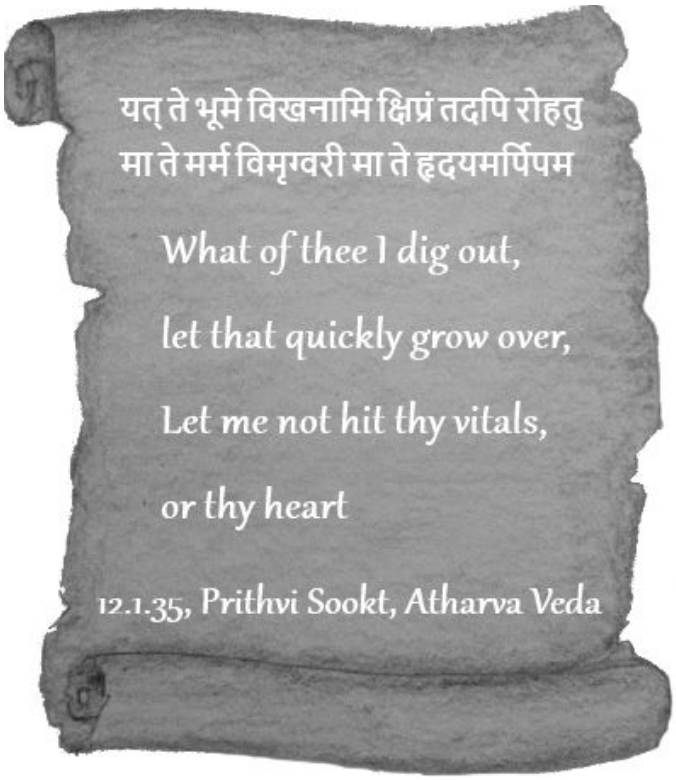
An Altiyan Dilemma

Prakriya Green Wisdom School



Team
Sreenija G.
Anjali Pattathil
Saranyan Sriram
Sonia Neelangatil
Vaaruni Suresh

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Acknowledgements

“Hasu-poopu”, Sonia yelled to the uncomprehending gardener. He stared at us, nonplussed.

Saranyan tried a different tactic. ”Cow dung!”, he shouted.

“Oh, cowdungaa”, the gardener said, looking relieved.

The gardener was just one of the people who helped us complete this project. We would like to express our gratitude to all of them.

First and foremost, we want to thank Durga aunty and Hussain sir, for being our guides and patiently reviewing all the different drafts of this project.

We also want to thank all the people we interviewed, Latha aunty, Naveen Thayyil uncle, Sandeep Varma bhaiyya, Vani Murthy aunty, and especially Ruth didi and Sohail uncle, who gave us a lot of information on birds in particular and biodiversity in general.

We want to thank all our teachers, for being flexible with our attendance to their classes.

We want to thank Pushpa aunty for guiding us with the composting activity.

We also want to to thank our school support staff for taking care of us while we were at school for the project, even on weekends.

We want to thank the Wipro for hosting this contest. It has been been an amazing experience; it taught us a lot about teamwork and time management and brought out every person's creativity and understanding, The results being the contents of the project: original poems, original characters, art and writing.

We also want to thank all our parents for chauffeuring us around, moral support, valuable inputs, critique and praise.

Thank you all so much!

Part A - An Altiyan Dilemma

Prologue

Humans ridicule the idea of aliens;

How can they be so sure?

Earth is a speck in a titanic universe;

***How** can they be so sure?*

About 4 billion years ago, Altiyans, residents of Altiya (aka. Kepler 452b[1][2] of constellation Cygnus[3]), identified a tiny planet in the Milky Way galaxy as capable of sustaining life. As an experiment, they sent a basic set of DNA sequences to this planet (aka. Earth). These strands of life survived, multiplied, thrived, and evolved into the diverse life forms that we see here today.

The project was an unqualified success. The Altiyans were very proud of their daughter planet, who had developed her own cyclical processes and kept evolving. Oh, there were problems- the ice ages, the extinction of the dinosaurs, the volcanic explosions, the earthquakes, the epidemics, the famines, and more recently, the World Wars, but life on Earth not only managed to recover from these problems but also thrive.

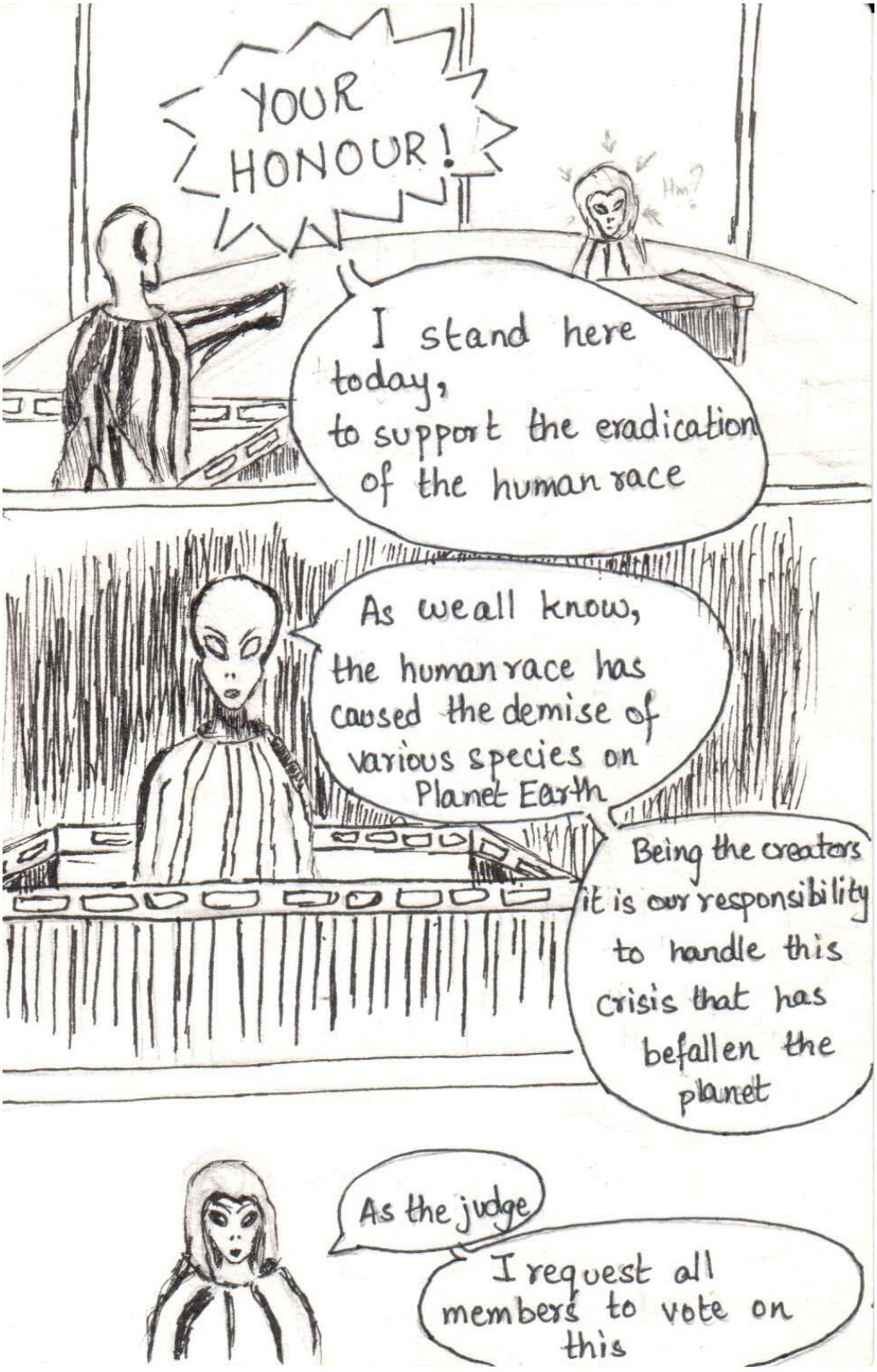
That was then, so long ago! Over the last century or so, the Altiyans noticed that something was amiss. They were very upset when they saw Earth facing an existential crisis of sorts, all because of the humans; and the humans carrying on, business as usual. They saw that the majority of the humans were being greedy and selfish; not even caring about their fellow humans, let alone the bees, the bugs and the bacteria!

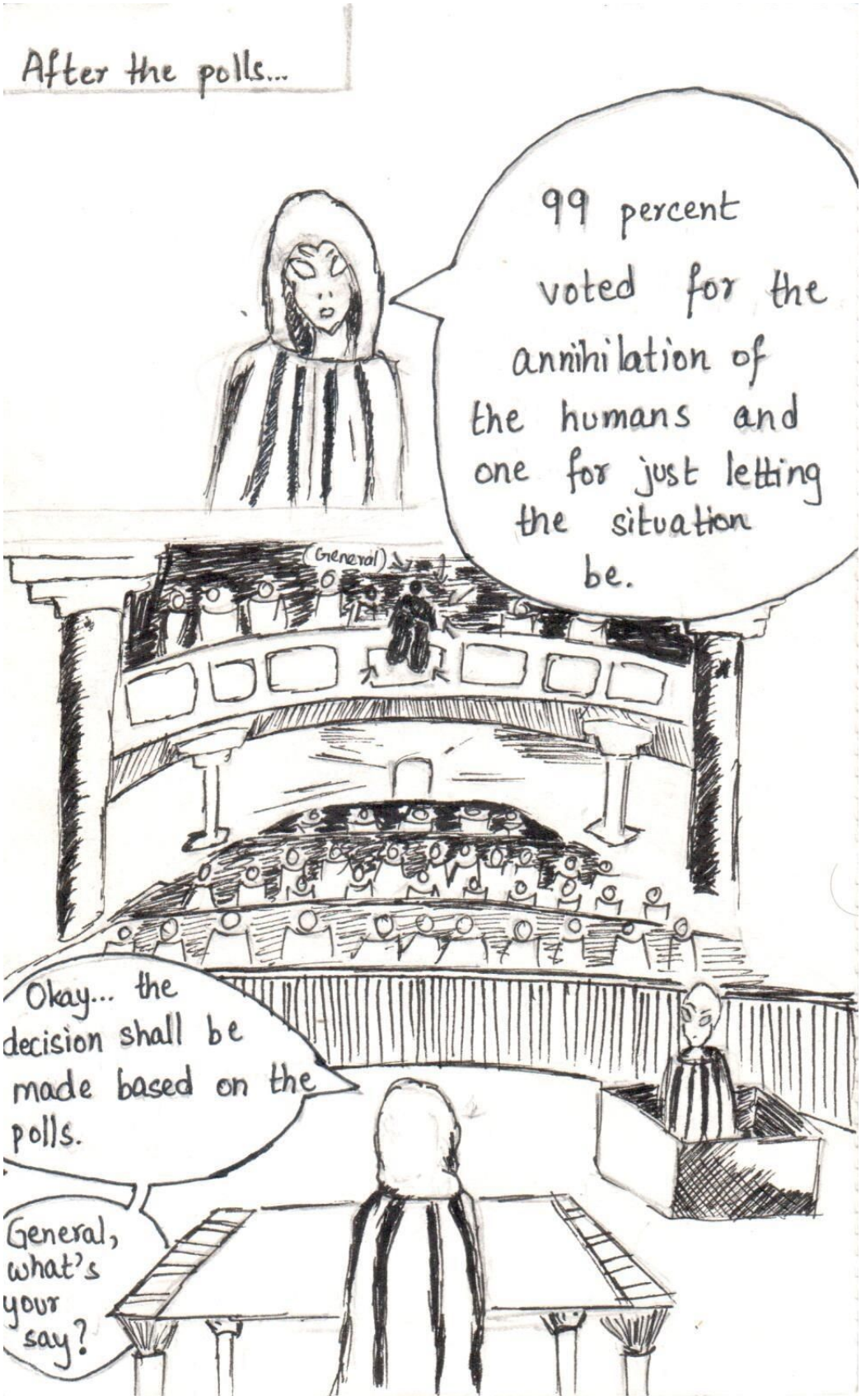
This caused great concern amongst the Altiyans, which soon turned into anger. The saner ones amongst them wanted to help the humans. They were their children after all!

An Altiyan Dilemma

The Altiyans are stumped- what are they to do with the humans? Some of them want to wage an all-out war with the humans and completely eradicate them. Their argument: “Humans are incorrigible. A hopeless and absolutely pointless race! If we let them live, they’ll destroy the rest of the life on Earth.” Others preferred a less drastic step. They countered, “Not all of them are self-centered. There are people who still care. We need to wait and see how this minority is able to influence the rest.”

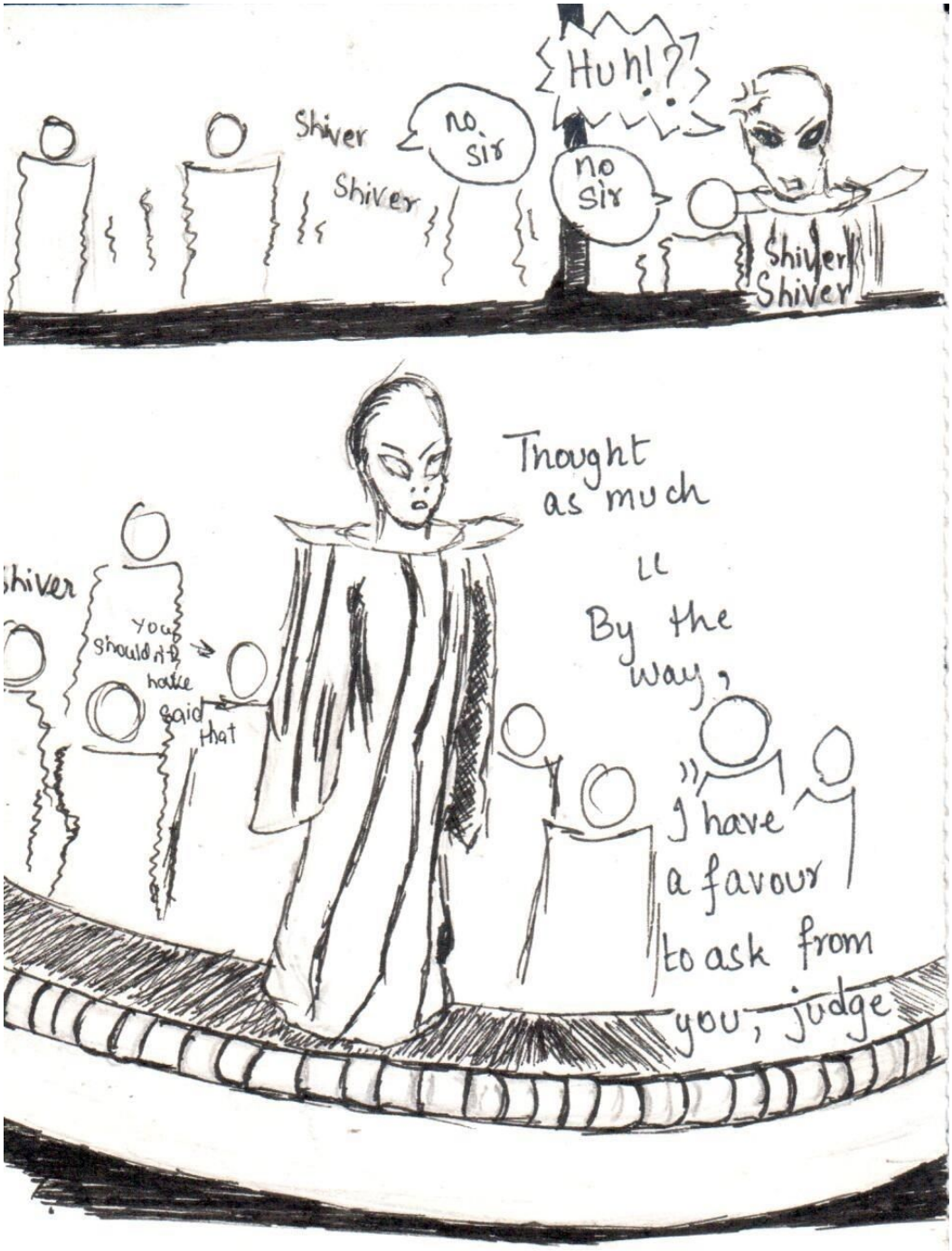
To Kill The Incorrigible Humans




After the polls...
99 percent voted for the annihilation of the humans and one for just letting the situation be.
(General)
Okay... the decision shall be made based on the polls.
General, what's your say?

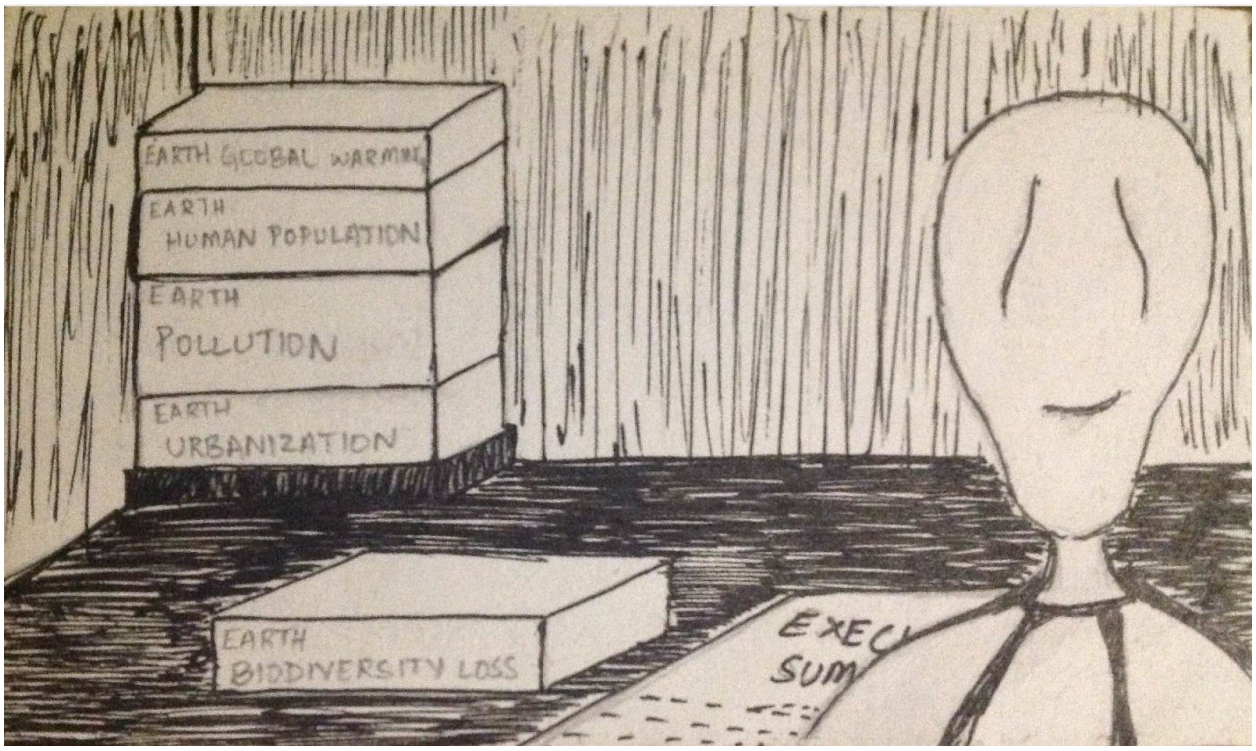

Sir,
I find it funny that we are taking decisions like humans
Sigh.....
Like humans? Care to explain?
Do I have to?
Most definitely
I feel it is unwise to base decisions as big as this on a measly vote.


Hm...
I know I might get myself in trouble for this but...
What have you done, General?
Here goes nothing.
I sent my spies to Earth last year, without authorisation
gasp
They brought me a few reports which look promising
chatter chatter
chatter
WHAT!
Do you mean that you had no authorisation?
chatter
chatter
I mean what I said
rise
Got a problem!?
chatter
Huh?


Huh!?
Shiver
no sir
Shiver
no sir
Shiver
Shiver
Thought as much
By the way,
I have a favour to ask from you, judge
Shiver
You should'nt've hatte said that


I need you to read these reports
Before taking your decision, please consider this.
Do you have them with you now?
I do
I request you to read them when you're alone
It is a matter of utmost importance. I trust you understand.


Sigh...
Consider it done
Thank you
Clap
Magizchi
Clap
Clap
Swish
Clap
Clap
Clap



The Judge Kasooya sat down at his table. He was sleepy, but curious. He took down a report from the top of the pile and began to read.

Executive Summary

The ECO's (Earth Committee of Observation), Team ME-7 was assigned to study Earth biodiversity.

As a part of the research, the team has:

1. Interviewed people from different walks of life to understand their views on biodiversity and how it impacts their lives.
2. Studied various self-regulating processes that have evolved over eons and how they help sustain life on Earth.
3. Spent time observing and understanding the diverse forms of life on Earth.
4. Reflected on the interdependence that exists between biotic and abiotic components in the ecosystem.
5. Studied the reasons for the deterioration of biodiversity.
6. Recorded positive stories of human intervention to preserve the same.

The team overwhelmingly agrees that most of the humans are callously destroying other life-forms they consider inferior; there is no denying that the excessive focus they place on development is the cause for the extinction of several species. This, we believe will

lead to ecological imbalance to such a degree that their way of life will eventually collapse.

However, there are some who do care about the fate of their home. We have even witnessed some of them beginning to act. This small group, in our opinion, has the ability to influence the others and create a mass movement towards protecting our daughter planet.

Attached are the mission reports for your perusal.

Yours sincerely,

Team ME-7

Mission Report 1- On biodiversity and ecosystems

From: The Earth Biodiversity team

To: Altiyan Assessment & Decision Group (AADeG)

Subject: The Human Problem

Objective: To outline the meaning of an ecosystem and biodiversity on earth

Data collection instrument: Observation and research

Report submitted by: ME-Animos1

An ecosystem is an arrangement of different living and nonliving things in a way that every organism has something to contribute to and benefit from the system's diversity and health. It represents cooperation and interdependence. It says that nothing in this world can stand alone and that they all need the support of other life. The earth's ecosystems are all exceedingly different. Some are extremely hot or cold. Some terrestrial, some aquatic, but all support a great deal of life. Each ecosystem has life adapted to it. The diversity of these life-forms is called biodiversity.

Just like the Chief Seattle did

Think of the world as a web.

Every time you break one strand,

You shake every other thread.

Mission Report 2 – Seeing their world

From: The Earth Biodiversity team

To: AADeG

Subject: The Human Problem

Objective: To understand how an ecosystem on Earth functions and the role of leaves in it

Area of study: Bengaluru, Prakriya Green Wisdom School and Akme Harmony apartments

Data collection instrument: Observation

Report submitted by: ME-Enigmos1

The school is located in the Chikkanayakanahalli village. As I walked in, I saw a tree, which I identified as the banyan, to my right, and to my left, a pond. I reached a building, the sign board outside said, "Vasundhara". I sat there, my eyes and ears open. I heard an assortment of sounds- bird calls. I identified some with my knowledge dispenser – the cuckoo, the parakeet, the leaf-eater, the myna- and I saw many different creatures- lizards, butterflies, crickets, spiders, a snake. I could see a small ecosystem thriving there, a beautiful balance between the biotic and abiotic components; a living example of the interconnected relationships that exist in Nature.

There was a fruiting tree- the Singapore cherry- which attracted several insects that came to feed on the nectar of the flowers and eat the berries. To eat these insects, came the lizards and small birds, and to eat these birds (sun birds, flowerpeckers) came the larger ones- kites and eagles. There was also a cat waiting her turn! This was a progressive web of sorts, where energy flowed from one organism to another, controlling the population and keeping the ecosystem alive and functional. I witnessed a cycle in nature, the control and distribution of energy and life, each creature sustaining the other.(*See **Appendix #1** for details on the birds and insects*)

Further on, came a pond. Water spiders glided on the surface and guppies swam under it. I sat there, observing. A family of cats resided there and they occasionally came forward to get a drink before heading off. Plants grew in the water- lilies, lotuses. At one point, a frog hopped out of the water. How strange these frogs are, having the ability to dwell in water and on land. There are more creatures like this- amphibians.

There were small fish swimming in the water, eating the algae growing on the walls of the pond. Even though this pond was a man- made creation, it functioned so well, almost like a natural pond, in supporting so much biodiversity. If human-made structures like this

one are able to attract and sustain so much life, imagine what would happen if Nature was left to her own design!

While observing the pond, I saw a wagtail collecting twigs and leaves to build her nest. Leaves as flooring! That got me examining the leaves. Each leaf had a different shape and venation pattern. Some leaves- the neem's or the banyan's- have a main vein running through the centre, from where sub-veins branch out and spread over the leaf. In some other leaves, like grass, the veins start at the base of the leaf and run parallel to each other. (*See **Appendix #2** for details on leaves*)

During my stay on Earth, I've been staying (incognito) in a human home they call an 'apartment'. When I was observing the plants in my balcony, I noticed that moths had made their nests on the underside of the leaves of a mulberry bush. I later found out that only silk moths lay their eggs on Mulberry leaves, which serve as food for the larvae once they hatch. This means: if Mulberry trees die out, so will silk moths.

The role leaves play in sustaining biodiversity, as I have understood, is as follows:

1. They make food for the entire ecosystem several using chlorophyll and sunshine.
2. Some creatures built their homes on them like the fire ants, and a good percentage of the birds.
3. Butterflies and other insects lay eggs on them.
4. When leaves are shed, they decompose, forming compost; which gives nourishment to growing plants.
5. They provide the oxygen for animal respiration.
6. Humans use them for cooking, shelter, medicine and so on.

The power of teamwork is best shown by Mother Nature;

All her children are unique, but they all work together.

All her children are unique, but they have a common purpose,

To keep their home thriving and alive forever.

Mission Report 3 - All Creatures Great and Small

From: The Earth Biodiversity team

To:AADeG

Subject: The Human Problem

Objective: To understand decomposition in nature:

Subject of Study: Prakriya Green Wisdom School

Data collection instrument: Hands-on activity/observation, collection and recording of data

Report submitted by: ME-Enigmos1

My curiosity was piqued by the question, where do the leaves go? Why don't they just pile up, creating ever-growing mountains of organic matter? These question led me to some very interesting findings about the role of the unseen, the unnoticed, and the under-celebrated: the microorganisms.

Earthlings have a fascination for the big and the impressive. Humans always link biodiversity to lions, tigers, elephants, whales, pandas, birds of paradise, redwoods, teak, ebony, and/or other exotic creatures. Most people tend to ignore microorganisms, and at some level take them for granted. What I found over the course of my investigation was that while they may not be the poster species of the animal world, life on earth would be impossible without them.

These microorganisms break down organic matter, which provides several nutrients like nitrogen, phosphorus, and potassium in forms that plants can use. This breakdown is absolutely necessary for an ecosystem as it sets up one of the essential cycles that the earth relies on- it keeps the food chain cyclical and non-linear.

"But how does this process happen? Is it possible to replicate it on a smaller scale so as to study it to understand it better?" These questions cropped up in my mind, so I went back to Prakriya to participate in the composting activity undertaken by the children of Prakriya. I saw them layering dry leaves, kitchen waste and cowdung. I decided to follow the observation sheet given to them. This is what I found out:

(*See **Appendix #3** for details*)

I also interviewed an activist, Ms Vani Murthy, who works with Composting. Compost, as aforementioned, is the result of the breakdown of organic material by microorganisms. From her, I learnt that:

1. Composting helps us take responsibility for the waste we generate. It helps us to enrich the soil for the growth of plants.

2. Composting helps to prevent pollution by keeping organic waste out of landfills, where anaerobic breakdown would release greenhouse gases like methane, and would contaminate soil and water. By sending organic waste back into nature, we help to keep the food chain a cycle by building a "living soil".

Given its indispensable nature, I find it nothing short of a miracle that the humans don't pay more attention to these unsung heroes- the decomposers.

They keep the Earth alive

by doing what they do.

Biodiversity isn't always pretty;

But they need the limelight too.

Mission Report 4 - Flower Power

From: The Earth Biodiversity team

To: AADeG

Subject: The Human Problem

Objective: To study the human's relationship with flowers and its effect on biodiversity

Data collection instrument: Interview

Subject name: Latha

Subject occupation: Florist

Reported submitted by: ME- Micros1

Today, I met what the humans call a florist. From her, I found that humans actually sell these vegetative reproductive structures, these flowers for a living. The names of some of the flowers she sold include: three varieties of *jasmine, lotus, thethi, chembarathy, aparajitha, aralli, chempakam, jamanthi, marigold, tulsi and vilvam*.

As I chatted with her, I found:

1. The demand for flowers have decreased in the cities. The reasons range from people's change in taste (not wanting to wear flowers in their hair) to lack of faith (people doing less pujas).
2. Demand for flowers skyrockets during festival season like during Ganesh Chaturthi, Dussera, Onam. There is even a festival for flowers called bathukamma.
3. Demand also goes up during the 'wedding seasons'. These are during the summer months like June, July and August, mid-January through March.
4. Weddings do not happen during the inauspicious months of the year like July-August and December- January.

5. During off seasons, she supplements her income by selling puja items; and serving as maid in people's houses.
6. One problem she faces is having to sell the flowers within two days, otherwise they wilt. If she has a lot of flowers at the end of the day, she just hands them out, free.
7. She also mentioned hybrid flowers, which are flowers that are made by crossing different species to inculcate desirable traits in the flowers. Hybridization made the flowers brighter, and better at withstanding pests (it is designed such that pesticides are part of them). They require less water to grow and are easier to transport.
8. I compared these flowers to the local flowers, and could see the difference quite clearly.

I also spoke with Sandeep (a student with a degree in Environmental Sciences) of the Bhoomi College to further understand hybrids. He said, "There have been occasions of hybrids turning wild and invading the natural ecosystems. Also, you can't save seeds from the hybrid variety of a plant; you have to buy new seeds every time. This is an additional cost that most people don't notice."

My conversation with him opened up a world of possibilities, he talked about people taking up professions, hitherto unimagined. He talked about people who've taken up bird-watching, and those who study about butterflies.

Mission Report 5 - The Fading Feathers

From: The Earth Biodiversity team

To: AADeG

Reg: The Human Problem

Objective: To understand the impact of man on birds.

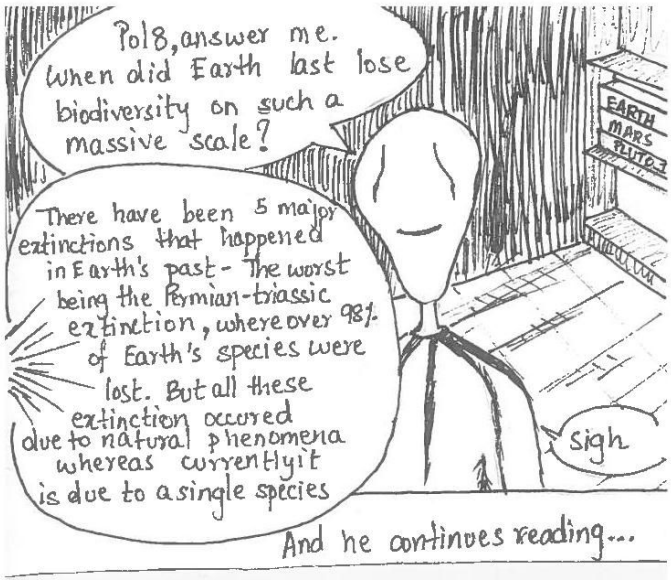
Data collection instrument: Interview; observation, collection and recording of data

Area of study: Prakriya Green Wisdom school

Participant name: Sohail Mohamed

Participant occupation: Birdwatcher

Report submitted by: ME-Micros1



"The Jerdon's courser[4] is a small brownish bird with huge black eyes and two white bands on its neck. It lives in some

parts of this planet, inhabiting dry scrubland. Now, because of the destruction of its natural habitat by humans, it is starting to die out."

This is just one of the multiple stories I heard within a week of my stay on this planet. Thousands of species are dying out- slowly but steadily- because of the humans.

Some birds are so rare that people consider it a quest just to document them, or even just to see them. I found one such person who introduced himself as a "bird watcher". He would go to remote places simply to glimpse birds like Jerdon's Courser. He told me that several birds had lost their homes due to urbanisation. Chemical agriculture, logging in tropical forests to meet growing demand, and the spread of invasive species are just some of the factors that can destroy habitats. I also learnt that Bangalore used to be a scrubland, and a home to the Jerdon's courser before the humans cleared it for expanding the city. The sparrows' disappearance can also be linked to this expansion.

The tweet of a Sunbird, the hoot of a Coucal,

The cry of a bold Cactus Wren.

You stop there to marvel, to praise Mother Nature,

Ever thought you mayn't hear it again?

Mission Report 6 - Does the Establishment Care?

From: The Earth Biodiversity team

To: AADeG

Reg: The Human Problem

Objective: To understand government initiatives in the field of conserving biodiversity.

Data collection instrument: Interview

Participant name: Dr. Naveen Thayyil

Participant occupation: Environmental lawyer

Report submitted by: ME-Micros1

It's not enough that individuals care and conserve. Society's attitude can be changed drastically through the government. Laws can make or unmake a country. The Biological Diversity Act of 2002[5] is one step in the right direction. India isn't the only country which has taken a resolution like this, many other countries (Brazil) have passed similar laws. The main objectives of the Act are:

1. The conservation of biodiversity.
2. The sustainable use of the components of bio-diverse areas.
3. The fair and equitable sharing of the benefits gained from genetic resources

As you can see, the humans are getting their act together; nations are doing their part to preserve biodiversity.

Mission Report 7 - A Conversation with the Future

From: The Earth Biodiversity team

To: AADeG

Reg: The Human Problem

Objective: To understand the situation from the viewpoint of a child.

Data collection instrument: Interview

Subject name: Sameer Gupta

Subject occupation: Student

Report submitted by: ME-Animos1

I spoke with a student from an unconventionally eco-friendly school in my last week on earth. As it is the children's thoughts that will eventually decide the fate of the earth, I deemed it a fitting end to our mission.

Here's what he said when I asked him his opinion on earth's current situation:

"What I've learnt here is that all the life we see isn't here for us to use, but to love and be part of without hurting it. We need to learn to coexist with Nature not just because we have to, but because she's our Mother; We have a moral obligation to accept and protect her."

I have hope that these ideas will spread and alter the mindset of the human populace, changing the earth's predicted future.

Analysis

The missions undertaken have been successfully completed. The Analysis and Research committee, along with Earth's McKinsey Consultants, has analyzed the data. Their research forms Part B of this mission document. See Part B for more details.

Part B - Biodiversity loss and Economic freedom

The crisis on earth will never resolve itself until man changes his attitude towards the land and tries to understand the relationship between nature and himself.

Man's attitude towards Nature – Then and Now

The wall we see between man and nature today didn't always exist. Long ago, dating back to Paleolithic times, and even later, when he learnt about agriculture, metals, acquisitions, civilizations, and conquering, man acknowledged himself as part of nature, intertwined, inter-linked, and connected.

Nature and her various phenomena such as the thunder, lightning, sunrise, sunset, rain and so on were viewed with awe; man slowly began to worship them. Even earlier, somewhere in prehistory, when he had not yet developed a belief system establishing the commonality between man and nature, he had learnt to revere it. He took as much from nature as he needed to survive, and nothing more. In a sense, he lived just like his animal brothers, sustaining himself with the available resources. After all, who could own a river, a fruiting tree, or a bush? He didn't create them, and he didn't see a need to own them.

The remnants of this belief can be found in our own Vedic civilization. Our ancestors believed in nature worship, which was a manifestation of their understanding of nature. They didn't place human beings on the other side of the wall, but made them an integral part of the whole (nature). The hymns of the Rigveda, sung in praise of the Pancha Mahabhootas[6], bring to the fore their belief that everything, including inanimate objects, is sacred. They revered and worshipped Aakash (space), Vayu (air), Agni (fire), Jal (water) and Prithvi (earth), they humbly proclaimed, "*Ishavasyam idam sarvam*," which means "*Ishwara* resides in all beings, whatever be their form." This spiritual view of the natural world slowly found a way into the various practices and rituals that evolved.

1. Even today, people associate various trees with various deities, consequently protecting them
    a. Peepal tree, also known as the Bodhi tree, is the most worshipped tree in India; it is believed that Buddha attained enlightenment under this tree; Bilwa is considered auspicious and is associated with Lord Shiva; Kadamba, with Krishna; Neem, with goddess Durga; mango, with Saraswathi and Hanuman; Tamarind, with Puliyidaivalaiyamman, an agricultural deity worshipped in Tamil Nadu; Lotus, with Saraswathi and Lakshmi; and Dhurva grass with Ganesha.
    b. Animals, too, found a place in our mythology. Through the concept of "Vahana," or divine steeds, our ancestors sought to protect various animals. Thus, we have garuda (Vishnu's eagle); bull and snake (Shiva); peacock

(Karthikeya); mouse (Ganesha); goat (Agni); dog (Bhairava); tiger (Durga), swan (saraswathi), owl (Lakshmi); elephant (Indra) and water buffalo (Yama) - mentioned in the Hindu scriptures.

2. The practice of maintaining the sacred groves or devara kadus ensured that some ecosystems were left wild and undisturbed. No-one is allowed to hunt any organism or disturb the '*kaadu*' in any manner. Specific trees or plants are revered either as dwellings or manifestations of God. It was basically the ancient equivalent of a nature sanctuary or a wildlife preserve. Even to this day, the Khasis of Meghalaya[7] safeguard the Sacred Groves of their hills. They live by the simple dictum- Nature is part of us, we are part of nature.
3. Most religions, including Christianity and Islam, respect the sacredness of all beings. When Noah was told to save himself from the flood, he was asked to take with him a male and a female of *every* animal on earth. Islam believes that every creature present on earth has a unique purpose to fulfill. Sikhism emphasizes the importance of living in harmony with all of God's creations. Buddhism tells us that the human mind and body are intricately connected to the outside world, including all the flora and fauna. Jainism maintains that killing a fellow living thing is the greatest of sins.[8]

Thus when man started out, he saw himself as a part of the web, and regarded his role as no more significant than any other organism. But now, we see that he has "fallen" quite a distance, deviating greatly from his original beliefs. Man of today doesn't care about any creature as much as himself. So what happened?

Science happened! Industrialization happened!

The who, why and where of this idea of man being separate from Nature, has a complex history, but in our limited understanding, we say that it all started in Europe, with the scientific revolution. "Man and nature were regarded as two separate entities. When "I" and "everything else" are two separate entities, there is nothing wrong if "I" exploits "everything else. In the absence of commonality between man and nature, nature becomes easier to exploit by man, life becomes a race to be won by the fittest. Newtonians told us that the world worked according to mechanical laws and everything in the material world could be explained in the terms of the arrangement and movement of its various parts."[9] This mechanistic worldview formed the basis of scientific revolution and later, the industrial revolution.

When a certain idea is prevalent for a long time (2000 + years), it is bound to shape the way a society thinks, feels and acts. This philosophy, needless to say, has guided the modern man in that he considers himself as not only separate from, but also superior to nature. The materialistic way of living that we practice today, is a direct outcome of this.

The development of mechanistic view and its projection through a materialistic way of life has had a direct bearing on Earth and all the diverse life-forms she supports. As Carolyn Merchant says, "The image of the earth as a living organism and nurturing mother served as a cultural constraint restricting the actions of human beings. As long as the earth was conceptualized as alive and sensitive, it could be considered a breach of human ethical behavior to carry out destructive acts against it."

With these ethical boundaries gone, man now has the freedom to exploit Earth's limited, yet, vast resources for the production of goods. The processes of production and distribution enables him to create technological marvels and medical breakthroughs, but also creates waste at every level. Without a conscious thought, he pumps the waste back into the Earth, polluting her land, water and air, jeopardizing the life on Earth.

"Life sustains life," is a tenet that holds true for Nature. The key principle guiding this is the diversity of life forms she supports. This diversity, (the diversity of life: bio-diversity), essential for sustaining life on Earth, is currently under threat.

Bengaluru and Biodiversity

Bengaluru is a living example of this. This once-thriving "garden" city, with its blooming parks and thriving lakes now mostly has mega-malls, massive office buildings and apartment complexes. Half its lakes are practically dead, with their waters heavily contaminated by industrial and domestic waste. The other half has been converted into bus-stands, stadiums, shopping centres and residential homes. The open spaces/neighbourhood gardens have disappeared, taking with them the biodiversity they support.

So, what is the main reason for this? In our opinion, it is the unbridled urbanization happening in our city. Due to better employment opportunities, people at every level, be it the Olacab drivers or the security guard at our school or the IT professionals, are flocking to the city in droves. How to house them? Feed them? The answer seems to lie in converting open-spaces into apartments and office buildings.

Monkey sightings were an integral part of our school bus ride until a few years ago. Now, with the coming of apartments, broadening of roads, and smoke and honking becoming normal, the monkeys have vanished. Thus, right in front of our very eyes, we have seen the link between habitat loss and disappearance of biodiversity, in this case, monkeys. And monkeys are conspicuous creatures; what about the birds, squirrels, snakes, worms ad caterpillars that had made the trees their homes? What about the bacteria and fungi that we literally can't see? What's happened to them? Do they migrate to a new homes like humans? If so, where? Are their new homes protected, and if so, for how long? Shouldn't we call these creatures 'development refugees'?

Biodiversity and Life

The more we thought about this, the more we realized- we have an ethical duty towards all things natural. Biodiversity is important for the existence of all life. The various cycles- water, carbon, nitrogen, food, seasons - that Nature has developed over millions of years, enables Her take care of billions of species.

Cycles maintain the interdependence between different forms of life in an ecosystem. Take for example, the carbon-oxygen cycle- plants give out oxygen and take in CO_2 and the animals take in O_2 and give out CO_2. Without this gas-exchange mechanism, life is would not be possible on Earth. This symbiotic relationship that exists between animals and plants, proves that "everything depends on everything else."

Cyclicity is also Nature's way of making sure nothing is wasted; she seems to understand that her resources are limited and that they need to be recycled if she is to survive. The food cycle, for instance, ensures that energy keeps flowing from one organism to another without wastage. The decomposers make sure that organic matter is recycled, so that the nutrients required by the plants, are put back into the soil.

Biodiversity is important to every aspect of human life. We get food, clean water, and most of our medicines from nature. There are also the things we get that we are not in the habit of noticing (these are called ecosystem services), like soil formation, soil protection, decomposition, a manageably stable climate, protection and recovery from natural disasters. IUCN has placed the monetary value of the ecosystem services provided by Nature to be close to 33 trillion USD *every year*[11]. The strangest thing is that we wouldn't be able to pay for all this even if we wanted to, but the earth does it all for us, *free*.

Our conversations with the Latha the florist and a vegetable vendor, brought home the realization that the diversity we see in nature, also gives economic freedom to hundreds of peoples across Bengaluru. Like Latha, many depend on biodiversity as a source of income; it provides an important livelihood option. The interview we had with Sandeep uncle of Bhoomi college also enabled us to understand how chemical agriculture is destroying the native variety of nearly everything. Hybrids in the case of fruits, vegetables and flowers and HYVs in the case of food crops are yielding much more produce in the short run. The fact that the seeds need to be procured season after season affects the seed-sovereignty of farmers, which in the long run will affect economic freedom of our nation; what needs to be grown, where and how...all these fundamental decisions that were once the farmers' will soon be decided by the MNCs.

Another area where we see biodiversity playing a major role is in medicine. For example, take Ayurveda. Ayurveda is different from allopathy both in philosophy and practice. Its principles mimic the principles of Nature, that "the whole is more than the sum of its parts." Ayurveda also goes beyond the physical; it considers the emotional and spiritual

realms as well. As in Nature, Ayurveda is also, in several ways, decentralized. There aren't one or two pharmaceutical giants dictating the way business is run, but multiple players, practitioners, each with their own "niche".

In fact, every branch of alternative medicine in India depends on biodiversity to an enormous extent. Ayurvedic medicines completely rely on plant-diversity. The usage of over 1500 plants[12] in Ayurvedic medicine has been recorded so far. For example, tulsi is often prescribed for lung-related illnesses and brahmi herb for neural disorders[14]. Siddha texts/lores mention the usage of about 1147 varieties[13] of plants.

With the whole of the western world hankering after allopathic medicine, India is one of the few countries where alternative medicine is accepted, embraced, and practiced. The foundation for these is found in the diversity of plants found in the wild. The loss of biodiversity, in this sense, will impact the health-choice of an average Indian.

It is this loss of choice for one's own citizens and forcing him/her to accept what is being "offered" that would come in the way of economic freedom of our country in the long run. For an average Indian, loss in biodiversity would mean a lot more than just the loss of economic freedom, it strikes at the very heart of "a way of life."

So that's it?

All gloom and doom,

no ray of hope?

There is a little sunlight lighting a hitherto dark sky. About 1.5 decades ago, our school was an overgrown eucalyptus grove with bone dry soil and very little biodiversity to speak of. Seetha aunty, our school's founder undertook an afforestation drive, planting a number of native trees. Now, the Prakriya campus is rich in biodiversity, housing about 108 species of trees, 30 species of birds and 70 species of butterflies; we also have snakes that make an occasional appearance (so we hear from Pushpa aunty). In just fifteen years, a dead plot of land overtaken by invasive species was turned into a thriving space brimming with life!

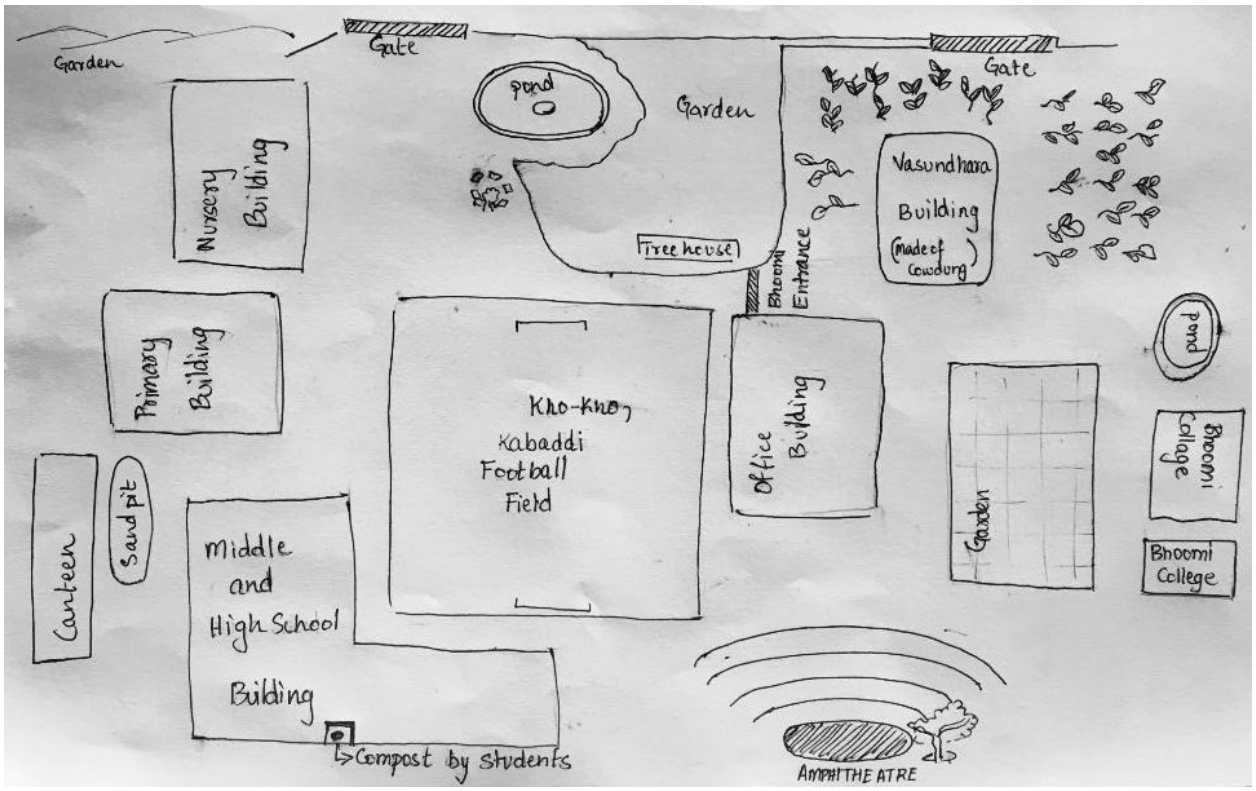
Another excellent example of positive human intervention is the story of the Kaikondrahalli lake which, until a decade ago, was dying. To save the lake from its fate, people joined hands, both government and NGOs partnered to revive the lake. The lake was completely drained and de-silted, and trees were planted all around the edges. In just a few years, the lake revived herself. This rejuvenated lake is now home to several species of birds and a popular destination for the migrators. Humans throng the lakes as well, for their morning walks.

The point to be noted in these anecdotes is that with a little help from us, the humans, Nature finds her way back - reviving, renewing and sustaining. Just like Seetha aunty, people are not waiting for someone else to fix the problem. Case in point are the people we met during the course of this project - Sandeep bhaiyaa, Sohail uncle, Vani aunty and

Ruth didi. Each one is doing their bit for Mother Earth, each one extending their hand, engaging and educating kids like us.

Conclusion

Humanity must understand that Nature is not an enemy, not something to fight and conquer, but to be respected and loved as a Mother. We must learn to tread as lightly as possible, for fear she gets hurt. We have listed a couple of success stories, but the fact remains that Consumerism is highly contagious. So, our recommendation is that we need to move towards minimalism, living with as little as possible. Recycling and reusing is good, but reducing and refusing, in our opinion, should become a way of life!



Prakriya School Campus

Recommendation

Report submitted by: Team ME-7

On the day we arrived here, we had planted a few cuttings of the Indian clock vine (*Thunbergia mysorensis*[13]) in our garden. Today, the day we are to leave, we notice that it has attracted several sunbirds[14], who come drink the nectar of the tubular flower. This convinced us, if planting a single plant can help so many of these birds, incredible things could be possible for the earth's biodiversity if the humans actually sat together and decided to do something about their problems. If they really tried, we are sure they could work wonders for their planet.

And it isn't like they don't have the ability to work together either. A case in point is the Vienna Convention of 1985, when the humans completely solved their ozone depletion problem by putting their heads together and taking decisive action. It is something all of humanity can be proud of because it shows they have the collaborative skill to tackle a problem when it threatens them all.

But even after this, are we saying that the humans *will* change? No, but the point is they might and that should be enough basis for you to decide to let them be, at least for a little more time because genocide isn't justified even in the gravest hour. We cannot give you an unambiguous answer to this question, so even after all this time, all we can offer you is a

Maybe.

Epilogue

Judge Kasooya finished the report. Was he disturbed? Was he troubled? Yes, he was. But, there was also a part of him that was hopeful. Optimistic.

He turned over in his bed, pulled the blankets over himself and went to sleep. An uneasy, indecisive sleep.

Will he listen? Will he listen?

Are we saved... or not?

Will he decide to give us a try,

Or say we just aren't worth a shot?

Appendix 1 - Birds

The below mentioned are a few birds we have observed in the course of this project.

A **Parakeet** has a green body and wings and red short curved beak. They are found in most urban colonies but are not easily noticed because of their excellent camouflage. It was building a nest on the top branches of a tall tree when we saw it.

A **Sunbird** (male) has a black bill, yellow body and a long sharp beak. It can hover for short periods of time. It eats berries and drinks nectar. It was found at one of our team member's house drinking nectar from a flower vine with long, tubular flowers.

A **Coucal** has a persistent hooting call. It has a blue body and brown wings. It does not fly very high due to its weight. It moves with strong forceful wing movements. We heard it call in the early morning when we went observing with two bird watchers (Ruth and Sohail).

A **Spotted Dove** has neck with white & black patches. The body is light reddish brown, while its wings are brownish black. They fly high above the ground. We first observed it eating grains on the ground. We also saw it on a tree while observing with a bird watcher in the school (Ruth).

Appendix 2 - Plants And Animals

The below mentioned are a few plants, animals and their linkages which we have observed during the course of this project.

Tulsi: A vine was growing on it. Ants had built their hill beside it. Ants get some of their food from it. Earthworms lived underneath it. Their excretory matter is rich in nutrients that are used by the plant. The earthworms also aerate the soil, which allow the plant's roots to breathe. We observed this in school.

Singapore Cherry tree: In spite of being a foreign species, it has adapted to India well. It has sweet nutritious berries and flowers with nectar. Thus, it attracts several birds and insects which help pollinate it while getting the required nutrition at the same time . Many small birds like flowerpeckers and the sunbirds go to it for its nectar and berries. During our morning walk in the school, we saw these birds ourselves.

African giant snail: An invasive species and the curse of every domestic gardener, it eats rotting plants, some fungi and sometimes soil directly. They get rid of decaying matter. They also eat healthy plants for calcium. If that does not suffice, they suck on small stones and bones.

Russel's Kukri: It is a non-venomous snake that eats reptiles and amphibian eggs. We didn't see it personally, but Sandeep Uncle of the Bhoomi network saw it and told us about it.

Rat Snake: It mainly eats eggs, lizards, frogs, other snakes, chipmunks, squirrels, small rabbits, mice, rats and bats. The male is longer than the female. It was found in our school campus.

Crimson Rose Butterfly: It has a distinctive red body. It has black wings with cream and red streaks on them.

Common Grass Yellow Butterfly: It is very common, small, with fluorescent yellow wings. It flies rapidly, and sucks nectar from small flowers. It is also an efficient pollinator.

Orange Tip Butterfly: It has white wings with orange on the upper tips. The underside of the wings have green patterns on them.

Appendix 3 : Leaf Biodiversity

The below mentioned are a few leaves we have observed in the course of this project.

Coriander: We found it in the garden of one of our members. Many animals feed on it. Owing to its tender stems, animals often pluck out the roots accidently, which prevents it from growing back.

Mango: These leaves are often fed as a fodder for sheep and goat. We found it in the garden of one of our members.

Strawberry: Several animals and birds love the fruit of the strawberry. However, deers and rabbits also love the leaves. A deer can eat the whole plant leaving only stem. It was found in the garden of one of our members.

Neem: Neem leaves produce more oxygen than most plants. Its essential oils, being highly volatile, evaporate, especially in the mornings. Inhaling these vapors are very healthy for the lungs. Neem also has several medicinal qualities, and are widely used in Ayurveda and other forms of alternative medicine. It was found in school.

Bougainvillea: Many sunbirds and butterflies are attracted to it. Caterpillars infest it at certain parts of the year. It was found in the garden of one of our members.

Appendix 4 : Interview Questionnaires

Florist

1. How long have you been selling flowers?
2. What flowers do you sell?
3. What flowers did you sell earlier?
4. Have people's preferences changed?
5. What flowers do people generally buy these days?
6. Has this impacted the people who provide you flowers?
7. What are the most common flowers you find these days?
8. Do you have problems finding any specific flowers now?
9. Do you sell any hybrids?
10. Are there any seasonal flowers? Are they of high demand?

Vani Murthy, Composter

1. How long have you been doing composting and what attracted you towards this?
2. In what ways does composting help us?
3. In what ways does composting help nature?
4. What are the different ways of composting? Which method is best suited for cities and why?
5. Is composting becoming popular here? Why? Why not?
6. What are the major obstacles in popularizing composting?
7. How can we make composting a household practice?
8. What are the latest advances in composting?
9. Would you like to share anything else about composting with us?

Naveen Thayyil, a Biodiversity Lawyer

1. Is India unique in having a legal protection to its Biodiversity through the Biodiversity Act? How do other countries do the same? Does the UN play a role in protecting Biodiversity across the world?
2. In India, how is the law enforced? (they want to understand briefly the institutions, their governance and the role of judiciary. Might be important to give an outline the role the central, state and local governments are expected to play)
3. There are a lot of laws in India but no justice. Is the enforcement of the Biodiversity Act effective? Why? / Why not? What can be done to improve the enforcement of the law?
4. Please help us with some of the landmark examples (ongoing litigation, case laws etc.) of how the law has helped protect Biodiversity? Where can we find more details about these? [BT Brinjal, Biopiracy by MNCs, GI infringements, laws on cloning of livestock, GM Foods etc.]
5. How do lawyers help protect Biodiversity? Can you help us identify some of the leading organizations and people in this field?

6. Is there anything else you would like to share with us regarding biodiversity?

Sohail uncle, Ruth Bird Watcher

1. Since from how many years have you been working in this profession?
2. What attraction has this profession held for you?
3. What are the Common features of birds found in this area?
4. What birds have you observed here then and now?
5. What happened to them and which factors are responsible for their sudden disappearance?
6. What role did the urbanization play in it?
7. How could we help? What can we do to bring them back?
8. Are there any misconceptions regarding their migration? How can we clear it?
9. Which all birds have adapted to the sudden change in surroundings?
10. Which features have helped them to adapt?

Rakesh K, Forest Ranger

1. What portfolios do you hold?
2. Where all have you been stationed so far?
3. What was the major Flora and Fauna of the place you were stationed at?
4. Was poaching a major problem there?
5. What were the targeted species and why?
6. What are the regulations that Government has against poaching?
7. Were these strictly followed?
8. What were consequences on violations of these regulations?
9. Were there any plants or animals that disappeared NOT as a result of poaching?
10. How did the administration react to this?
11. Were they re-instated? If so, how?
12. What are your views on and experiences with invasive species?
13. How were they controlled?
14. What are the changes you noticed during your time there?

Ajith Subramanian, Veterinary Doctor

1. What is your occupation?
2. How long have you been working in this field?
3. What is your area of interest (within your work)?
4. Have you been involved in developing any hybrids in domestic animals? Could you please explain with a few examples?
5. Why do we develop new hybrids? What are the good and bad effects of hybrids on the environment?

6. What methods are used to compare a hybrid with other existing breeds?
7. Aggressive use of hybrids leads to mono-culture. This results in lesser genetic diversity in those species. What are the disadvantages of this? What are we doing to reduce this loss? What more can we do?
8. What are some of the qualities found in specific traditional breeds of domestic animals such as cows, hens etc that not found in commercial breeds?

Appendix 5: Composting

Our Compost Setup

Layers	Organic Matter Contained
Dry Leaves	Torn dry leaves from school garden
Vegetable Matter	Potato, carrot, beetroot and banana Peels.
Cow dung	Cow dung slurry
Vegetable Matter	Beetroot, carrot, potato, lemon and cucumber peels. Mint and Coriander stems from our cookery practical class.
Cow dung	Cow dung slurry
Dry Leaves	Torn dry leaves from school garden

Observations

S No	Date	Organisms	pH	Temp
1	03/08/2016	Red ants and Green coloured fungi	9	23°C
2	16/08/2016	1. Worms of about 3cm length. They secrete a slimy substance behind them. They have a white head with black tip. It is translucent with a brown line running throughout its body. 2. White small mushrooms 3. Few seeds had germinated 4. Dead plants were being eaten by ants.	9	25°C
3	23/08/2016	Flies, Red ants and Mushrooms	8	24°C

Appendix 6: Aquatic Ecosystem Observations

We have observed two aquatic systems over the course of this project.

We went on a walk to a lake behind our school which was initially a lowland filled with vegetation. As monsoon began, all the water started accumulated in the lowland, forming a lake. Algae grew on the plants that had previously terrestrial, like the now-underwater leaves of a eucalyptus tree. Water spiders and tadpoles have come to the lake. Many birds come here too, we found a nest on a tree in the middle of the lake. We even found insect eggs on the same tree. From the footprints we found in the wet mud surrounding the place, we deduce that even animals come here to drink water. Dragonflies of various colours also live in the lake. It is rich in aquatic flora.

We also observed a controlled aquatic ecosystem i.e. a pond in our school. Mollies and guppies were there in it pond few years back. Tadpoles and water spiders also inhabit it. There is moss growing on the walls of the pond, which is food for some of the fish. We also observed some fish eating a live spider but as soon as the spider was dead, the fish left it. We had picked up the spider, but as soon as we dropped the spider back into the pond, many fish swam towards it. But when they noticed that it was dead, most turned back. However, some of them ate it. We deduced that some were herbivores, and others were carnivores or scavengers. Also, as water is essential for all life, we also observed several non-aquatic creatures living there, like a family of cats that occasionally came forward to drink from the pond.

Appendix 7: Card Game

Kit

25 cards each describing the ecological importance of an organism

3 boards filled with hand – drawn pictures of various organisms

How to play:

The player picks a card and reads it out to the whole group.

He/she identifies the organism, and finds two pictures of it on the three boards.

By finishing all of these tasks in 30 seconds he or she gains 2 points.

Result: Many people were reflected and thought about the importance of biodiversity.

We tried out this game in the Soul Kere Habba, where it became quite popular.

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