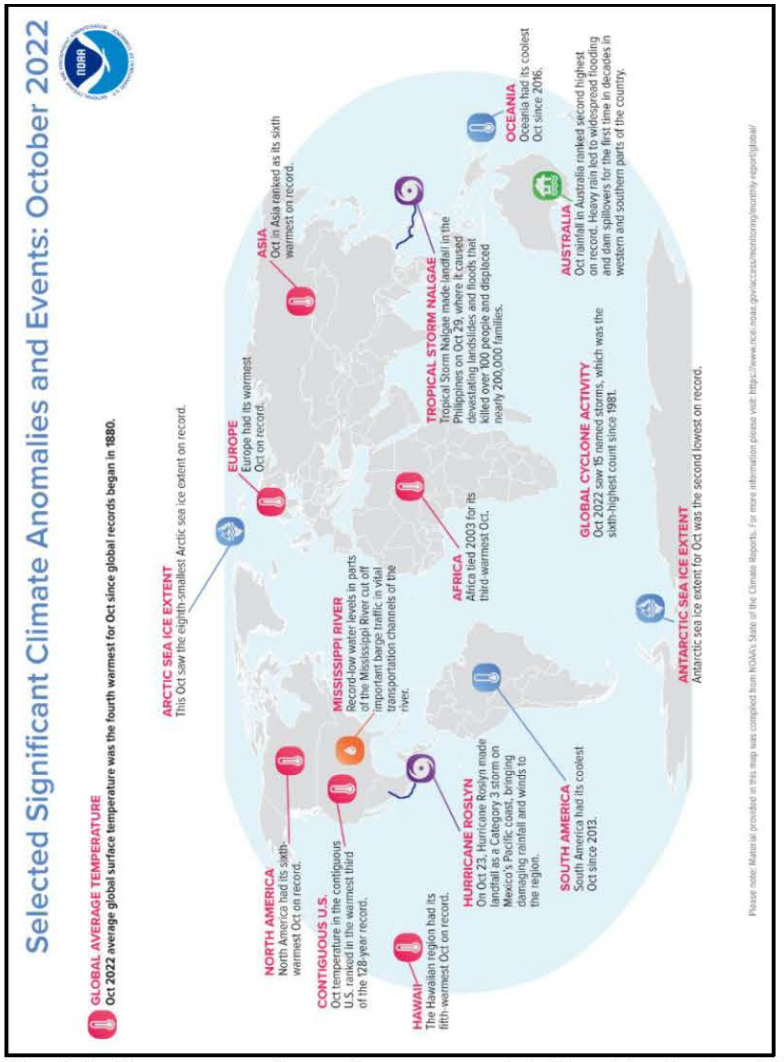
The effect of climate change led to abnormalities in our environmental conditions, and now is the stage where the frequency of those abnormalities is very high globally. Graph 3 is the recent data for October 2022, where extreme temperatures, floods, rainfall, storm, and landslides are happening worldwide.



Graph 2: Countries that emit the most carbon dioxide as per 2019 data.

In order to combat this effect, UN Environment Programme has developed a Six-Sector Solution, which is a roadmap to reducing emissions across sectors in line with the Paris Agreement commitments. The six sectors identified are: Energy, Industry, Agriculture & Food, Forests & Land Use, Transport, Buildings & Cities

Young climate activists like Greta Thunberg (Sweden), Licipriya Kangujam (India), Vanesa Nakate (Uganda), Tahsin (Bangladesh), and many others are inspiring people all over the world to spread awareness and act on the same. Some of their work includes: (i) Doing strikes and challenging world leaders to take immediate action for climate change mitigation. (ii) They advocate for alternative energy, water harvesting, clean-up campaigns, tree plantations, upcycling, and reuse. (iii) Start movements/organisations/ campaigns like "Fridays For Future" and many other things. They also educate against single-use plastics and fast fashion.



Graph 3: Climate anomalies and events on a global level for October 2022. (Source: National Centers for Environmental Information)

5. Target Audience

Initially, the target audience was thought of age 11 to 14 living in urban cities. However, later during the field visit, it was realised that higher-grade students might face time constraints due to study and other priorities in their life. Moreover, it is easy to change the behaviour and attitude of children when they are young.

So, we have decided to go with the age group of 10 to 12 years old urban kids. As they spend most of their time in urban areas, they may not have the opportunity to experience the benefits of nature and gardening. Moreover, they have access to technology and may spend significant amounts of time indoors, which may have negative impacts on their physical and mental well-being. Also, the pre-adolescent stage is a critical period for their social, emotional, and cognitive development. At this age, they are old enough that they do not have to depend on elders; and parents trust them to send them outsides and can roam freely without much supervision. Also, they are ready to mix with other age groups, children and social backgrounds, and there is a willingness in them to learn and sense curiosity about a lot of things.

Therefore, this project aims to introduce them to the joys of gardening and help them connect with nature by providing them with an opportunity to engage in physical activity and learn about healthy food choices as well. Through hands-on learning experiences, the project aims to stimulate their curiosity and creativity and foster a sense of responsibility and pride. Technology access also helps them to gain knowledge and share their experience with others and thus inspire others to garden.

6. Fieldwork

6.1 Activity 1- Tree plantation:

Month: January 2023

Location: Near Lab Building, DA-IICT, Gandhinagar.

Site selection:
I have chosen a few sites on the campus which have ample space to conduct the activity as well safety perspective was also considered since I have to bring children and conduct the activity for the coming few months. With help and support from Mr Kirit Pandya and Vikrambhai (garden staff supervisor), we came to the selection of a patch near the Lab building. The choice of the space was also based on the amount of sunlight received and the required amount for the coming summer months.

Total children participated: 7

Name and number of trees:
Asopalav (2), *Neem* (2), *Parijat* (1), *Borsalli* (2)

Motive:
To check the commitment and interest of children in such activities.

Images 6.1(a): Children doing tree plantation

I have made a long bamboo tool to dig holes in the ground, as shown in the image. It has a tapered end at the bottom and has sufficient diameter and height, considering the target audience's height and hand size.

It was made in order to communicate to them that there is no need to require fancy market-bought tools for such activities. They can make their own tool and use the available material in the surrounding environment.

I am glad that after hearing this, one of the kids immediately started finding resources from the environment and was able to find a thick stick to dig the ground while the bamboo tool was being used by another kid.

Images 6.1(b): Bamboo tool to dig ground(L), Kid digging ground using neem stick (R)

Observations:

- Children seem to be very excited and enjoying while doing.
- Initially, six children decided to participate in the activity; however, at the last moment, one of their friends also got to know about such a plan and joined, so a total of seven children participated, which shows how excited they were for this.
- They showed team spirit and helped each other. However, at the same time, they compared the finishing touch with each other and had a competitive mindset and felt proud if they completed first.
- When asked if they knew which plant they were carrying, they could easily recognise the *Asopalav* and *Neem* trees. However, they could not recognise the other plants they had. During their time on the campus, they were very curious to know the names of the various plants on the campus. So, I also teach them how to use google lens to know about any plant since they use mobile phones in everyday life and few of them have personal mobiles.
- They were surprised to know that the bamboo tool was handmade by me and amused to know that such garden tools are possible to make from bamboo.
- At the time of leaving campus, they showed interest in coming again and planning to come early next time.
- They quickly catch the name and recall it when next time sees the same plant.
- They used to keep on checking with me how their plants were doing.

Limitations/ Difficulties:

- Most of the nurseries do not have a ready stock of trees, and those which were available were huge in size. Also, not so many varieties were available in private nurseries, and government nurseries do not sell any plant except during monsoon season. So, based on the availability of plants in nurseries, we had to communicate with the admin department, and only those trees were allowed to bring which were approved by the Admin department.
- Due to space limitations at the residence, we have to conduct the activity on campus.
- The space was not sufficiently watered even though I informed and asked the day before conducting the activity. Hence we had to take help from the garden workers to dig holes for the trees.
- They could not take care of the plants entirely by themselves as we only had permission to visit the campus during the weekend, but even we could not visit all the weekends as sometimes they were busy with exam preparations or we had planned different sessions to conduct around the residence.

Follow-ups:

We used to visit the place during the weekend to check the growth and provide fertiliser if required.

- They made their name tag from waste to be placed near the plant which they have planted. But since it was made from cardboard and paper, we could not use it.

Image 6.1(c): Children holding a name tag

- During the subsequent visit in February, one month after the plantation, the neem plant had fallen all its leaves and was not in good condition. After seeing such a condition of the plant they had planted, children felt very bad about it and thought it was because of irregular watering, not taking proper care of them, or because of less sunlight at the place. Later I showed and asked them to observe neem trees in their surrounding area, and thus they understood the effect of seasonal changes on plants and their growth as all of them receive the same care and sunlight still, but the growth varies. And thus, they got the hope that their neem plants will recover soon.

Images 6.1(d): Neem plant during mid February(L), during February end (R)

Later, when we again visited in March, those children who planted the neem tree were immensely happy to see new growth. And at that time, we gave a small quantity of organic fertiliser (provided by admin) to all the plants, and I taught them the basics of fertiliser.

Images 6.1(e): New growth on Neem plant during March(L), Kid giving fertilizer(R)

- They learn to check how to ensure the plant is doing well or growing by seeing the new growth on the tip of the branch. Also, by observing the change in colours of the leaves as there is a colour change when a leaf is young and when it becomes mature.

- They were asked to find information about the plant they had planted and its benefits and uses.

- They learn and observe the different kinds of leaves – size, shape, colour, arrangement, veins, texture, edges, etc.

- I explained to them about underwatering and overwatering and the benefits of less frequent watering for trees so that their roots can go deep in the soil to search for water.

6.2 Activity 2- Growing Fenugreek from seeds:

Month: February 2023

Total children participated: 4

Motive: To make them experience and get excited about the magic of seed germination.

In this activity, I guided them about the pot and its use based on the materials like terracotta vs plastic, how a pot should be, and creative ways to use different waste materials as a pot. Also explained to them about the soil mix - how to make it, in what proportions, the role of each ingredient, soil-related common issues generally seen in the home garden, and the reason behind that, like hardening of soil over the period of time.

Images 6.2(a): Kids after preparing pot with soil mix(L), Kid showing fenugreek(R)

Observations:

- Some of them did not have any pots at home and were planning to order pots for the activity. They think that a planter/pot has to be bought from the market in order to grow something. After sharing inspiration as below and explaining the use of waste material to grow plants, they came up with creative options like plastic water bottles and cardboard boxes.

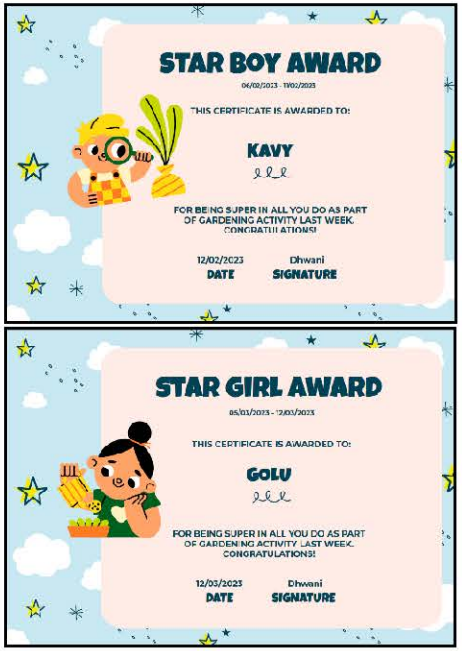
Images 6.2(b): Creative inspirations shared with kids

- Children shared their experiences with so much joy. They felt so excited once seed germination started, and it seemed like magic to them to see quick growth day by day. They keep on checking the growth daily.
- One child proactively made two pots, one small and one big, which shows how involved he is and dedicated to the activity.
- They are not aware of hydroponics, and the concept was very surprising to them.

- They reused waste bottles and made watering tools so that the growth of delicate fenugreek stems does not damage.

Image 6.2(c): Handmade watering tool using a waste plastic bottle (L)

- Some were not aware of how to do watering or how much water was sufficient. They used to make the soil very soggy.
- When inquired about do they made plant food at home or purchased from outside, their instant reply was how come one makes plant food at home, they have to buy from outside. This means they do not know about composting and other easy homemade organic fertilisers.
- In order to sustain their interest and make them feel appreciated, I used to give a certificate and a bar of chocolate to those who did well throughout the week and share the updates with me through images daily in the WhatsApp group. Nevertheless, this idea worked well, and every week they were curious to know who would get the award.



Images 6.2(d): Certificate for boy (L), Certificate for girl(R)

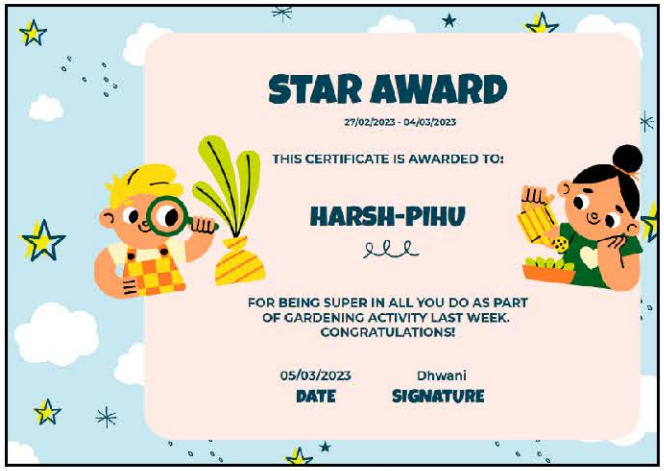


Image 6.2(d): Certificate for group activity

Limitations/ Difficulties:

- A new child was added to the group leading to a total of 8 children. However, out of them, four were occupied in exams or other family events.
- Those who were not present were interested in doing the activity, and they themselves said that they would do it later. Also, I have shown readiness to explain them and take sessions again whenever they are available. Also reminded them periodically to reach out to me if any queries or need any kind of help from my side. However, that did not happen.
- The fenugreek was growing well for those who were doing in big containers.
- We planned to use that harvest and organise a mini picnic, but due to seasonal changes and hot weather, it did not survive well.

6.3 Activity 3 – Planting at the public garden:

Month: February 2023

Location: Public garden, Sector-2, Gandhinagar.

The motive behind site selection: This garden is nearby their house, and they usually go to play there in the evening/morning. Also, it is a closed, safe and public space to plant something they can care for and check daily without worrying about any damage to it by stray animals. Moreover, it was also planned to instil in them the community garden concept and grow something which can benefit all who visit it.

Name and number of plants: Mulberry (*Shetur)* (1), *Nagod/Nirgundi* (1), Lemon grass (2), *Giloy* (1), Fig (1), Touch-me-not (1), *Panfuti/ Patharchatta* (1), Sweet neem (1), Arjun tree (1)

All these saplings were sourced from Govt. Ayurvedic Nursery, Sector- 19, Gandhinagar.

Images 6.3(a): Images of the nursery with limited plants

Images 6.3(b): Nursery entrance(L),Green Mulberry(M),plant information display(R)

Images 6.3(c): Board displaying QR codes to access plant information(L), All the bought plants for activity(R)

Total children participated: 9

Observations:

- When children indulged in planting, some visitors were curious to know what was going on and appreciated them and were glad to know that they did not have to go to find those plants but could get them from here in future because of their medicinal properties.

- Some children who were playing there were also friends of this group of kids, and they had also shown interest in planting and helped them plant there. One of them was just a 7-year-old boy whose mother requested me to include him in this group for future activities because his kid had shown his interest to her to include him in this group. He was also part of past activities in the garden, where we all played and talked about the plants.


Images 6.3(d): Children with their extended group of friends playing in the park

- Kids were given bamboo tools for the activity, and the response was terrific. They enjoyed using them and eagerly waited for their turn to come so that they could use them. Even though there was no need to give water to other garden plants, they still watered because they enjoyed using the tool. One of the girls has readymade garden tools at home and was complaining about their heaviness and saying that they were not so comfortable to use as compared to these bamboo tools. They were even curious to know if I made those tools and if it was difficult to make.

Image 6.3(e): Handmade bamboo tools

Image 6.3(f): Children during the session

Images 6.3(g): Children watering(L) and planting(R) with help of bamboo tools

Images 6.3(h): Children planting in a group(L) and undestanding about how to operate water source(R)

Images 6.3(i): Children during the session(L) and planting Arjun tree(R)

- We have also planted seeds of brinjal, okra and cluster beans there. The in charge of the garden also helped us to dig the patch of land to soften the soil for better growth of plants. Children were curious to see the seeds of vegetables, and it was a new learning experience for them. One girl shared that she now understands how deep a seed has to be planted since, in the past activity, she has sown the seeds so deep that they never germinated.

Images 6.3(j): Vegetable seeds(L), Garden in charge helping us to soften the soil on a patch of land where we planned to grow vegetables (M, R)

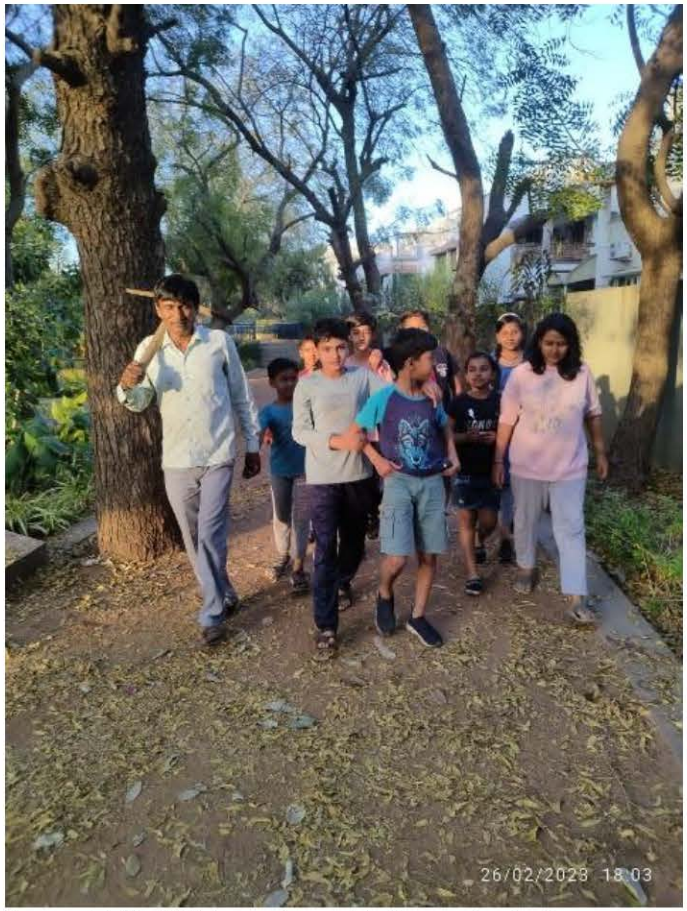
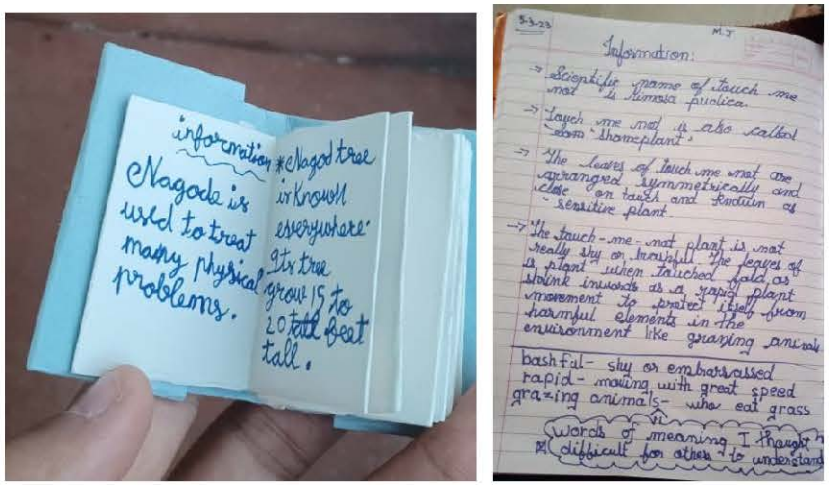


Image 6.3(k): Children, along with the garden in charge and me

- As each child has to take care of the respective plant he has planted, check its well being and water them daily when they come to play in that space, they did their duty well, and also it was fascinating for them when they saw their sown seeds get germinated after some time. They felt terrible if some plants did not survive or were missed from the place they had planted. One of the children had shown true dedication to that by checking the plants even on those days when he did not go to play in the garden. In contrast, the rest of the kids have slowly forgotten about taking care of plants as the soil was mostly moist enough by the drip irrigation pipes on the ground. Children also learn about the benefits of drip irrigation and complain when they see someone working in the garden using the water hose and watering the plants with force.

- Since each child has one plant, I explained to them the basic information about it, like the name of the plant, which category it belongs to, and whether it will be a huge tree, shrub, small plant, or vine. They all were excited about the touch-me-not plant. Also, they were asked to find the information about the plant they planted and share the same next time they met. Two children have made notes, as shown below. The rest of them did not find it, and some already forgot the name of the plant they had planted.

Images 6.3(l): Paras showing a handmade book(L), Book front(M), Information inside about the Nagod plant (R)



Images 6.3(m): Information about the Nagod plant (L), Information about the touch-me-not plant (R)

Limitations/ Difficulties:

- I have planned a visit to this Ayurvedic nursery with the children, but this could not happen due to their school/tuition timings. Also, since it is a government nursery, it follows the government calendar and timing. However, some children have shown interest in visiting by taking off from the classes for one day, but I refused and told them we would plan again sometime in the future.

- Since it was not the pick season, the nursery did not have many options and availability of plants. You can see that in the image 6.3(a). However, the person available there helped to manage a few plants from here and there since he believed it was for a good cause.

- In order to conduct the activity in the government public garden, I must take permission first from the in charge. When I visited there for the same, I explained the things to a lady sitting outside, but initially, she told me to take permission from their supervisor as they also report to them. However, after some time, she called his husband, and when he learned about the project and the intention and idea behind this, he was so happy and supportive and immediately agreed. He even showed their Tomato, Potato, and Flat bean plants. He helped to decide the space where we could do the planting, and it was nearby his room so he could keep watch of the plants. Later in the coming days, he showed his bucket, other tools, and the water source and explained how to operate it to the kids so they could easily water the plants.

- Out of 9 plants we have planted, the mulberry plant was damaged just the next day as if someone had stepped on it, probably from the garden workers. Touch-me-not did not survive. Lemon grass and Fig were not in their place after some time. The rest of the plants are still doing well.

Image 6.3(n): Dried touch-me-not plant

- The vegetable seeds germinated and were doing well. However, later they were damaged by the garden workers. Once the seedlings were suppressed under the pile of dried leaves, as shown in image 6.3(p). So, to protect them, I created a border using a rope around it so no one could go inside. Later after a few days, neither seedlings were there nor that rope because the garden cleaners had to sweep the ground hastily to remove the fallen leaves and clean the area when their supervisor came in to check.

Image 6.3(o): Seedlings of Cluster beans

Image 6.3(p): Seedlings of Okra

Image 6.3(q): Seedlings of Brinjal

Images 6.3(r): Seedlings suppressed under the pile of dried leaves (L), Grown seedlings damaged by sweeping on the ground (B)

Additional point:

In February end, I attended an urban horticulture development training from the Director of Horticulture, the Government of Gujarat. They emphasised the importance of horticulture and practising composting at home. They also shared available schemes and subsidies provided by the government to practice professionally. They have newly launched a scheme after the pandemic period for women to make them financially independent. They also shared the address of offices to visit for any query and where to get quality seeds at nominal rates. The knowledge-sharing session was full of tips for better growth and more production of vegetables/fruits. It was very interactive and solved issues faced by participants who practice horticulture. They also showed the latest developments and availability of tools to avoid pests and diseases.

Image 6.3(s): Certificate of Urban Horticulture Development Training

6.4 Activity 4 – Growing tomato from seeds:

Month: February 2023

Total children participated: 7

Observations:

- There was so much excitement about growing tomatoes among the bunch of kids. Infect, they all insisted on doing this as the next activity after the fenugreek. So, it was happening parallel to the public garden activity. One girl tried to grow a tomato plant from seeds earlier in her life but failed then. For this activity, I showed them practically how to sow the seeds straight from the Tomato and at what depth—taught them to germinate the seed and later shift the seedling. Also showed how to use airtight bags to fast germinate seeds to grow plants. And they followed the same by themselves later.

Images 6.4(a): Shifting the grown seedling(L), Tomato seed inside ziplock bag(R)

Image 6.4(b): Sproted Tomato seeds inside a ziplock bag

- When I went to one of the girl's house for a demonstration, her mother shared that she has an immense interest in gardening. Every time she saw the message to meet, she got excited. Also, her mother shared that even though they have several plants at home, she still does not know many things that her kids share with her, whatever they learn from me as part of weekly activity.

- Children were eagerly waiting for the seeds to germinate and felt impatient if their seeds took time to germinate while their friend's seeds germinated early.

- One of the kids has proactively and dedicatedly given protection using a poly bag to his seedlings while he observed they were not doing well, and he had successfully revived them, and it is growing well till date.

Images 6.4(c):
1. Protecting seedlings using a poly bag
2. Unhealthy tomato seedlings
3. Tomato seedlings, when small
4. Tomato seedlings grew into big plants

- Of the five children who failed for the first time, three proactively tried again to grow from seeds.
- One child was so excited that he started thinking of growing everything from seeds and experimented with watermelon seeds. However, then, I slowly redirected him to get help from the internet to learn basic requirements (soil, size of the pot, season, weather, water frequency etc.) for any of the plants he wishes to grow so that he does not need to depend on others to gain the knowledge in future.
- One kid's sister was also interested in gardening and was trying to propagate mint in water. She also reached out to me for her queries. Furthermore, we had a plant sharing as well.

Image 6.4(d): Mint propagation

Limitations/ Difficulties:

- I have shown practically for 2-3 children's pots; the rest did by themselves. However, sometimes they did not follow exact instructions, and thus it led to failure.
- Due to exams, some children have missed paying attention and taking care of their seedlings, resulting in failure.

6.5 Activity 5 – Growing coriander and vegetables in groups:

Month: March 2023

Total children participated: 6

Motive: To get a personal experience and understanding of the difference in required care and plant growth when planted in open ground and pot. It was a group activity, and three groups were created. Each group would work on coriander and any one type of vegetable seed (same seeds used as activity-3).

Reason for the group activity: During this time, they had to prepare for the exams and take care of the Tomato individually. So, to make their life easy, it was done as a group activity where each group member had at least one thing to take care of - coriander or vegetable.

Observations:

- They brought waste containers (like mobile cardboard boxes and thermocol boxes) and learned how to use cardboard boxes in gardening using a poly bag to protect that from water.
- They enjoyed playing with soil and knowing the different treatments required for coriander seeds, like breaking them first before sowing.
- They felt joy when seeds sprouted and grew rapidly day by day.
- One of them who failed has shown consistency and dedication, and he still tries to grow even after previous failed attempts. He was the most curious and usually asked so many questions. He even discusses the drip irrigation ideas he has.
- One week after sowing, I asked them to find the basic information from the internet about the plant they have in order to make them self-sufficient:

- How many days will it generally take to germinate
- How the soil should be for the bigger pot
- When should we re-pot
- When to provide fertiliser
- What kind of fertiliser is best for it
- How long does it take to fruit
- How many hours of sunshine is required

Images 6.5(a): Splitted coriander(L), Children preparing soil mix and pot(R)

Image 6.5(b): Sprouted Coriander seeds


Image 6.5(c): Child splitting Coriander seeds(L), Okra Seedling with its visible roots(R)

Images 6.5(d): Sprouted Coriander seeds

Images 6.5(e): Sprouted Coriander seeds

Images 6.5(f): Okra seedlings starting to die because of lack of re-pot

Limitations/ Difficulties:

- Since this activity onwards, two children have stopped participating because their exams were approaching, and they could not get time to play. So, they chose to play over this to make the most of their free time.
- After germination, when the seedling has grown, it is required to be transferred to a bigger space, but they felt lazy in doing so or were not so quick in action as instructed, so it did not survive further.
- For coriander, since summer has already started, they could not maintain the moisture level and placed the pot in direct sunlight so it could not survive more.
- One cardboard box was damaged in the rain since they left them outdoors and could protect on time.
- I wanted to try different propagation methods and hydroponics techniques with them but could not as it was required to sow seeds at the proper time (season), but by the time their exams started, they started losing attention to it. However, recently two of them contacted me to continue since their exams are over, and they have shown interest in doing snake plant propagation.

6.6 Analysis and conclusion:

- Initially, all the children were excited and happy doing various activities. Even the new kids kept on joining this group. However, from mid-March onwards, some of them slowly started shifting their attention and interest towards other priorities in their life, like playing, over this, because due to exams, they could not find enough time to play.
- In some activities, they succeeded and in some, they failed, but the important thing is that they learnt about:

    1. The basics of gardening – watering, soil mix, light, fertiliser, signs of growth, leaves, seed germination and its methods, drip irrigation, etc.
    2. Different characteristics and behaviour of plants in different seasons
    3. Sustainable practices in gardening using waste materials
    4. Through failure, they knew why it did not work out. Hopefully, they will remember it in future.
    5. Use of technology like Google Lens to gain knowledge about plants, thus creating less dependence on others to gain knowledge.

- As result of all those activities, it generated interest in two of the children. They still visit my house to ask various questions related to plants and request to start and conduct new activities as their vacation is going on. They have shown interest in snake plant propagation as a subsequent activity.

7. Choice of Medium

7.1 Comparative analysis of similar products

There has been a lot of material about gardening for adults (even apps and books) but not enough for children. Below are the already available materials for children:

- Gardening kits for children are available, which may cost more, and not all can afford them. Also, they do not teach sustainable ways of gardening. Moreover, they are specifically targeted to grow either herb/micro greens/ flowers/ pizza garden kind small segments. Also, some are targeted to techniques like hydroponics and drip irrigation only.
- Websites
- Informative articles/blogs
- Animation films/ Videos

However, the already available material is not from a holistic point of view. It does not target the problems of space, money, time and resources, which may not help sustain their interest in gardening.

7.2 The Kit

Since our target audience is urban children between the age group of 10 to 12 years old, to generate their interest in gardening and promote sustainable practices, we have to think of something that can be a fun, engaging and enjoyable experience for them.

Hence, I have chosen an interactive kit. The kit includes a guidebook that can help children with various aspects of gardening at home and growing plants. The kit also includes several other essential supportive components like seeds and tools that can help to facilitate our goal.

During the research phase, I learned about incidents where parents did not help or support their kid's academic plant-related projects/assignments where kids attempted to grow something. Moreover, sometimes, parents lack the knowledge and motivation for gardening. Hence the kit is designed such that children do not have to be dependent on anyone to start with. However, it is always beneficial to them if they have a supportive hand of parents. For that, the communication and instructions must first be easy so they can get involved and experience gardening as a gratifying activity. They may or may not like it as it depends on the individual's preferences, but it is crucial for us to encourage and introduce them from a young age since they will be a global citizen of the future. In order to achieve that, the project aims to do information dissemination, interactivity, participatory activities, rechecking what they have learnt, and sharing the information with others, so they also promote the idea among friends, etc.

8. Content Strategy

At the beginning of the 4th semester, my guide asked me to map the micro level (garden) with the macro level (climate change and global warming) to emphasise that until the size (micro level) is mismanaged, it adds to the scale (macro level). Hence, I created all the mappings and connections, which helped me to focus on the relevant topics, keeping in mind all the other aspects it affects. This approach gave me a tighter grip on what to address and why.

8.1 Chapters

(i) The guidebook is designed such that the initial part consists of **general chapters** related to the basics of gardening like:

- Water,
- Sunlight,
- Soil,
- Fertiliser And Compost,
- Insecticides,
- Weed,
- Mulch,
- Re-Poting,
- Pruning,
- Space Selection etc.

These chapters can be helpful to children to understand the basic concepts and enable them to sustain their interest by addressing problems like watering when on vacation, space issues, light etc. Also, it shares homemade cheap organic resources like pesticides, compost, and fertiliser, which are readily available from home.

(ii) The middle part is the core of the book, consisting of chapters including instructions to follow to grow plants. The chapters are categorised based on the scale of easy to hard and are divided into three sections: (i) Planning, (ii) Planting, and (iii) Growing and Maintaining. Below is the list of chapters:

1. **Microgreens**:
   - It includes both types of microgreens which cannot regrow (Mustard, Fenugreek, Coriander, Cumin, Fennel, Moong Beans, and Black Chickpea) and which can regrow (Wheat Grass) after harvest.
   - All those mentioned are readily available at home.

2. **Garden Plants**:
   - It includes an air-purifying vine plant, "**Pothos**", that can be grown in water and soil and adjusted in any space. Targeted stem propagation method.
   - It includes an air-purifying desert plant, the "**Snake plant**", which is less maintenance and targets a leaf propagation method.
   - It includes an air-purifying, desert, succulent plant with medicinal properties, "**Aloe vera**", which is less maintenance and targets propagation through leaf and offset.
   - It includes a flowering plant, "**Marigold**", beneficial to pollinators and a great companion to tomato plants. It targets the seed propagation method.
   - All these plants are widespread and readily available in the surrounding.

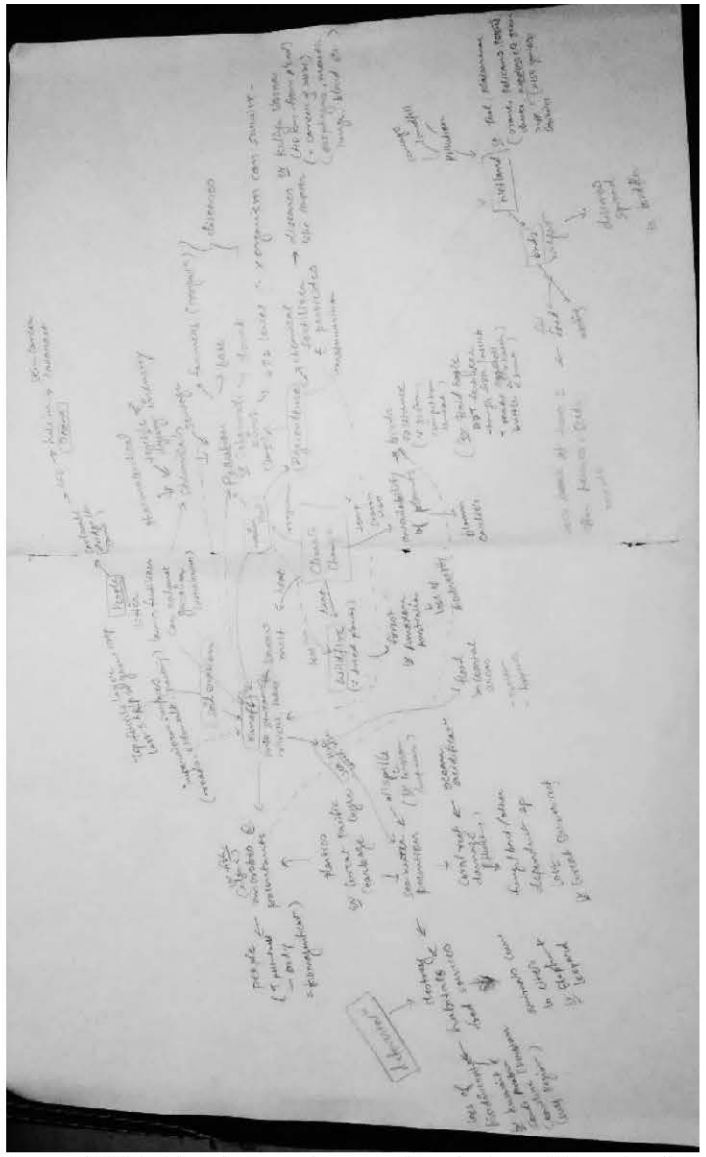


Image 8.1(a): Mappings and connections between Micro level and Macro level

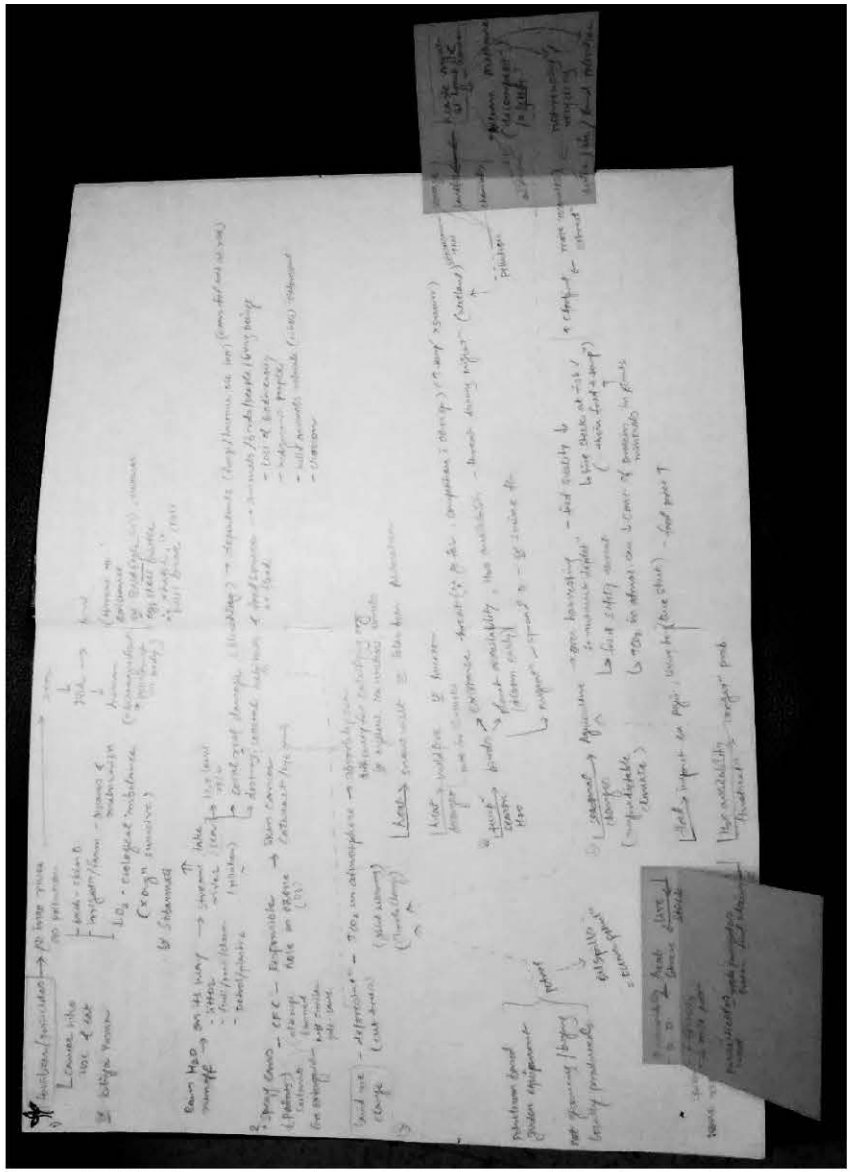


Image 8.1(b): Mappings and connections between Micro level and Macro level

3. **Herbs**:
   - Here we have introduced the hydroponics method along with the conventional soil medium for "**Fenugreek**" and "**Coriander**". Also, coriander is a pollinator attractive plant.
   - It includes a runner "Mint", an insect repellent and a pollinator attractor.

4. **Vegetables:**
   - It includes fruiting vegetables like "**Tomato**" and "**Brinjal**", which can be grown through seeds.
   - It includes underground root vegetables like "**Carrots**" and "**Beetroot**", which can be grown through kitchen waste and are biennial plants.

All the plants are chosen based on the climate and soil condition of the region. They are targeting different propagation methods and different categories of plants, promoting sustainability through companion planting, insect repellent, and pollinator-friendly; they can be grown in different media, solving the issue of soil and water. Most importantly, they enable kids to start their growing journey immediately from the readily available seeds/kitchen waste.

(iii) The last part of the guidebook contains various supportive chapters like:

- How to plan a space for a garden at an apartment/house
- Types of different possible gardens,
- Trackers to track and plan in the garden
- Glossary

8.2 Narrative

In order to persuade children, the language used in the book is very easy to understand, simple and in a storytelling way.

It also includes interesting, fun facts.

A second-person narrative is used, which can help to engage the child better because they feel like to be addressed directly.

All these, along with the visual elements of images and illustrations, were used.

9. Design Process

11.1 Exploration Of Different Layouts

This was the most time-consuming part. Initially, I tried various layouts, as shown below, until I reached the final design.

- Exploration 1:

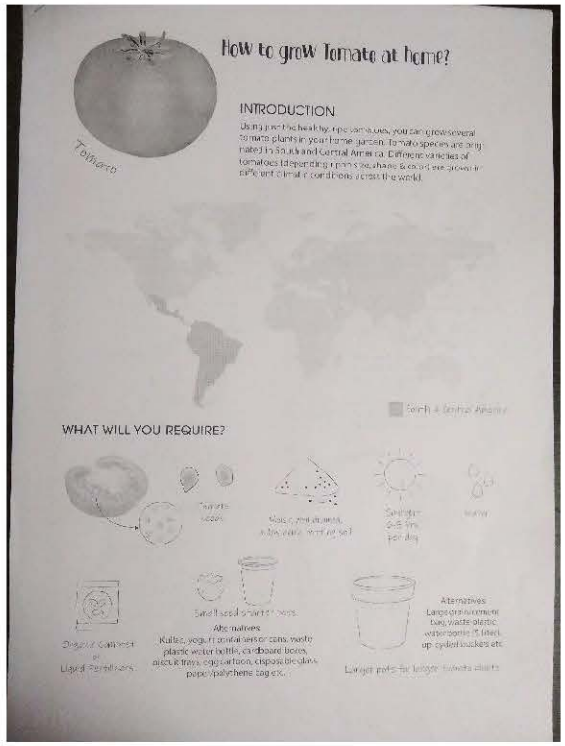
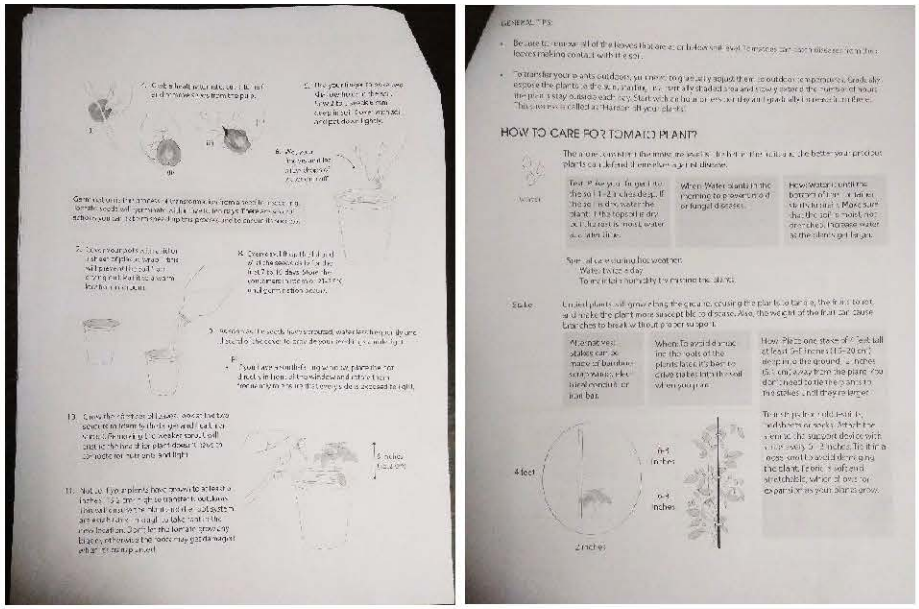


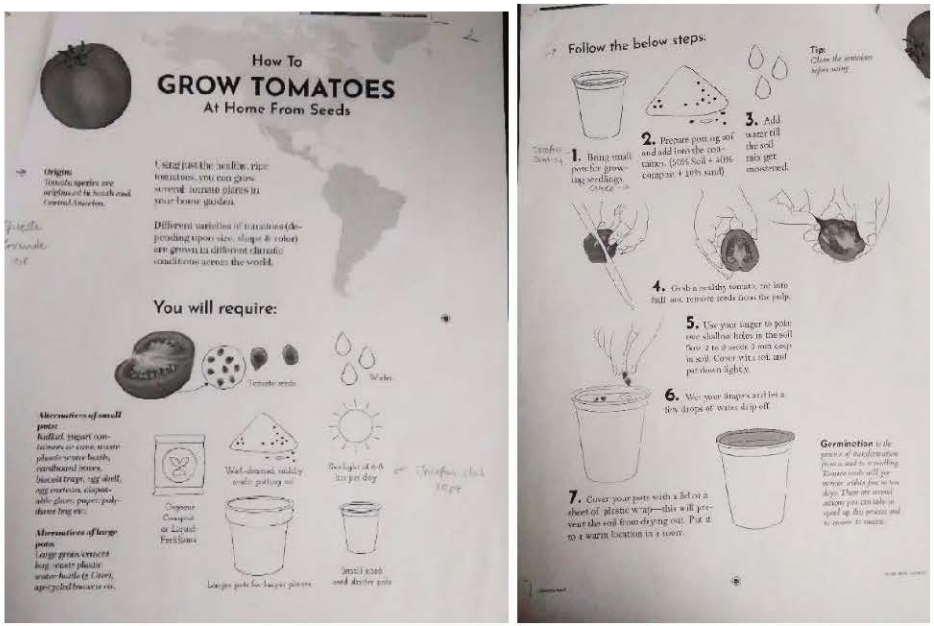
Image 9.1(a): First Layout of a chapter showing the title page



Images 9.1(b): First Layout of a chapter showing inside pages

Issues:
The content does not follow any grid and creates problems in eye movement to follow the flow of instructions. The boxes are of free size and not following any standard size.

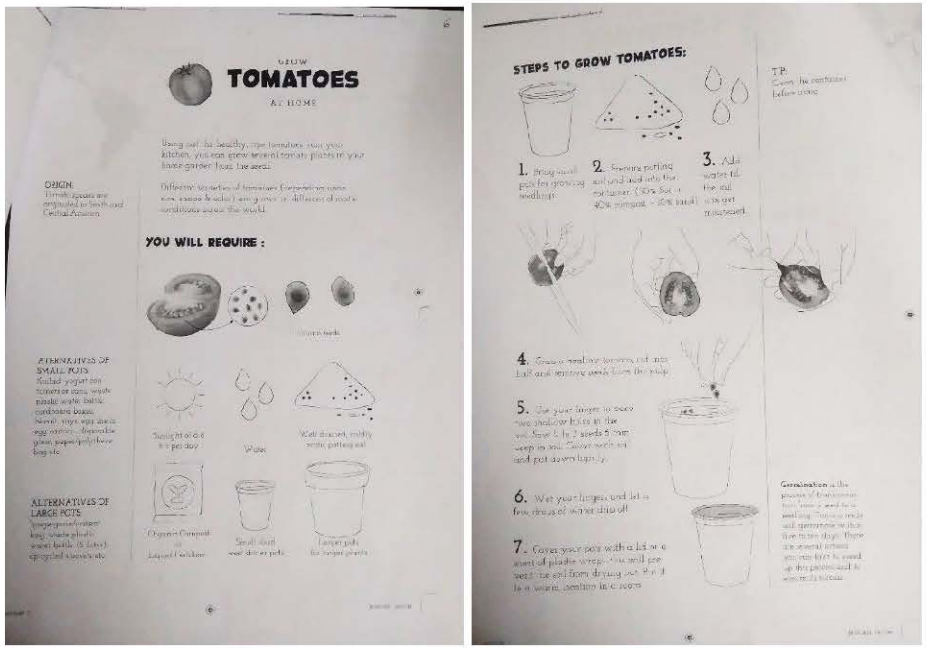
- Exploration 2:



Images 9.1(c): Second Layout of a chapter showing title page and inside page

Issues:
Here I have tried to follow the grid. However, the supportive content merge with the primary content, and there is no proper separation. Content in the steps part follows a free layout inside the grid, which is not visually appealing.

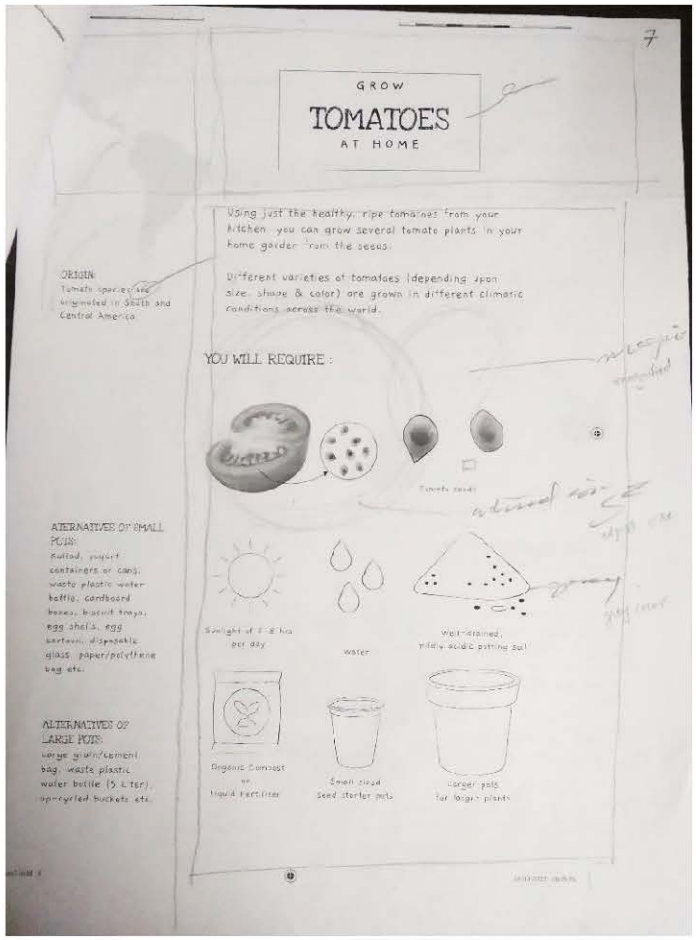
- Exploration 3:



Images 9.1(d): Third Layout of a chapter showing title page and inside page

Issues:
Here I have tried to separate the supportive secondary information from the primary content through a thin vertical line. However, the title part was not appealing to me and also the steps part was looking messy.

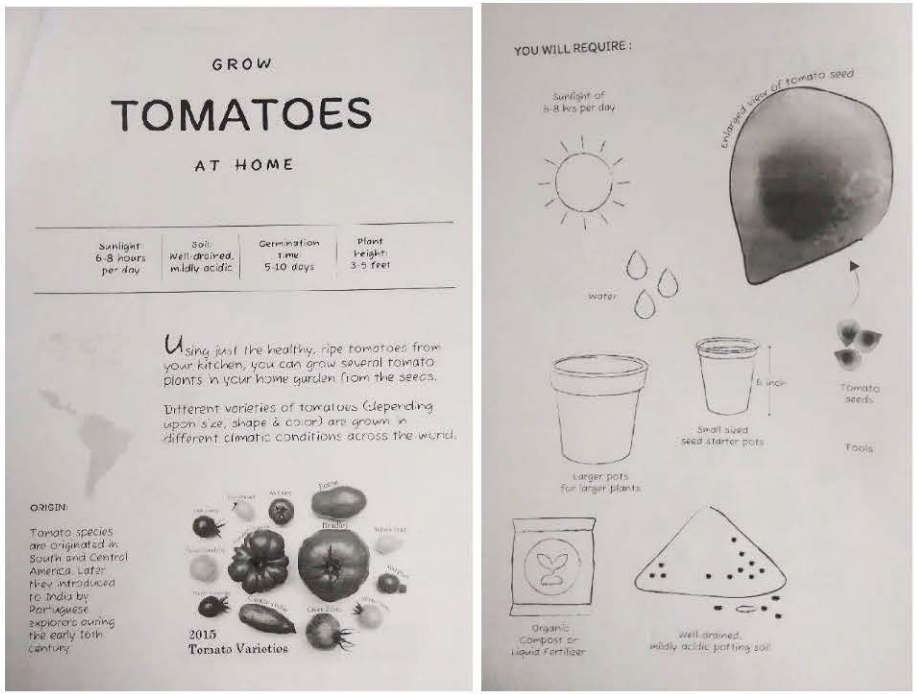
- Exploration 4:



Images 9.1(e): Fourth Layout of a chapter showing the title page

Issues:
It does not generate any kind of interest because all the illustrations are of the same size. Also, the title part was not appealing to me.

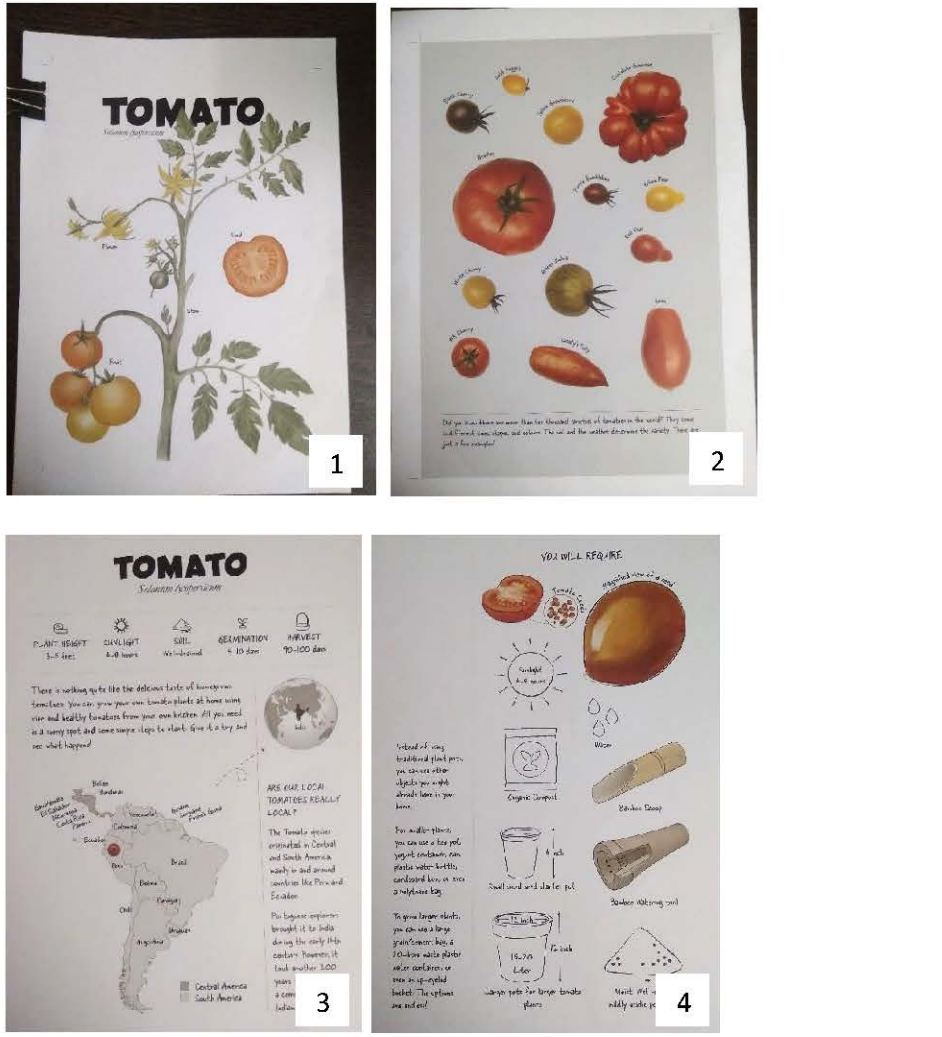
- Exploration 5:



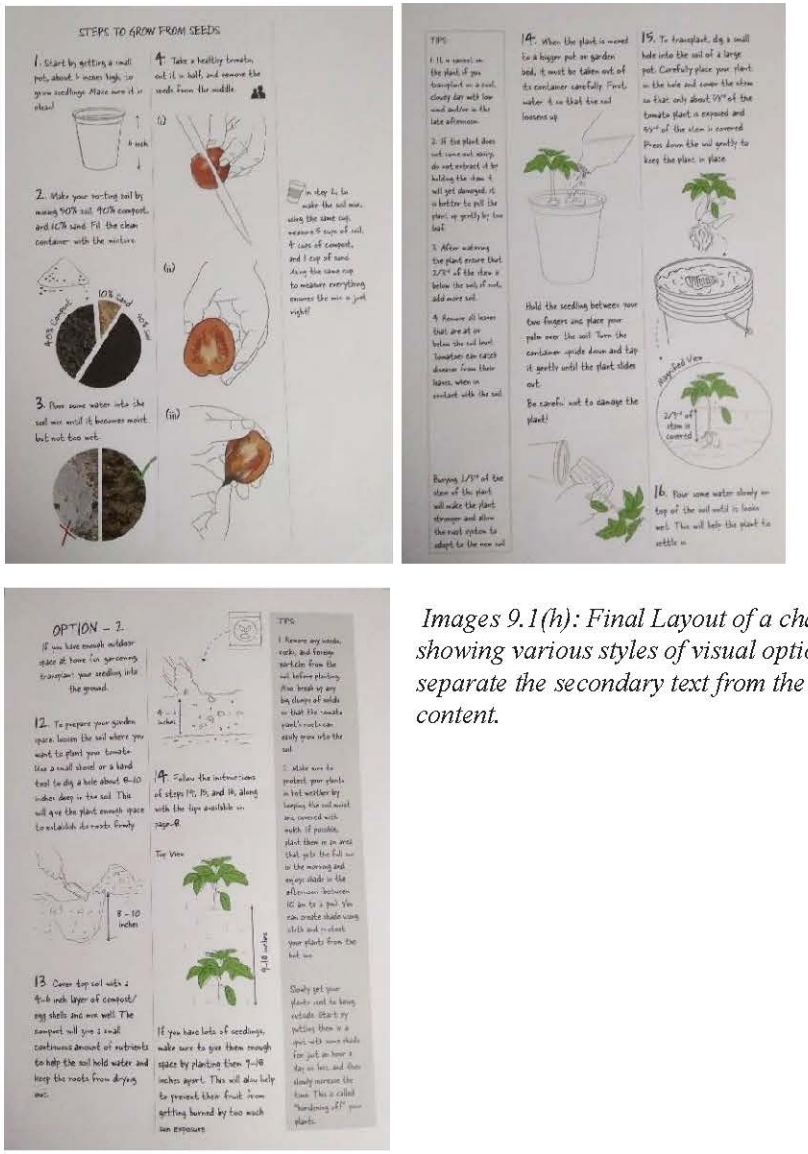
Images 9.1(f): Fifth Layout of a chapter showing title page and inside page

Issues:
This time I tried a totally different layout and placement for the sections. I have added a bar showing all the important information regarding a plant, like soil, sunlight, germination, and harvest time. Also, I created a separate page for the required things and tried to create a visual hierarchy in order to generate interest.

- Final Layout:



Images 9.1(g): Final Layout of a chapter showing 1. Chapter divider page, 2. Varieties page, 3. Title page, 4. Requirements page.



Images 9.1(h): Final Layout of a chapter showing various styles of visual options to separate the secondary text from the main content.

11.2 Sizing And Grids

Here is the right-hand side page given. The left-hand side page is an exact mirror copy of this.

Page size:
17.5 cm (w) * 25.5 cm (h)

Orientation:
Portrait

Margins:
Top and Outside: 1.27 cm
Bottom and Inside: 1.5 cm

Gutter: 0.75 cm

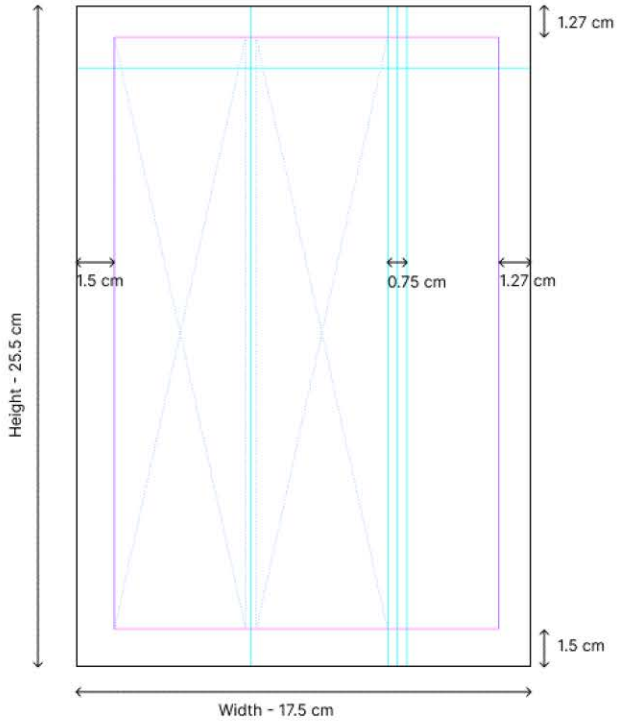


Image 9.2: Display of page size, layout, and grids along with dimensions.

11.3 Typography

Deciding on a font was challenging, considering the target audience and readability. It took almost four days to decide on the fonts. We tried various options for heading, subheading, and body text. Experimented with various combinations to decide which font suits another font. Also, based on the heaviness, we tried various font sizes to finally decide on the font size. Here are just a few sample pages shown, which we tried and printed in order to decide:

Explorations:

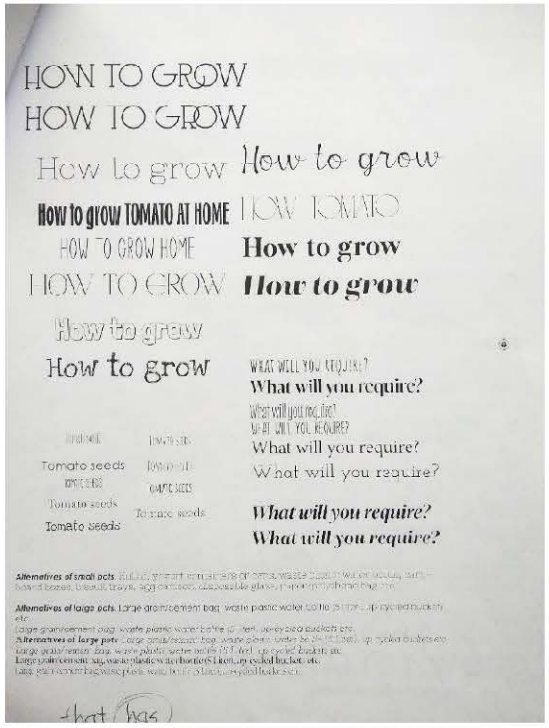


Image 9.3(a): Font options for heading, subheading, and body text

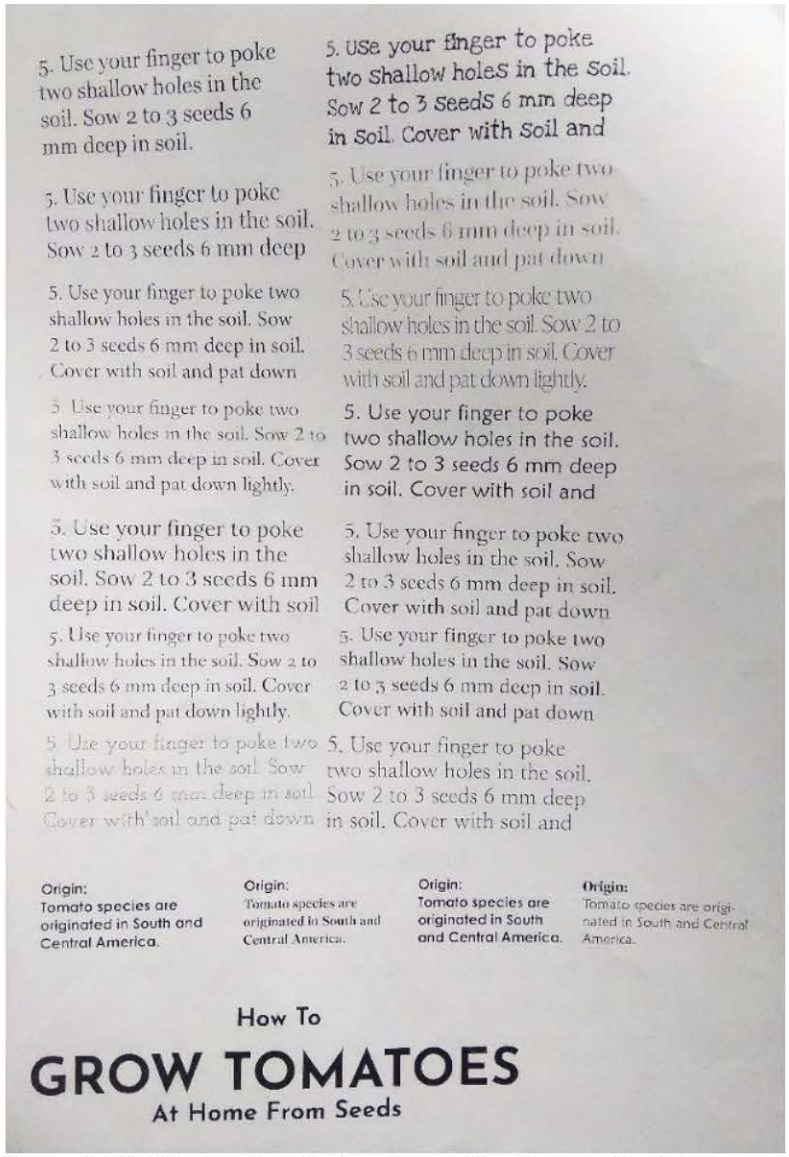


Image 9.3(b): Font options for heading, subheading, and body text

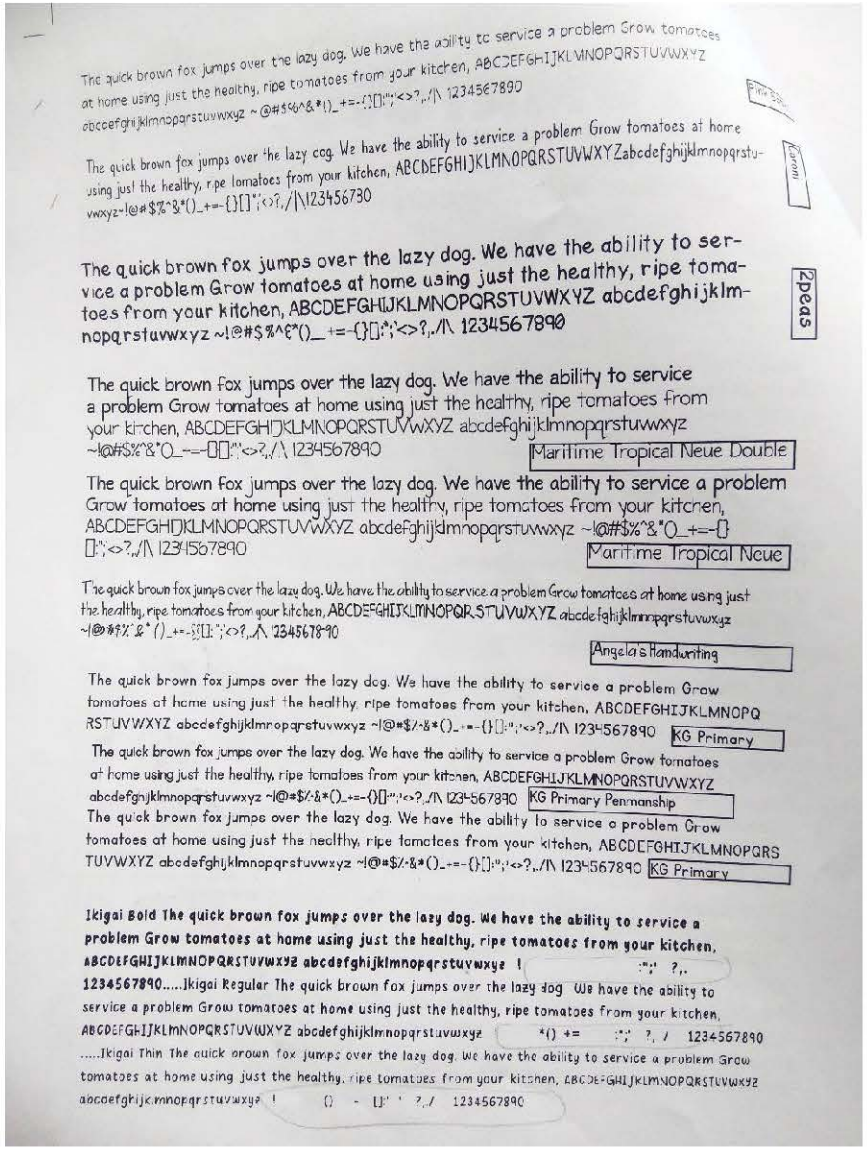


Image 9.3(c): Various font options for body text

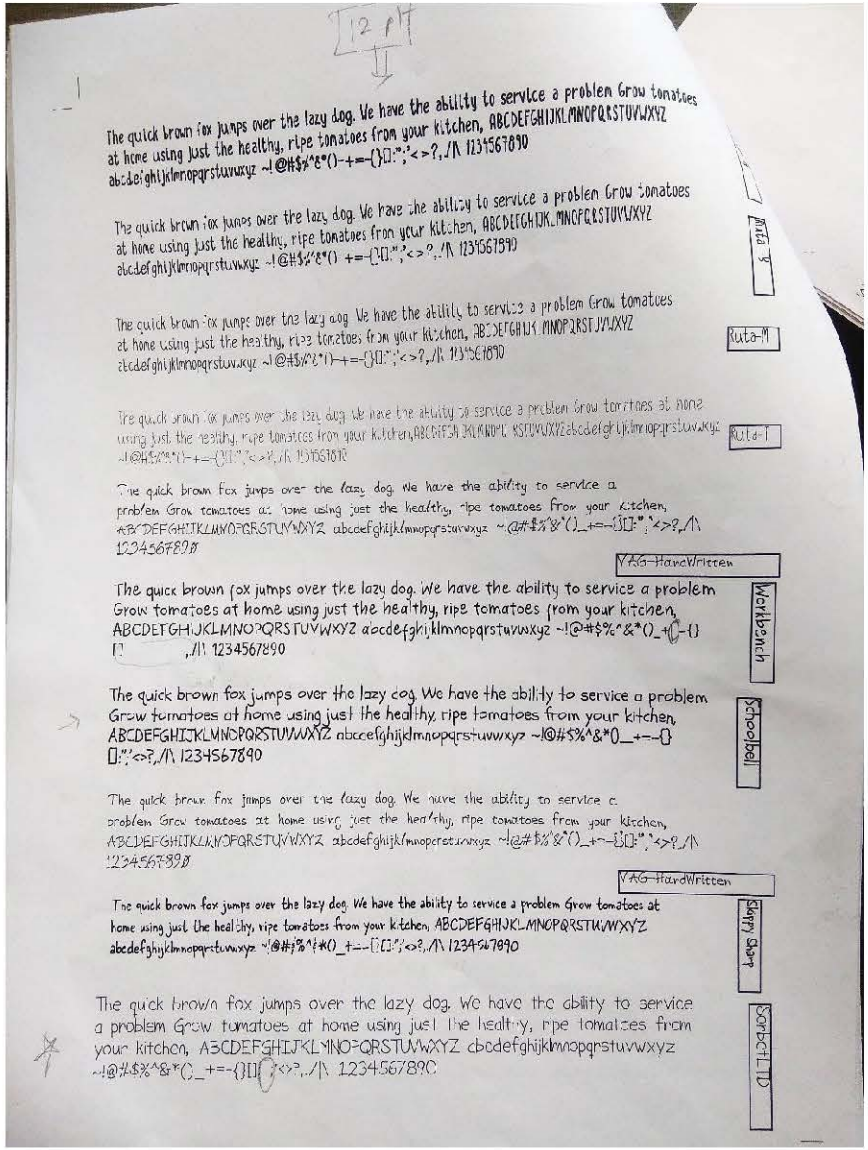


Image 9.3(d): Various font options for body text

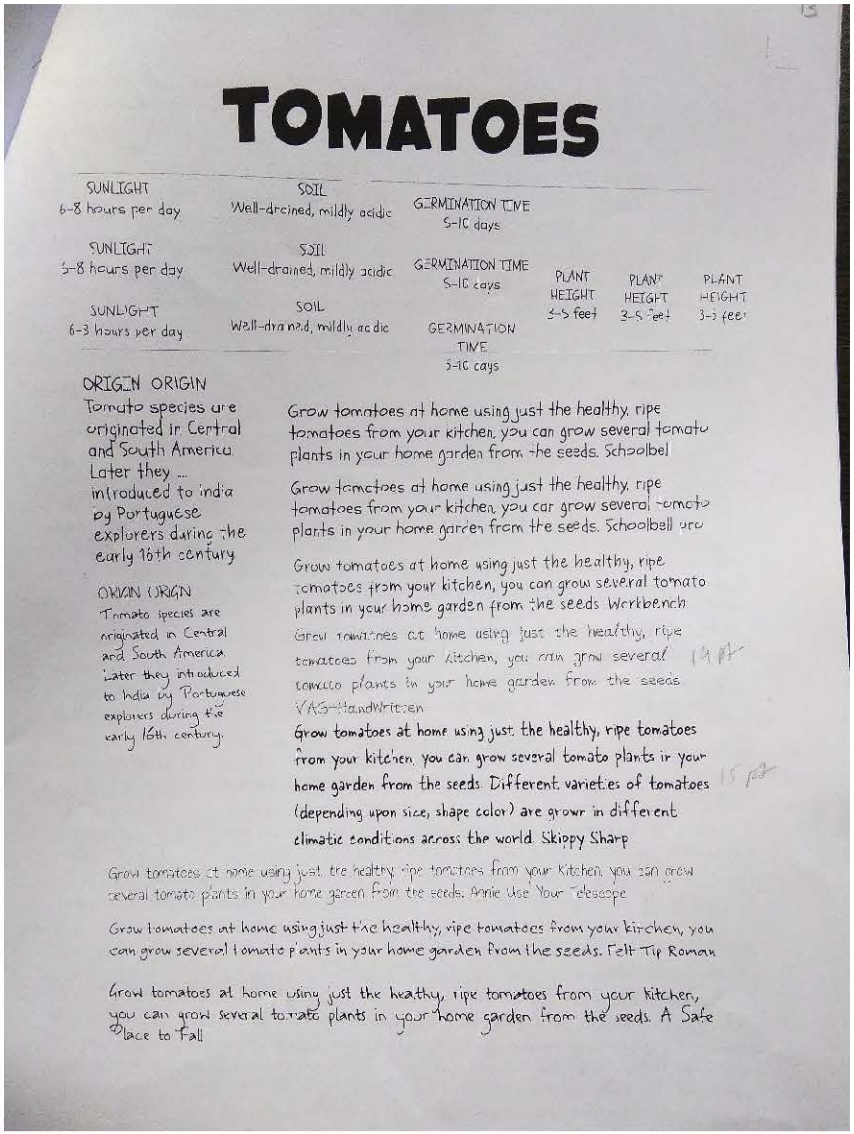


Image 9.3(e): Various font options for body text

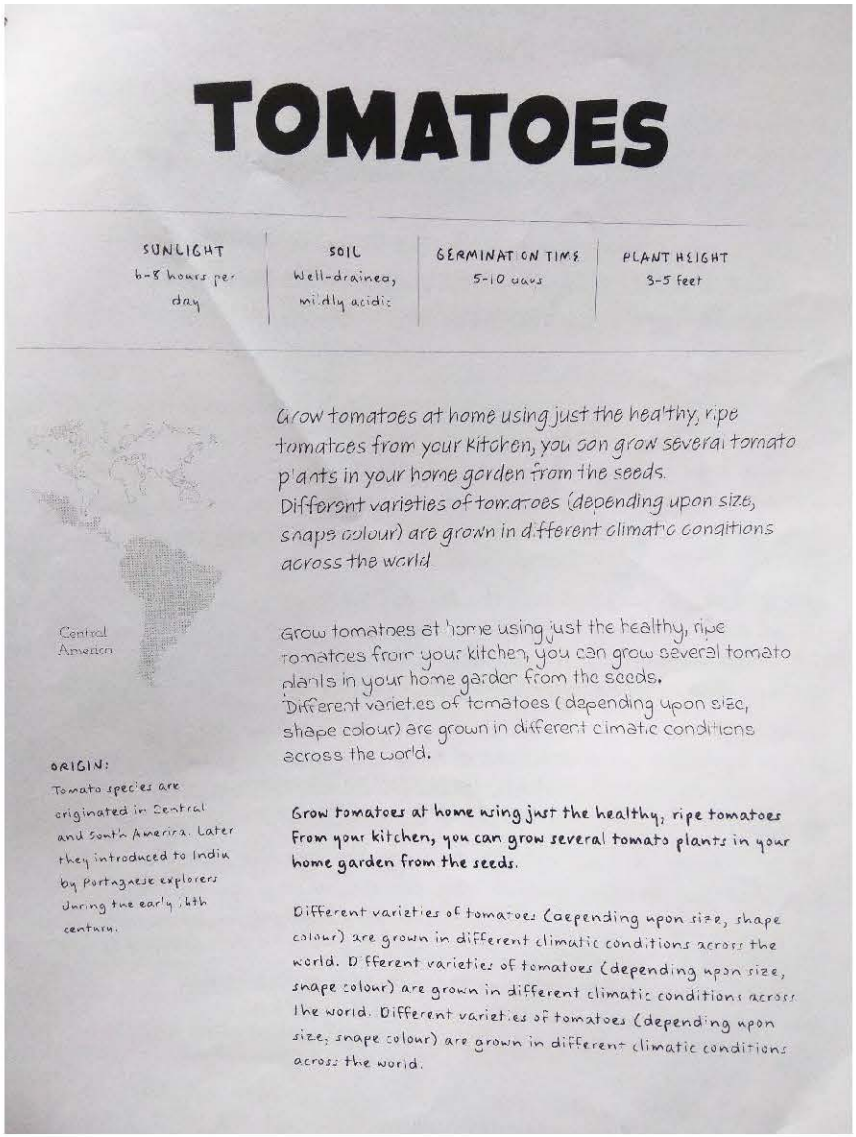


Image 9.3(f): Various font options for body text

The final selected Fonts and its size are as below:

HEADING1

(Kids magazine, 38.5 pt)

HEADING2

(Kids magazine, 30 pt)

Scientific Name (Garamond, Italics, 16 pt)

12345 (Skippy Sharp, 24 pt)

SUBHEADING (Skippy Sharp, 18 pt)

Subheading (Skippy Sharp, 18 pt)

Body text (Skippy Sharp, 15 pt)

SUPPORTIVE TEXT HEADING (Skippy Sharp, 14 pt)

Supportive body text (Skippy Sharp, 14 pt)

Legends (Skippy Sharp, 12 pt)

11.4 Illustration

To catch the attention of children, we must carefully decide on a graphic style which is easy to understand and, at the same time, interesting enough.

- The botanical drawing was made using watercolour and gouache brushes:
  Kyle's Real Watercolour – Small Round Basic
  Kyle's Real Watercolour – Fine Detail
  Kyle's Paintbox – Gouache Detail

- Illustrations in the instructional part were kept very simple in the form of line drawings and highlighting only the main part/ leaf/ vegetable. The stroke of the line used is "Pencil- Thin."

- We have used real images where it was required to explain how it looks. And made illustrations where we just had to explain the concept.

Images 9.4(a): Illustration incorporating real image(L), Vector Illustration(R)

Image 9.4(b): Botanical illustration of Tomato

- Since based on the illustration style, our dominating colours in the book are the plant's real colours and textures. And those will vary based on the choice of plant, and hence for the rest of the space, our colour choice was kept to neutral colours.

11.5 Choice Of Software:

- Adobe Illustrator – For vector instructional line drawings

- Adobe Photoshop – To manipulate and clean images, to create botanical drawings

- Adobe InDesign – To create publication design.
  Initially, I used Figma for that because it is easy to work with layouts and measurements in that. However, it did not work well with the Illustrator files and could not handle text-heavy work well, and most of my time was consumed in layout design and adjusting text. Even if a small change at some place made me adjust, rest all the pages and a lot of time wasted.

  Then I tried creating a publication in Illustrator, but the same thing happened there until I started working in InDesign, where I could create a master page and follow the same grid for all the pages. Also, it works well for text-heavy publications and handles pages very well. Adjusting the layout and text was quick. Also, we get to see the spreads as they will look in the final book.

- Figma– To manage the content part. Figma was used so that I could quickly create the rough layout part and see if it worked or not and arrange the content visually in a way it is easy for me to follow the hierarchy.

- Microsoft Word – To manage the content part of the book.
- Microsoft Excel – To maintain the project-related important data and trackers of the date-wise tasks and progress.
- Sketchup Pro – To work in a 3D layout of space.

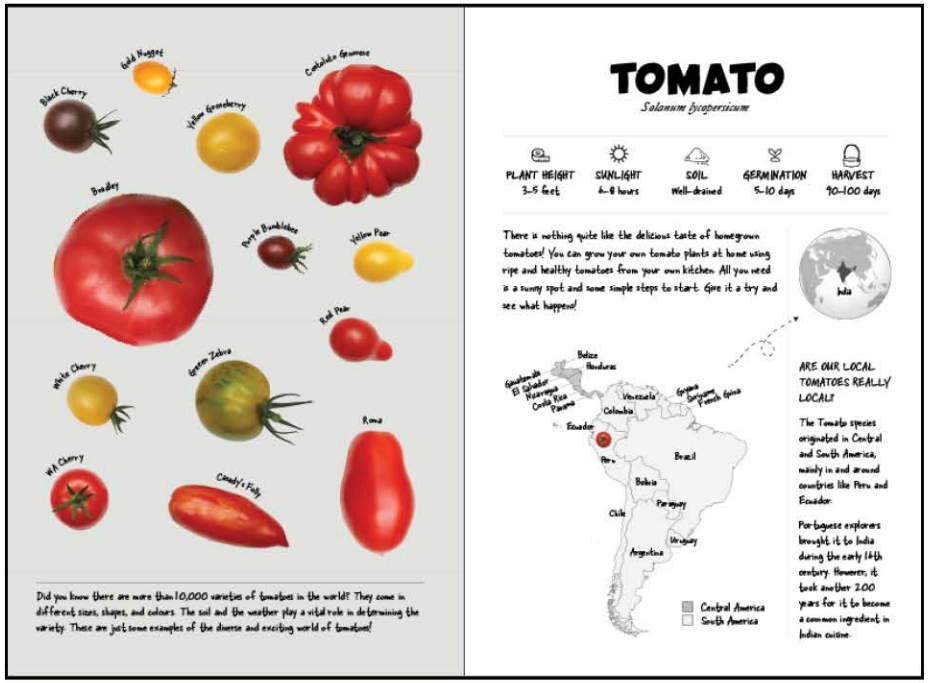


Image 9.5: Page spread view in Adobe InDesign

10. User Testing and Feedback

I have shown a sample chapter of "Tomato" to three children from the group I have done my fieldwork with. The children were selected based on their interest in the activities conducted and their medium of study.

Images 11(a): Children reading the sample chapter

I have chosen one child who was so involved and the one who lost the attention/ interest in between during the fieldwork. They both are studying in the English medium. It was easy for them to understand the language of instructions. They found the document and illustrations quite interesting.

Also, I have shown the chapter to the one studying in the Gujarati medium to check if it is easy for him to understand the simple English language and to check if he can understand or not through images. It took time for him to read and understand, but except for few English words he did not know, he could understand the rest easily and with the help of images. The look and feel of the book were interesting enough, according to him.

The changes or observations I received from the field testing were the ones in which I intended to do the corrections already, like:

1. The fonts arrangement of country names on the map is a bit small, and a cluster in a small space

Image 11(b): Feedback from children for country names

2. Side supportive text looks like the third column and has to separate from the rest of the content. Also shown various separators in the form of coloured box, border box, coloured line etc.

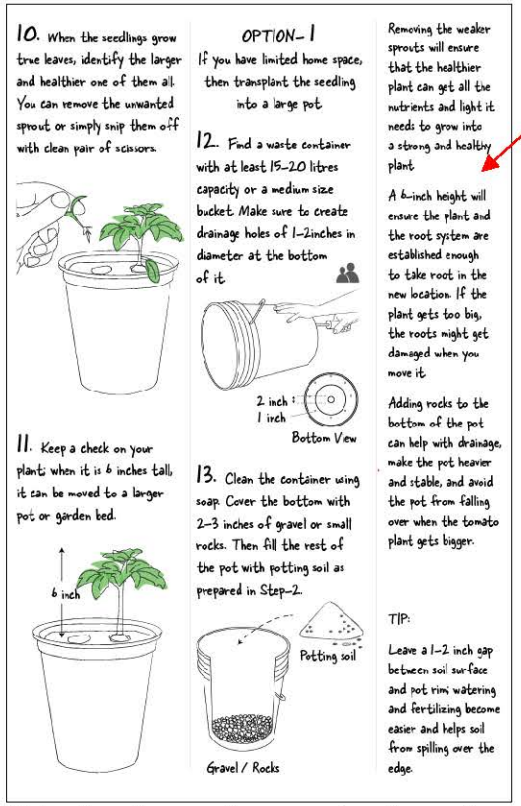


Image 11(c): Right side page showing side column of supportive text

Certain suggestions and feedback were based on their personal liking and preferences, which were not required to change from the design perspective; hence after discussing with my guide, we dropped them.

11. Product Details

- **Name of the Kit:**

  "Green Magic – A Gardening Kit for Kids"

  The name is inspired by the experience described by the kids who were involved in the activities during the fieldwork and testing. They described their experience as magical and that became inspiration behind the name of the kit and book.

  The kit is based on the concepts of sustainability and low budget.

  There are various components in it like:
  - Bamboo tools for gardening
  - Guide book
  - Seeds

11.1 Bamboo tools for gardening:

- **Selection of Material:** Bamboo was chosen because it is a sustainable option and sturdy at the same time.

Image 11.1: Handmade bamboo tools

11.2 Guide Book:

- **Language:**
  The book is in English because most kids here study in English medium schools. During my fieldwork, out of 10, only one kid was studying in the Gujarati medium school.

- **Paper Selection:**
  I have test printed on papers having a matt finish in white and off-white colour, of varying thicknesses of 100GSM and 130GSM thickness papers. Based on the count of pages and the estimated thickness of the final book, I decided to go with 100GSM paper with a matt finish.

- **Size and layout of the book:**
  The book's size (17.5cm by 25.5cm) is carefully chosen to create minimal wastage of paper when printing. Also, since it is a guidebook, we must keep the optimal size so kids can easily handle it. The layout is portrait.

- **Book Cover:**
  Design and art style are kept as a minimal line drawing to maintain consistency with the inside content. A ruler on the back side near the spine is also printed, showing inch dimensions so kids can use the book to measure.

- **Printing:**
  All the digital files are created in CMYK format to avoid any changes in colour in content when it is printed. The colour print is used in the content of the book.

- **Binding:**
  I did the cutting of pages and binding of the book, which is a glue binding.

11.3 Seeds packets:

- **Choice of seeds:**
  Seeds are included in the kit based on the chapters covered in the book. They are included for kids just to give them a start in case they do not have at home. However, the chapters are designed such that, they do not have to rely on seeds and can perform as directed in the book by obtaining seeds from the kitchen or from their surroundings. All the provided seeds are organic, not hybrid.

- **Packaging:**

Selection of material:

Inside:

- To protect the seeds from moisture and avoid the effect of weather on them, we have to consider the airtight packaging for them and for that, transparent zip lock polybags are selected.
- Deciding whether to include poly bags in this sustainable kit was challenging. However, less quantity is required, and also it can be reused to create a greenhouse kind of setup inside the bag to fast germinate the seeds. These factors help to decide to include the polybags.
- A printed seed name tag is also included in the poly bag so kids can quickly identify it.

Outside:

- Seeds are further categorised and packed based on the chapters of the book. By considering the target audience, seeds are further packed within the bag of the particular category so that kids can learn by knowing categories. Also, they do not have to go on searching for seeds among all the individual packets.
- For outer packaging, I have selected an organic, sustainable option: cotton from the waste cloth piece available at home.
- The print (floral) and colour (earthy) were chosen carefully to match the theme of the kit.
- A both-sided printed category name tag is also attached to the string of the cotton bag so kids can quickly identify by the category.

Image 11.3(a): Inside and Outside packaging of seeds

Image 11.3(b): All the components of the entire kit in a box

12. Future scope:

The target audience for this project is children in urban areas, particularly those with limited access to green spaces and opportunities to connect with nature. However, it can not be limited to only that. Below is the future scope of the project:

1. The project can be used to provide an opportunity for families to engage in gardening activities, learn about sustainable food production, and develop a deeper appreciation for the natural world.

2. Additionally, the project can be targeted to youth development organisations, such as after-school programs and summer camps, as potential partners in implementing and expanding the project. By collaborating with these organisations, the project aims to reach a wider audience of children and provide them with opportunities to engage in gardening and nature-based activities.

   It is important to note that this project cannot be limited to a specific age group or socioeconomic status. Rather, it can provide accessible and engaging activities for all children and families, regardless of their background or previous experience with gardening or nature-based activities. The project is designed to be adaptable to the needs and interests of different communities and can be implemented in a variety of settings, such as community gardens, schools, and parks.

   Overall, the target audience for this project includes children in urban areas, but it can be further extended to position as a family activity as well as target youth development organisations interested

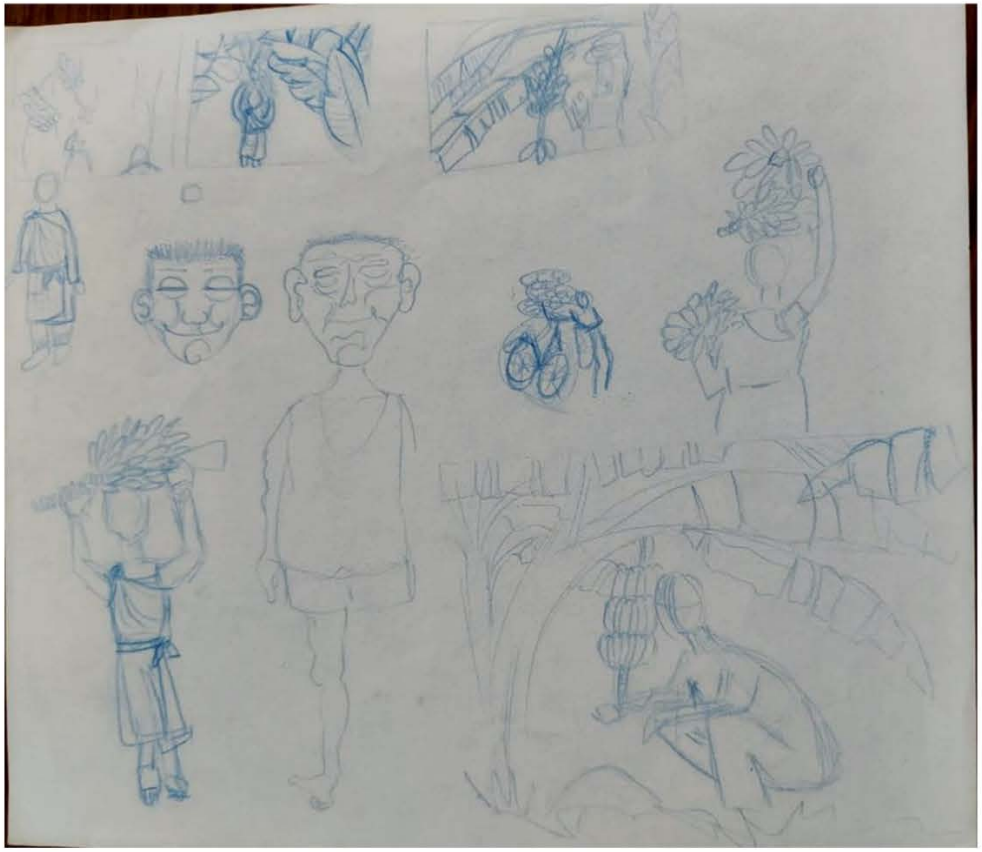
in promoting sustainable food production and nature-based activities for children.

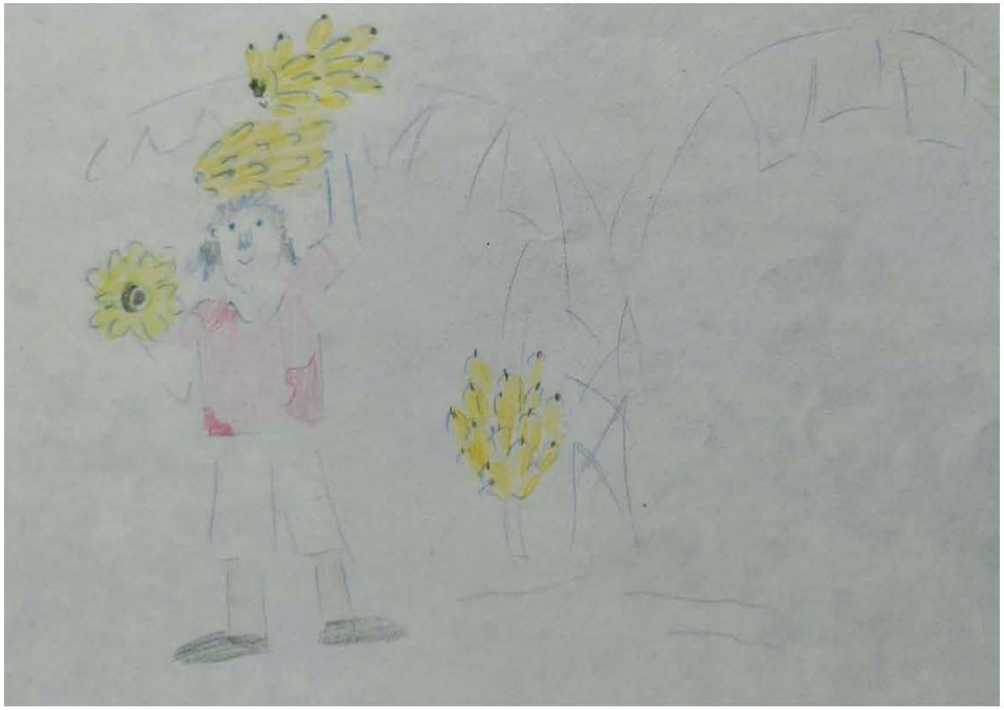
3. The kit can include various other components like an illustrated storybook, which can help engage children and spark their interest in a topic while conveying the importance of nature and trees/forests, etc.

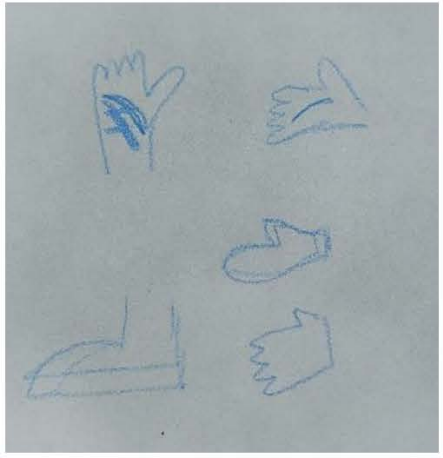
   I have explored various folk tales of different states of India which showcase the theme of nature and trees and their importance. Also, some tribal folktales were studied and chosen to include in the illustrated storybook.

   The art style was also explored and finalised for the storybook.

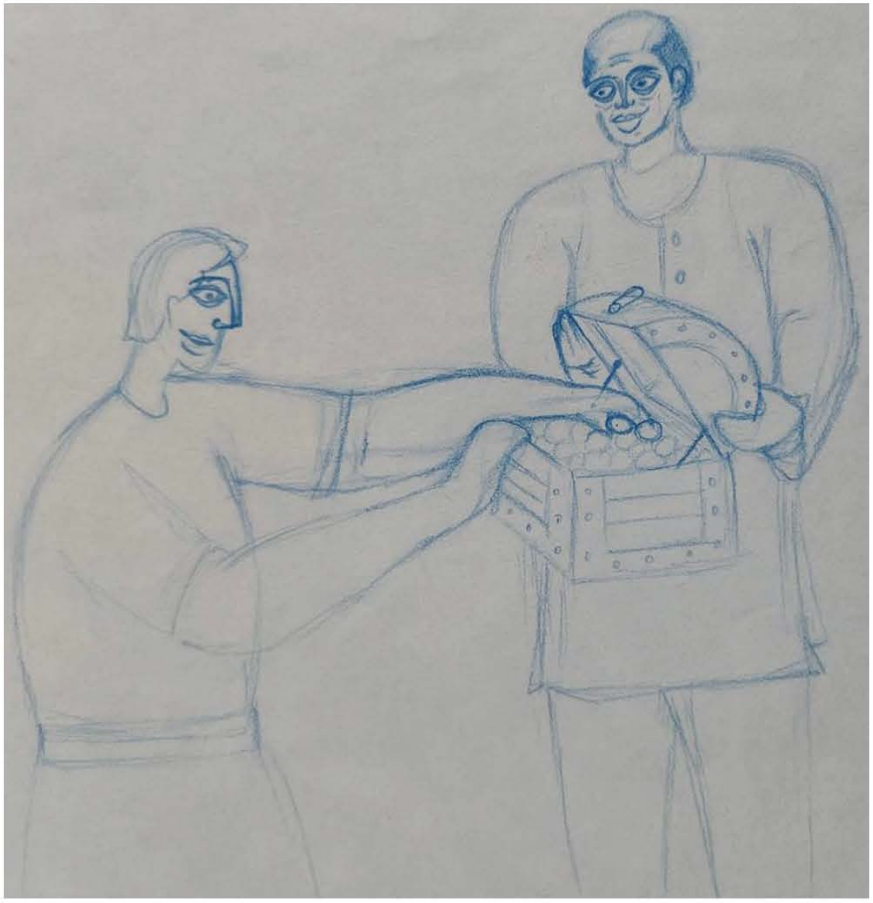
- Some of the explored styles:







- Created illustration style:



4. The guidebook in the kit as part of this project is made in the English language. However, it can be published in a local Gujarati language as well in order to capture a wider audience.

13. Conclusion

This project resulted from merging so many various paths related to gardening, nature, environment, waste management, global warming etc. It aimed to encourage the interest of urban kids aged 10-12 years in gardening and nature by enabling them to experience it in a fun and engaging manner. The project involved the development of an interactive kit, which includes an instructional guidebook, garden tools and seeds to help them start with. The kit is designed to be engaging and educational, providing children with a hands-on experience of growing their own plants.

During the course of the project, I went through the entire design process. I worked with a group of curious kids who were always ready to try new things. I had to play multiple roles to understand the mindset of a child by looking at things from their perspective as well as an educator. Although I am passionate about gardening and practising it, however, this project helped me learn many new things related to the subject. It also helped me reveal certain qualities of myself that I was unaware of. The learning opportunity provided by this project was enormous, and it helped me to improve myself as a designer.

Overall, I believe that this project has the potential to make a positive impact on the lives of urban kids by fostering an interest in gardening and nature that may stay with them for years to come. I hope that the kit will be well-received by its target audience and inspire future generations to connect with nature and cultivate their own green thumbs.

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