

The TRCC Project: The Solution to End Garbage Pollution in Indian Villages

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Introduction: The Problem

India makes up 1/8th of the entire world's population with an astonishing 1.42 billion population count. Due to the sheer number of people in India, pollution is a key problem that major cities such as New Delhi or Bombay (Mumbai) experience. Pollution not only causes disease but it can ruin the atmosphere causing the air to be "dirty" in a sense, containing harmful chemicals that are not good for the human body. The popular news channel CNBC made a report on this issue in the capital of India, New Delhi. New Delhi is a city with twenty million people and is heavily polluted with vehicles, factories and their emissions. The newscast categorized New Delhi's pollution as "severe" with an air quality index (AQI) level of 480. According to IQAir's live pollution tracker, New Delhi currently ranks number five on the list of most polluted cities as of December 12, 2023. While pollution in major cities is a mixture of factory waste, vehicle emissions, and human littering, pollution in rural areas is comprised of improper disposal of waste such as plastic, food/biodegradable products and lack of good human sanitary practices. Baijudih, a small rural village in Bhagalpur Bihar, is one such example of severe unsanitary habitation that lacks the standard protocol for waste management and sanitation techniques. To the eyes of some of us, this may not seem like a serious problem. And it's valid to not comprehend or envision these problems when we live in a society where facilities like sanitation, waste disposal and management seem very basic mundane duties provided and regulated by the city. But it's vital to understand that rural villages like Baijudih, situated in Bhagalpur Bihar are

also contributing to a major ecosystem downfall by polluting inside of the village. These villages are just the beginning of a hyper-polluted town. The river Ganga, one of the largest rivers in the country of India is a prime example of hyper pollution. Ganga at one time in the past was a clear water table that people benefitted from. Due to its well known sacred place in Indian (Bharatiya) culture, it has been the epicenter of worship for Hindus from ancient times. The state of Ganga now due to human littering for hundreds of years is unfathomable. In an article published by PBS which discusses India's effort to clean the Ganga, author Fred de Sam Lazaro mentioned how locals take baths and even drink water from the Ganga, while reciting prayers to heal the body. Over time it has become a discolored, polluted, disease causing water source while remaining the only water source to serve water to surrounding areas including Baijudih. It's not hard to imagine how all of this is interconnected to each other, and ultimately peels away the ecosystem layer by layer until it's gone. Slowly, this ecosystem will end up spilling its waste into the larger ecosystem through oceans and into the world where it won't take long to reach and pollute the privileged communities like us. What can we do about it? Where do we start? How do we solve this problem? What's the solution? It's very important to understand why this is all happening so we know how we can fix it. The single most important problem that we face is- lack of education and awareness about waste disposal and management. Due to a lack of sanitary education and awareness around it, the villagers do not know how to properly dispose of their waste. They have been taught to throw trash and waste out on the street or in the rain gutters. Now not only is this unethical but, it comes with its own set of problems. While it may seem irrelevant and a small issue, this practice of dumping trash onto the street causes three major issues. First, the trash is causing a blockage in the gutters of the street that prevent floods from rainwater. Second, this practice of throwing trash out also includes food waste which risks water borne diseases making

these areas endemic. Third, it makes these areas filthy and unsanitary for habitation and hinder the development of the village. To remedy these problems, the members of the Weekend School Foundation Club at Dripping Springs High School have come up with a solution that will tackle these issues on ground level and help spread awareness about hygiene and sanitation.

Proposition

The members of the Weekend School Foundation Club at Dripping Springs High School have conjured a project to help the village's garbage disposal issue. The name of this project is TRCC. The acronym stands for Teaching, Recycling, Composting, and Compacting. The members have spent hours devising this plan. We hope that by instilling this plan, we will be able to reduce the daily garbage pollution greatly. Each part of the TRCC project is designed by individual members and a research style report was issued to explain their findings and solutions.

Recycling

Recycling is a process of reusing common materials such as paper, plastics, metal, etc. Many of us have access to this process. Recycling contains steps in the process that ensure the re-use of an object that can be recycled. First, consumers take a product usually made out of materials that can be recycled and dispose of it accordingly. Then, the waste is taken to a processing facility and re-used to make new products from old waste. This cycle then repeats constantly making use of reusable materials. The only catch, it still produces CO₂ emission. However, it is still a more viable option than throwing plastics out on the street. Club member Sofia Vences led the research and formation of the report on recycling. Throughout her findings, Ms. Vences found four possible solutions to implement a recycling culture in Baijudih. In her

report, Ms. Vences explained that “in order to fix the problem with recycling we must first educate the public about the importance of recycling and the proper way to recycle different materials”. Her first solution is to install standardized protocols and guidelines that will help locals distinguish between different recyclable materials. She also proposes that there are two methods of simple recycling: single-stream and multi-stream. Single stream recycling offers a simplistic approach to the concept by providing a communal recycling bin that takes care of all reusable materials. Multi stream recycling offers a more in-depth approach. This method uses many bins that are segregated by the different types of recyclable material. This makes it so that the waste that is sent to the processing plant is already sorted and ready to be processed. Ms. Vences also took the time to format a plan that would be the start of the recycling process. Her plan includes a five step process. First, she proposes that education is required for the villagers to understand what they need to recycle. Second, she proposes to standardize recycling guidelines through a lecture and live demo. Third, she insists that the Weekend School Foundation should invest in recycling infrastructure such as a communal recycling bin and a way to access a nearby processing plant. An alternative to this can be the construction of “trash bricks”. These bricks are made by using paper, plastic, or any soft reusable material. Fourth, she proposes that single stream recycling will turn out to be more efficient than multi stream recycling. And finally, she believes that the best way to keep her plan alive is to have constant consumer engagement. Ms. Vences explains this as a vital step in her plan because “it will ensure that our efforts to fix this problem will stay in place and actually work to fix the problem”. Ms. Vences also wants to create a “program that will teach consumers the advantages of recycling and the effects that waste has on the environment”. By implementing her plan, she is confident that locals will cooperate to recycle their waste for the betterment of the environment.

Compost

Composting is an important part of an ecosystem. Long before humans existed, composting was already thriving. Composting is a simple process. When something is made up of matter, it can be deconstructed within a certain time period. This especially goes for organic matter such as plants and animals. We think of composting as a way to save food scraps and not be wasteful of food. Club member Ryan Schindler took the initiative to research and for his report on how composting can be used in Baijudih. There are many different types of composting but two of them are widely used around the world: vermicomposting and Bokashi composting. Vermicomposting is the method of composting that most of us are familiar with. It uses organisms to compost such as worms, fungi, and even bacteria. Bokashi composting is very similar. It uses microorganisms such as yeast, fungi, and bacteria. Mr. Schindler outlines in his report that the design for composting is “very simple yet very useful”. He suggests that to get the majority of the community’s involvement, communal compost bins should be installed. After the composting process is completed, the compost can be used by whoever and placed in gardens, fields, etc. He also explains that one of the benefits of having a community compost bin is that the community will have a better understanding of the system of composting. Mr. Schindler believes that by implementing his composting plan, the amount of food waste and organic material that goes to waste will not affect pollution but rather assist in reducing it.

Compacting

Compacting, according to Oxford Dictionary, is the act of exerting force on an object to make it compress and become denser. This action has many benefits towards the environment

such as reducing house waste and minimizing the amount of space that landfills take up. Club member Wes Anderson was in charge of the research for this topic. In his report, Mr. Anderson discusses one major way that locals in Baijudih could compact their trash. His idea is to create trash bricks from the compacting. He explains that “making bricks out of trash is a promising form of compacting and recycling”. Bricks can be made from paper, plastic, sawdust etc. Paper bricks are much easier to make as they only require paper, water, and a sediment. The paper must be soaked in water and mashed until a fine paste is made. Then by adding a sediment such as sand or sawdust, a concrete like mixture is made. By placing it into a mold, the brick is formed. Plastic bricks on the other hand, require you to heat the plastic until it is extremely malleable to make the brick. Then you must mix the plastic with sand to form the brick. These two can be combined to make a strong, durable brick. Mr. Anderson proposes a simple design to get the job done. His design involves an aluminum box, a metal plate and a metal handle to apply leverage pressure to compact the trash. This design is not expensive and can be expanded any time. During his research Mr. Anderson developed an idea to make these bricks without melting plastic, as that can be hazardous. “You can make bricks with paper and plastic shreds instead”, explained Mr. Anderson. To do this process, you must soak the paper in water and grind it until it forms a paste. Then, you must add plastic shreds to the mix. This mixture is placed in a mold and air-dried until complete. However, Mr. Anderson noted that “without a hydrophobic coat, the bricks will turn into mush”. Many things can be done with these bricks, such as sending them to a facility, or even burning them. He believes that by implementing his plan of compacting, the amount of improper waste disposal will reduce rapidly.

Culture and Teaching

Even if all of these parts of the TRCC project are implemented, there is no guarantee that the locals will oblige to do these tasks. That is why we have decided that I, the club president, will travel to Baijudih, January 1st through the 5th, and give a lecture to the locals. The objective of this lecture is to charge the culture of throwing trash on the street. In this presentation, the other members from the Weekend School Foundation Club will join a Zoom meeting allowing them to speak to the villagers with a translator. By doing this, the teaching part of the TRCC project will begin. Over time the villagers will slowly adapt to the new system and benefit from the TRCC project.

Conclusion

The TRCC project, composed of Teaching, Recycling, Composting, and compacting, is just the start to cleaning up India. By implementing this project, with approval from the board, our organization will be able to start taking steps to recycle waste, compost food scraps, and compact trash, to reduce the amount of pollution significantly. Baijudih is just the beginning, and we aspire to implement his project in many other small villages in India.