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MOUNTING GLOBAL PLASTIC POLLUTION INSPIRES INNOVATION IN JAPAN

WASHINGTON | CORE



In recent years, marine plastic pollution has become a major global concern. Global estimates show that 1.2 to 2.4 million tons of plastic waste enters the world's oceans from annually.¹ At the same time, global plastic production continues to increase, reaching 368 million tons in 2019.²



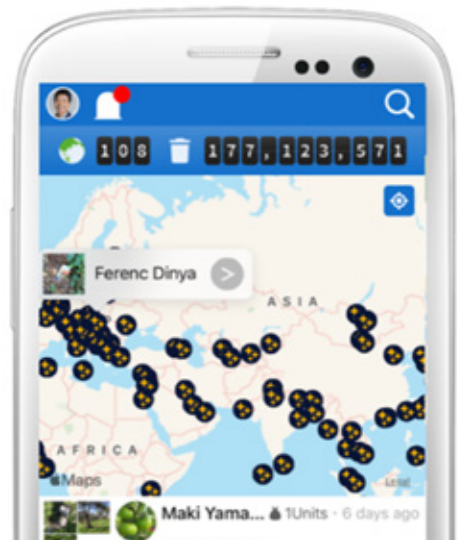
Riverine plastic waste pollution

The Asia Pacific region is the source of 86% of the land-based plastic waste leaking into the world's oceans. Many countries in this region struggle with poor waste sorting, recycling, and disposal systems along with limited regulatory oversight powers. Combine this with rapid population growth and demand for consumer products and a rising tide of single-use plastic ends up in landfills and/or leaks into the environment.³

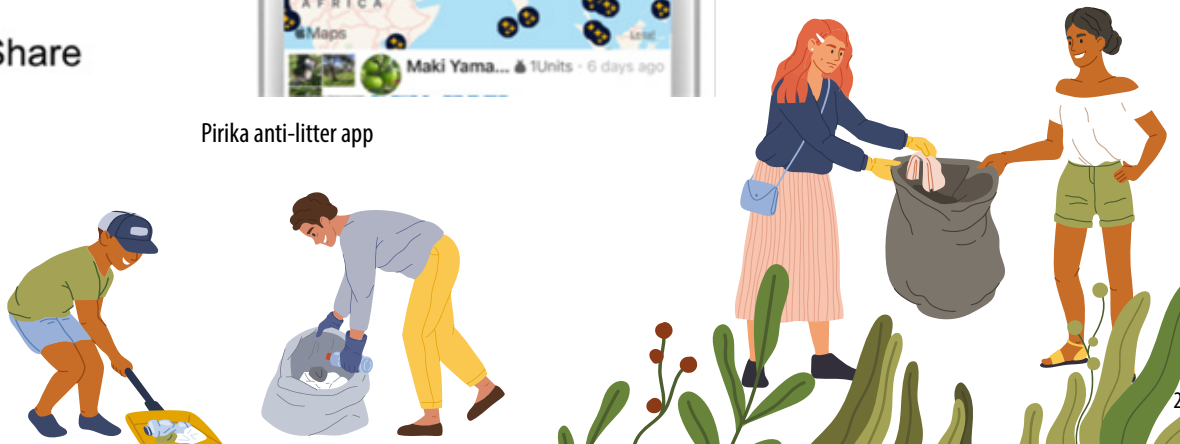
A variety of technology solutions are being developed and deployed around the world to deal with the marine plastic waste problem.⁴ Washington CORE recently spoke with Mr. Fujio Kojima, CEO of Pirika, a Japanese startup that is developing technology solutions to measure and reduce marine and land-based plastic pollution in Japan and internationally.

SOCIAL MEDIA MEETS LITTER WASTE MANAGEMENT

Several years ago, while on a travel break from his environmental studies at the University of Kyoto, Mr. Kojima noted that litter had become a significant threat to the environment worldwide. He decided to create an affordable technology solution, and teamed up with university colleagues in 2011 to establish the company "Pirika", and develop an identically named anti-litter social media app. "Pirika" means "beautiful" in Ainu, the language of an indigenous people living in northern Japan. Now used in 110 countries, the Pirika app provides a simple way to raise awareness of the littering problem and to encourage people to pick up trash. Over 190 million pieces of litter worldwide have been picked up by app users. Companies and organizations can post photos and track data on their clean-up activities (including number of participants, quantity of litter collected, and time spent).



Pirika anti-litter app



APPLYING AI TECHNOLOGY TO THE URBAN LITTER PROBLEM

To address low public awareness of existing anti-litter efforts, Pirika developed the "Takanome" solution, in which user-provided smartphone videos of city streets are analyzed using AI and image-recognition technology. The solution can accurately identify the type and geolocation of litter, and visualize it on a litter-density heat map. Based on the data collected, Mr. Kojima advises local governments on litter locations and ways to combat the litter problem.

TO UNDERSTAND A PROBLEM, UNDERSTAND ITS SOURCE

More recently, Pirika decided to address the growing international problem of tiny microplastic particle waste in bodies of water and the need for more effective measurement of its scope and sources. Conventional microplastic waste measurement involves dropping a large surveying device from a vessel into a body of water, which is financially and manpower intensive. Mr. Kojima created "Albatross", a significantly more mobile and cost-efficient surveying device that utilizes off-the-shelf low-cost components. Mr. Kojima and his team measured microplastic levels in previously untested rivers and waterways throughout Japan and discovered that runoff from artificial turf and rice fertilizers is the primary source of microplastic pollution leakage in Japan. Thanks to Pirika's efforts, the microplastic problem went from being virtually unknown to a topic discussed by the media and city councils, and analyzed by manufacturing industry experts.

However, just measuring microplastic levels won't bring any improvement, says Mr. Kojima, if the behaviors and thought processes of microplastics producers are not changed. In order to disseminate his research findings to relevant industries and promote change, he contacted several of Japan's largest artificial turf manufacturers. One of these companies agreed to make mitigation of microplastic waste leakage from artificial turf products a primary business focus. They are now working with Pirika to create guidelines on artificial turf maintenance, and are collaborating with major construction companies to develop a microplastic filter.

However, for other microplastics pollution industry sources like agriculture, making change is difficult. Fertilizers used in rice farming are coated with microplastics to lengthen their lifespan. These microplastics run off into waterways and rivers, leading to water clogged with plastic pellets. Farmers continue to use these pellets due to lower costs. Consumer awareness of and therefore pressure to address the problem is limited because producers do not label the rice to indicate use of microplastic-coated fertilizers.



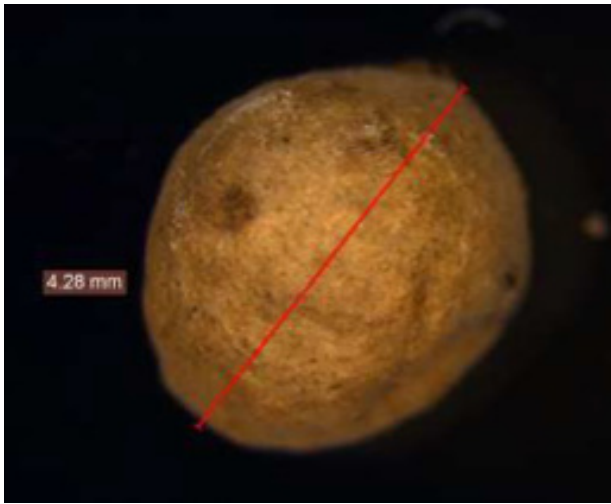
Takanome solution: image recognition



Albatross surveying device



Artificial turf



Microplastic-coated fertilizer

NO SINGLE GLOBAL SOLUTION

Every location has its own unique waste problem. While Japan suffers from high levels of microplastics pollution from artificial turf and fertilizer, Southeast Asia and European countries struggle with high levels of Styrofoam microplastic waste from products used by consumers.

In 2019, Pirika partnered with the United Nations Environmental Programme to track microplastic waste in the Mekong River to its sources and provide policy recommendations to governments to stop plastic waste leakage into waterways. Pirika used its Albatross solution to conduct microplastic leakage surveys on the Mekong River in Thailand, Lao PDR, Cambodia, and Vietnam; and also conducted an aerial visual analysis survey of plastic litter distribution. Pirika's surveys detected high levels of microplastic concentration, that are significantly contributing to the pollution of the Mekong Delta.⁵

Demonstrating tangible benefits is important when introducing environmental technology solutions to a new market. Pirika recently entered the Sri Lanka market, using the same strategy as in Japan. Pirika began by taking sample measurements of microplastic levels across the country pro bono and making the information available to local governments and source industries. He then offers to work with them on measuring waste and implementing key data-based policies and changes. Since Pirika's microplastics measurement technology is low cost and easy to deploy, says Mr. Kojima, governments that want to solve their plastic waste problems but have limited budgets are prime customers.

JAPAN AS A SPRINGBOARD FOR ENVIRONMENTAL TECHNOLOGY

In the past, the adoption of environmental technology products has been limited because they have not been sufficiently effective and affordable. Japan is an exceptionally good country for startups to develop, test and perfect new solutions because of its sprawling and vibrant community of small factories willing to take the time and risks to develop new prototypes. Mr. Kojima sees the current reality of Japan, with its aging population and associated problems, as the future of other developed and developing countries, and therefore an excellent testbed. Technologies can be tested in Japan, and then rolled out to other markets in Europe or Asia.

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Endnote:

¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5467230/>

² <https://www.sciencedirect.com/science/article/pii/S2452223621000535>

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5467230/>

⁴ <https://www.sciencedirect.com/science/article/pii/S0160412020320225>

⁵ <https://www.conference2020.countermeasure.asia/livesession2>



Pirika CEO Fujio Kojima

Fujio Kojima

Eco-entrepreneur Fujio Kojima founded Pirika. Inc. in 2011 when he was an environmental studies graduate student at Kyoto University. Pirika is a startup that uses social media to address urban litter and marine plastic pollution issues via technology. The company's anti-litter smart phone app named "Pirika" has already encouraged over 1 million people to pick up 190 million pieces of litter in 110 countries. The company used its "Albatross" microplastics survey system for one of the biggest microplastics research projects ever in

Japan, revealing for the first time that 25% of microplastics waste in Japanese rivers comes from artificial turf used in soccer and tennis courts. Mr. Kojima started to research plastic pollution in Southeast Asia in 2019 with the United Nations United Nations Environmental Programme and is continuing to explore new issues and solutions.

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