



Robots for Fighting Plastic Pollution

Sainath Manikandan

United Arab Emirates

Sainath Manikandan once read a story about the famous environmentalist, Dr. Jane Goodall. She'd helped him to see that no matter how small a step might seem, the tiniest effort can eventually make a huge difference. He was just a young boy in school, but he had paid attention when she said that it didn't matter how old someone was; what mattered was the action they took to move the world into the right direction.

So Sainath decided to start where he would be able to make a change—in his own school. He'd seen that a lot of his classmates in the United Arab Emirates (UAE) used single-use plastics in their everyday lives. He found this extremely concerning.

He'd first noticed the impact of single-use plastics when he had visited his family's hometown in India when he was 8 years old. "It's normal for people in India to use single-use plastics, like straws, cups, and plastic bags in their day-to-day lives," he remembers. "But there just isn't enough room to dump all of the waste. There were small pieces of plastic everywhere." So the plastic ends up being tossed in the streets and then ends up in the rivers and lakes.

Sainath was bothered enough by this that when he got home he did some research. "This is a problem all over the world," he says. "An estimated amount of *eight million tons* of plastic ends up in the world's oceans every year." If that continues, it is estimated that by 2050 there will be more plastic in the oceans than there is marine wildlife. These shocking numbers made Sainath wonder what he could do about it.

To start, Sainath created a campaign to collect plastic trash and old electronics from his classmates. Once every three months he would hand over all the trash he had collected to the Emirates Environmental Group for recycling. "At first, it wasn't such a big deal," he says. It was just a project he had started with some friends, placing some trash cans in the school to collect plastic waste, and convincing other students to stop using single-use plastics.

Then one day one of the teachers overheard Sainath talking to his friends about the project. That's when his PEPC (Papers, E-waste, Plastics, and Cans) campaign moved to the next level. "She wanted me to give presentations about our project to students in other classes," Sainath says. "Soon more people realized that they needed to get involved."

It took some time, but eventually, as more students joined the effort, the scope of the project grew. Together they started collecting plastic trash outside, educating others about the importance of sustainability, and even planting plants and trees around their school. Some students started bringing waste from home that wouldn't have been recycled otherwise.

"It was really inspiring, and it gave me the energy I needed to move forward," Sainath says. He realized that what was happening was exactly what he'd learned from the story about Jane Goodall: it just took one person to take one small step in the right direction to create a much larger wave of change.

Around this time Sainath joined other young changemakers by becoming a member of Jane Goodall's Roots & Shoots Programme in the Emirates. "It's about raising awareness, reaching others, and taking small steps that will create a big difference in the future," he says.

By now he realized that it wasn't going to be enough to tackle the issue of plastic pollution by just collecting trash before it gets to the oceans. After all, there is already an astonishing amount of plastic there. So he started to think about how the plastic already in the ocean could be collected.

Because the United Arab Emirates has both desert and coastline, it is a country with a strong interest in fighting environmental pollution and climate change. Therefore, technology is often used there to tackle important problems, like the lack of water for agriculture.

Sainath started thinking about how there might be a technical solution to the problem of marine plastic pollution. He had started going to robotics classes when he was 9 years old. Now he started wondering if his knowledge of robotics might be used to address this problem.

He decided to apply what he'd learned about robotics and put his skills to work. And with the support of his teachers and his parents, he worked tirelessly to develop a robot that would be able to collect plastics from water sources. There were many technical problems to solve: how to make the robot float, how to collect the plastic from the water, where to store the collected plastic, and how to protect the robot's sensitive electronics from the water.

"I used recyclable materials, like plastic bottles, popsicle sticks, pencils, and sheet glass to make my robot float on the surface of the water," he explains. His robot—which he calls Marine Robot Cleaner (M-Bot for short)—has three little motors: two of them act as paddles, and a third motor in the front is used to push the plastic trash into a basket attached to the robot's back.

With his robot Sainath aims to protect marine habitats and work toward the UN's Sustainable Development Goal 14: Life Below Water. The robot is only a prototype at this point, but Sainath has already showcased it on various occasions, like UAE Innovation Month, the Dubai Makers Faire, the Masdar Festival, and the Abu Dhabi Chamber's Future Entrepreneurs.

Once he produces the robot on a larger scale, he hopes to build an even bigger version of it that will be able to collect up to 15 tons of plastic before returning to shore. The batteries can then be changed with solar panels, making the robot completely carbon neutral. A Global Positioning System (GPS) can be installed in the robot for navigational purposes, and a rotatable wireless camera and sensor can be fitted. This will sense whether the water is clean, and if it is, will send a signal to the robot to stop the process.

Sainath's invention has earned him multiple prizes, awards, and international recognition. He is even in discussions with a large company about programming the robot to clean up rivers and lakes, and someday maybe even the oceans.

While developing his robot, Sainath realized the importance of learning from past mistakes. "I always take feedback from people on how I could improve my robot," he says. He then goes over his design choices to figure out ways to make his invention work even better.

For Sainath, this is also an important lesson for adults around the world to think about. After all, the huge problem of plastic pollution that we are facing today was caused by the choices made by previous generations. But if we can learn from our past mistakes, and change our behavior to reflect the lessons learned, we can repair the damage. "We need to start working together toward saving our environment," Sainath says. "Better late than never!"

From working on his own projects, implementing his PEPC campaign, and developing his M-Bot, Sainath also learned another important lesson about the power of taking action, that he urges other young people to remember. "Keep yourself motivated and never feel small," he says. "It is our responsibility to conserve the earth for future generations; and together we can create a wave of change."

There is a powerful force unleashed when young people resolve to make a change.

Dr. Jane Goodall

Call to Action: Start from where you are now, and you will have started a wave of change!

Dr. Jane Goodall's Roots & Shoots: www.rootsandshoots.org

Jane Goodall's Roots & Shoots UAE: <https://uae.rootsandshoots.community>.

Stone Soup Leadership Institute

www.stonesoupleadership.org

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