Resiklo: The Recycling Project Milestones

A sustainability project on plastic recycling was adopted by SPRTC two years ago. This idea of recycling originated from the arising problem concerning how to manage the farm's accumulation of plastic wastes at approximately 10 tons per year. Whereas these wastes are not moving because of the government restrictions on disposal of massive plastic wastes in local dump sites. Thereby, the SPRTC management has recommended a solution by mechanically processing the plastic wastes through recycling.

In support of this initiative, the department has allotted a budget to purchase a machine called “Resiklo”. This machine was tested and proven to shred plastic mulch and seedling trays in relatively small pieces, and later on subjected to a process of extrusion through a mold to become a plastic post.

At the first stage of implementation in 2022, factors such as machine operation, safety and efficiency have been considered to improve the process. In order to achieve a smooth performance, the team ensured the collection of dry plastic mulch and seedling trays, and manually cut it into desired length before feeding into the machine. This practical adjustment prevents the machine from faltering.

During the extrusion process, safety and health of the machine operators, the neighborhood and the environment are given utmost attention. Purposely we aim to prevent the spread of plastic fumes and its hazardous effects. To suck the bad odor of the melting plastics, DIY hood exhaust fans and filters are installed. Filter attached to the hood is composed of pipes and a plastic drum container and within the container are charcoal and water mister that basically wash away the captured fumes while the carbon is absorbed by the charcoal. The filtered smoke is released through a chimney and wastewater is drained in a septic tank. Moreover, ornamentals are planted at the surrounding area of the recycling facility to help absorb the fumes. Melting is also scheduled when it is not windy so that fumes will not escape directly to the environment.

Fabrication of a single post with 2 meters length by 1.25 inch diameter requires 3 kg of mixed parts of crushed plastics. It is recommended by the way, to mix 3 parts of crushed plastic mulch with 1 part crushed seedling tray to achieve a sturdy post. Because in the first try, it is observed that melting plastic mulch alone will produce soft and weak posts.

In terms of labor and electricity, the average cost of shredding 3 kilograms of mixed plastics is 121.33 while the average cost of extrusion is 103.40. Summing up all these figures will give you an equivalent cost of PHP 224.73 per post. By the thought of comparing posts made of plastic with GI of identical size, you may have more or less the same price/unit. But the advantage of a plastic post is its resistance to weather conditions because it will neither rust nor need a primer paint to last.

Efficiency wise, fabrication of posts at the beginning is low at 15 pcs per day. While at present, the farm is now able to improve production at 30 posts a day. Currently we have already fabricated 550 posts that are distributed and utilized as trellising posts in mostly solanaceous crops.

Normally when the machine continually operates, the farm can shred 65% of plastic waste in a year. This data is from this year’s actual output of 816 kilograms of shredded plastic for 16 days a month. So that in an 8 month period the farm can crush 6.5T out of 10T of plastic. Crushing has been given priority during the dry season and eventually all the extrusion activities will be devoted in the rainy season.

While our plastic wastes are gradually moving on to the recycling process and the work procedure has already been established, the challenge still remains on how to increase the machine capacity and

minimize breakdown to sustain its continuous operation. This is time again to plan, do, check and take actions for improvements.

Melting/molding -

24-30 posts per day
18- 30 minutes per post
10 days melting per month at 8 months in a year
Will be at 2,000 posts per year
2,000 post at 3 - 3.2 kgs plastic per post = 6.4 Tons

Crushing/Shredding

45-60 kgs per day
16 days crushing per month at 8 months in a year
6.5 tons per year

Making a Difference: Efficient Waste Solution for Sustainability

A year ago, SPRTC launched a sustainability initiative to tackle the accumulation of plastic waste on the farm, amounting to approximately 10 tons per year. Faced with restrictions on disposing of such large quantities in nearby landfill sites, SPRTC embarked on a mission to find an effective solution: recycling.

The Journey: From Waste to Resource

To address this challenge, SPRTC management allocated resources to acquire a recycling machine dubbed "Resiklo." This innovative machine was meticulously tested and proven capable of shredding plastic mulch and seedling trays into small pieces, subsequently extruding them into durable plastic posts.

Prioritizing Efficiency and Safety

The initial implementation in 2023 prioritized factors such as machine operation, safety, and efficiency. The team ensured a smooth process by manually preparing dry plastic mulch and seedling trays before feeding them into the machine. Moreover, stringent safety measures were established to safeguard the safety and health of machine operators, the community, and the environment.

Mitigating Environmental Impact

Recognizing the importance of minimizing environmental impact, SPRTC took proactive steps to address concerns about plastic fumes emitted during an extrusion process. A CleanAir Filter kaizen initiative was designed to address harmful emissions. In addition, ornamental plants were strategically planted around the recycling facility to absorb fumes, and melting activities were scheduled during cool weather conditions to prevent fume dispersion.

Durable and Sustainable Alternatives

Recycled plastic posts have been proven for their durability, providing a viable alternative to metal GI pipes or wood cuttings. Unlike wood, which is susceptible to rotting and degradation over time, plastic posts offer superior resistance to weather conditions, ensuring longevity and minimal maintenance requirements. Similarly, while metal GI pipes may succumb to rust and corrosion, recycled plastic posts remain unaffected, thus extending their lifespan and contributing to cost savings in the long run.

Quantifying Environmental Impact: Carbon Emissions Analysis

In addition to economic considerations, SPRTC recognizes the importance of quantifying environmental impact. Through the upcycling initiative of plastics into durable posts, SPRTC effectively reduces carbon emissions associated with traditional manufacturing processes. For every ton of plastic waste diverted from landfills and converted into posts, an estimated 39 metric tons of carbon emissions are prevented, equivalent to the greenhouse gas emissions of 9.3 gasoline-powered passenger vehicles or 3,831 gallons of diesel consumed. Additionally, by recycling 6.5 tons of plastic mulch, SPRTC avoids emitting greenhouse gases equivalent to 645 tree seedlings planted over 10 years.

Driving Efficiency and Production

Efficiency has steadily improved since the project's inception, with daily increasing fabrication of posts from 15 to 30 units. To date, SPRTC has fabricated and distributed 550 posts, primarily used in supporting solanaceous crops.

Charting the Future: Overcoming Challenges

While significant progress has been made in diverting plastic waste towards recycling, challenges persist in enhancing machine capacity and minimizing breakdowns for sustained operations. SPRTC remains committed to continuous improvement, diligently planning, implementing, evaluating, and refining processes to meet evolving sustainability goals.