

EF Polymer's Collaboration with Okinawa Bank

Abstract

EF Polymer was established in 2019 through OIST's Startup Accelerator Program by an Indian entrepreneur Narayan Gurjar, who was 22-year-old at the time. The company develops environmentally friendly organic polymers that upcycle the residues of inedible parts of fruits and vegetables. The company's mission is to upcycle biodegradable waste (food waste) and convert it into low-cost, sustainable agricultural materials that are accessible to emerging countries, solving global environmental problems related to agriculture such as drought.

EF polymer has now started working with the Okinawa bank to continue their research during the current COVID-19 crisis. Okinawa bank graced The EF Polymer family with a significant grant money which helped the company to continue their research create to low-cost, sustainable agricultural materials that are accessible to emerging countries. The Bank of Okinawa, Ltd. was established in June 1956, in response to growing demand from society for the establishment of a commercial bank, to promote economic progress in Okinawa after the war. Since then, the Bank has worked to promote the industrial economy of the region and improve the living conditions of its people. It has steadily grown along with the region as a bank that offers international operations and medium-to-long-term financial trust services. Thanks to the cooperation of the people of the region, the Bank saw remarkable growth and listed its stock on the First Section of the Tokyo Stock Exchange in September 1989.

EF Polymer extends their sincerest gratitude and is thankful to The Okinawa bank for their contribution towards the company.

During the past few years EF polymer has contributed in various projects.



1. Onna Village – Red soil erosion project

In Okinawa, the red soil erosion is serious problem which cause the topsoil and fertility is losing continuously. The soil Erosion also effecting the ocean coral life. There are many reasons for the soil erosion like: - 1) Heavy Rain fall 2) Overdose of the chemical fertilizer and pesticides 3) Construction and deforestation etc. It has been learned from the Onna-son Agriculture Department that the problem of red soil erosion in Okinawa is huge and they are constantly trying to solve it with various solutions available including shading plants with main crops. In the same thought to find the more effective solution, Onna Village Center and EF Polymer Private Limited come up together to find whether the product developed by the company is effective in the red soil erosion prevention.

The EF POLYMER is ability to increase the water holding capacity of the soil. Due to this property this can absorbed the more water in the soil and retain the moisture for longer period. Additionally, this have property to retain the nutrient in the soil so the growth of the crop will be increased.

“We believe that due this property EF Polymer help in the reduction of the soil Erosion. We started the work with the support of Onna Village Agriculture Department Officials, we understand that using EF Polymer can be one way to prevent the soil erosion issue in Onna-son. Hence, we

mutually decide to do research/testing with the polymer to see to what extent it will be useful for red soil erosion prevention. “ – EF Polymer.

This preliminary experiment showed that EF polymer has tendency to retain the fertilizer and water in the soil. Which help to the increased the yield of the crop and support in reduce the soil erosion. Unfortunately, Due to the Typhoon clear data of soil erosion was not obtained. But According to the yield data and farmer feedback this indicated that EF Polymer have potential to reduce the soil erosion.



2. Orion beer – Waste to wealth

EF polymers in collaboration with Orion Beer developed methods to utilize the discarded wheat yeast left after preparation of beer. To utilize this wheat yeast, it was processed along with cow dung, local waste, cow urine, and leftover kitchen waste and was converted into organic and natural agri-input products, which were then used to grow wheat crop organically later to be processed into beer again. This was a small step towards the establishment of zero waste circular economy



3. Awaji Island – Drought Issue

In recent years, Awaji Island has been suffering from a massive drought due to a lack of rainfall during the winter, leading to a decrease in the harvest yield of agricultural products. On the other hand, there are also

concerns that crops will suffer root rot due to the extreme amount of precipitation on days when it does rain.

Established in 2019 with the support of the OIST startup program, EF Polymer is primarily engaged in developing eco-friendly, organic polymers. Additionally in Okinawa, EF Polymer has been working on developing liquid fertilizer from crop residues and from 2020, the company also conducted a collaborative experiment with Orion Breweries, Ltd. to develop an organic liquid fertilizer using surplus yeast from beer. Now, a new project is to be launched on Awaji Island, in which the company aims to realize efficient water resource management by using polymers that can store high amounts of water on farmlands faced with drought.

In this project, an experiment will be conducted on some onion farmlands of aqua.verde AWAJI corporation in the southern part of Awaji Island. In the experiment, EF Polymer's organic polymers will be used in outdoor cultivation, and Cultivera's membrane technology will be tested in the greenhouses. EF Polymer plans to assess whether the polymer, which can retain a high amount of water that is then slowly released into the soil, is able to keep the soil sufficiently hydrated even when there is no rainfall, and soak up excess water when heavy rainfall occurs.



Cultivera's membrane technology for institutional cultivation



EF Polymer's eco-friendly polymer

4. **Rabi-Season Pilot of Fasal Amrit**

A pilot was conducted across 7 Farmer Producers Organization's in 4 districts of Uttar Pradesh, namely, Chitrakoot, Mirzapur, Sonbhadra and Ballia, to assess the efficacy of Fasal Amrit in aspects of irrigation – water stress / drought management, production and revenue in Rabi season for different crops and vegetables, particularly wheat and pointed gourd. Out of the total sample size of 63 farmers, the data was successfully collected for 36 farmers across 5 FPO's from District Chitrakoot, Mirzapur and Ballia.

97% of farmers recorded increase in production by 28.7% and water saved during irrigation by 18.31% with a potential to bring around 33.5% higher income and 38.8% higher income in wheat and pointed gourd respectively. Basis the analysis it is expected that increase in yield and water saving would increase the income as well.

EFP team experienced serious challenges due to COVID-19 travel restrictions. We have tried our best to evaluate results from the limited data. The data is received through phone and email. The data could not be collected for 2 FPO's from District Sonbhadra due to COVID restrictions. Most farmers observed better vegetative growth in the fields which could possibly be because of better microbial growth and moisture adsorption in the root. It was also observed that occurrence of cracks was delayed by 5-7 days in treatment plots.



Demonstration of the use of Fasal Amrit in wheat



Demonstration plot at Chitra Gokulpur for use of Fasal Amrit in wheat



Sowing of Wheat in Treatment Plot in Bhojpur Pahadi, Mirzapur



Demonstration in Bhojpur Pahadi, Mirzapur

5. Mitsui Co. – Fasal Amrit testing in Thailand

EF polymer is currently working with Mitsui Co. in Thailand for testing of their product. The product fasal amrit is currently being tested on sugarcane crop. This project has been going on since past 9 months and is currently going on as well.

