



EcoPinet's Concept Narrative

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EXECUTIVE SUMMARY

Addressing Current Problems:

Climate and Health Crisis

For over a decade, PM2.5 pollution has been Thailand's most pressing national issue, a relentless crisis that has claimed thousands of lives and clouded the nation's future. In 2023, Thailand was ranked the third-most polluted country globally, a grim reminder of the challenges we face. The stakes are high and increasing: in 2021 alone, PM2.5 pollution was linked to over 29,000 deaths across 31 provinces, according to Greenpeace Southeast Asia. To this day, this invisible threat continues to drive premature deaths from respiratory and cardiovascular failures, lung cancer, and diabetes. Among the primary culprits is the open burning of agricultural waste, identified by Thailand's Environment Institute as a major contributor to PM2.5 levels. Of all agricultural byproducts, pineapple waste stands out, with a staggering 55% waste ratio, generating 1.8 million tons of waste and potentially emitting up to 2.1 million tons of CO₂ gas annually if all burnt.

Being an agricultural country, Thailand is one of the significant pineapple producers in the world, and the world's second-largest canned pineapple exporter. In 2024, pineapple cultivation generates approximately 1.8 million tons in total pineapple production per year. After fruit harvesting, a large amount of pineapple waste residue is left behind with approximately 38.78% of leaves and 16.13% of stems ([Ueasin, 2022](#)). Traditionally, the agro-waste is often burnt, decomposed and sent to landfills to quickly clear the fields in preparation for the next cultivation. This burning process of biomass causes carbon dioxide, carbon monoxide, particulate matter 2.5, and polycyclic aromatic hydrocarbons to be released into the environment, contributing to a plethora of health crises and premature deaths as mentioned above.

Plastic Pollution



Our planet is also plagued with an insurmountable level of plastic pollution crisis. Greenpeace has estimated that by the end of 2024, 220 million tons of plastic waste will be produced, and expected to triple by the end of 2050.

Even though efforts are being made to reduce the use of single-use plastic, it is an uphill battle. Plastic packaging is the largest sector, making up 36% of all plastic consumption. When plastic breaks down into microplastic particles, it becomes even more difficult to detect and remove from the environment, resulting in both health hazards and climate crises. In addition, toxic chemicals added during the manufacturing process, such as styrene and benzene can pass onto the animal food chain consequently integrating into our food chain. Incineration of plastic waste releases up to approximately 850 million metric tons of CO₂ annually, contributing greatly to climate crises.

Introducing Ecopinets Solution

Where others see waste and pollution, EcoPinet sees opportunity—EcoPinet aims to provide a viable solution that tackles harmful PM2.5, carbon emissions, and plastic pollution, offering a greener alternative to single-use plastic packaging. EcoPinet repurposes and upcycles discarded pineapple leaves, transforming them into eco-friendly paper and sustainable packaging. The product is also embedded with vegetable seeds that can increase plant growth.

EcoPinet material can decompose within 4–6 weeks, fostering soil enrichment, decreasing deforestation, and even posing as a fertilizer after decomposition. We also strive to offer eco-conscious consumers an active role in giving back to the Pineapple Farming community and our planet.

By doing so, we can become an integral part of Thailand's national agenda to tackle both climate and plastic crises. Not only will Ecopinets support Thailand's ESG agenda, but we are also contributing to UN Sustainable Development Goals that all nations must achieve.

Product Prototype Production

We started our product trials and feasibility by researching the process of turning pineapple wastes into paper. We visited 3 pineapple farms and successfully sourced over 260 kilograms of pineapple waste. The leaves and stems are shredded, then mixed with an okra binding agent, sodium hydroxide, and natural dyes like beetroot and vegetable seeds. We were successful in producing our first paper, bag, and box prototypes as seen in the introductory video.

EcoPinet's Unique Values

EcoPinet offers many unique values compared to other eco-friendly papers and packaging materials available in Thailand. Primarily, our papers are made entirely from biodegradable materials, setting them apart from traditional packaging options. Secondly, the market survey reveals that no other paper and packaging product with embedded seed components exists in the market, making EcoPinet unique with no direct competition in the eco-friendly packaging industry. Our product decomposes naturally and enriches the soil with rich essential nutrients like potassium, nitrogen, and phosphorus, acting as a natural fertilizer. The seeds within the paper will also sprout into new life. This process not only reduces agricultural waste but also transforms discarded packaging into a resource for growing fresh produce. Thirdly, we also integrate dried flowers and leaves directly into the paper pulp, creating unique textures and colors that celebrate the natural identity of our materials.

Notably, we can achieve up to 84.1 MPa average tensile strength in our pineapple paper, allowing it to theoretically withstand up to 858 kg of weight, making us one of the first to produce paper with such high durability, thus increasing our product's competitive edge.

Our unique value also extends beyond sustainability; our ethical production provides meaningful job opportunities for underprivileged communities along with supporting local farmers: fostering agricultural development in Thailand.

Target Market

From an entrepreneurial perspective, EcoPinet's business model is designed to meet the increasing demand for biodegradable packaging, targeting both individual consumers and corporations committed to sustainability. By riding on the rising ESG trend and requirements among major corporations in Thailand to showcase ESG practices, we are confident that there is a viable and growing market for EcoPinet's products as we aim to be an integral part of their supply chain.

Revenue Model

The current market value for paper and plastic packaging is approximately \$1.20 Billion. In 5 years, we hope to capture 5% of the total market, amounting to an estimated \$60M revenue projection. We plan to achieve our target through:

1. B2B sales: replacing current use of plastic packaging, ranging from hospitals, hotels, cafes, and restaurants that aim to reduce their carbon footprints. Revenues earned will be in bulk and recurring. To achieve this, we plan to use direct sales channels and Shopify.
2. B2C sales: retail outlets for both online and offline channels targeted for home products for eco-conscious consumers. Retail pricing will be at a 15% markup compared to corporate sales and appeal directly to the target audience who favors sustainable packaging.
3. Secondary revenue stream: We plan to use crowdfunding campaigns and sponsorship from corporations to assist us in our start-up. In return, we will promote their sustainability practices on our social media platform so our development and initial setup costs will be at the least minimum.
4. Unit cost and profit margins: Total costs include pineapple wastes, sodium hydroxide, seeds, transportation and labor costs amounting to \$0.06/unit of paper, while pricing would be at \$0.15/ unit, thus achieving a 60% profit margin. Boxes of various sizes would achieve a 44–53.57% margin.

Cost of products per piece in USD	Paper	Box size S	Box size M	Box size L
Pineapple wastes	0.02	0.1	0.11	0.12
Sodium hydroxide	0.01	0.05	0.06	0.06
Seeds	0.01	0.01	0.01	0.01
Labor cost	0.01	0.02	0.03	0.04
Packaging and Transportation	0.01	0.1	0.1	0.1
Total Cost	0.06	0.28	0.31	0.33
Selling Prices	0.15	0.5	0.6	0.7
% Profit Margin	60	44	49.17	53.57

In the initial phase, we plan to use the pineapple farming community as our labor to produce the product, thus labor costs would be relatively lower than using the manufacturer. However, once the market expands, our products will be made by manufacturers to ensure scalability. 70% of all net profits will be donated to the schools in the pineapple community to help improve their children's education, promote awareness of sustainable practices, and foster a generation of eco-conscious minds. 30% of the net profit will be used for operating costs and funding growth.

Team Capabilities

EcoPinet was established by 3 like-minded and environmentally conscious high school students, Ploen, Pei Pei, and Medbua with varying interests in business, product design, and environmental science as well as the collective desire to give back to the community. We are all experiencing the plight of PM2.5 and saw firsthand how pineapple wastes were burnt and left as trash. This became our motivation to develop EcoPinet and synergistically scale up the project to all pineapple farming communities so more farmers can gain additional income and dispose of their waste safely.