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EPPIC
ENDING PLASTIC POLLUTION INNOVATION CHALLENGE

Ending Plastic Pollution Innovation Challenge 2023

Top 8 Finalists

Target site: Sihanoukville province
Cambodia

ABOUT EPPIC

The Ending Plastic Pollution Innovation Challenge (EPPIC) is an ASEAN-wide competition aiming to beat plastic pollution in coastal cities in Viet Nam, Thailand, Indonesia, the Philippines, Lao DPR, and Cambodia by selecting innovative solutions and helping them to grow and scale up.

Over **25 teams** from different parts of Cambodia have applied to EPPIC 2023 in two months. They came up with a broad range of solutions to tackle plastic pollution with upstream and downstream innovations. In October 2023, **08 teams** were selected as EPPIC finalists and undertook a 2-month incubation programme, including two field trips to Sihanoukville province.

During the Final Pitching Competition, taking place on 07 December 2023, **04 winners (2 from Cambodia)** will be awarded seed funding of up to **USD 18,000** each and start a 9-month impact acceleration programme.

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Photos source: Naja Bertolt Jensen in Unsplash
Content prepared by: EPPIC Finalists 2023

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We Lab - ITC

Research Hub on Water and Wastewater Treatment Technology

Team

Dr. Saret Bun
Founder and Research
(based in Cambodia)

- Assistant Professor at Insitute of Technology of Cambodia (ITC), Cambodia
- Researcher for more than 10 projects worked on development of environmental technology.

Ms. Seila Chea
Researcher (based in Cambodia)

Doctoral degree student reseaching on Plastic Debris Distribution in Coastal and Mekong River Systems of Cambodia.

Dr. Phaly Ham
Researcher (based in Cambodia)

- Lecturer at Insitute of Technology of Cambodia (ITC), Cambodia
- Researcher for more than 5 projects of water and environmental technology.

Ms. Sothearoth Chea
Researcher (based in Cambodia)

More than 5 years of experience working on social development.

Plastic Pollution Challenge

Plastic has become an integral part of our daily lives as it was used in a wide range of fields and industries, including telecommunications, construction, health care, food products, transportation, and retail. There has been an almost 2,000% increase in the annual global production of plastic during the past 65 years, generating to the "plastisphere" in marine ecosystems. Marine debris is dominated by persistent synthetic materials, most of which are plastics. There is a broad classification of these small size plastic residues based on their size. Microplastics are not only of different sizes but are also of different shapes like microbeads, fibers, film foam pallets, fibers, and filaments.

(cont.) To prevent sea pollution from plastics, there are various possible actions including international ban on the intentional use of plastics, ban of single use plastic products and of microplastics from cosmetics, raising public awareness regarding the benefit of reducing plastic pollution from sources, i.e., beaches and harbors, and blocking plastics before they enter the sea. To reduce both macro- and microplastic pollutions in the sea, installing the barrier at the discharge wastewater canal could be the effective and applicable concepts.

Solution

The solution proposed is an installation of the barrier at the discharge wastewater canal to reduce both macro- and microplastic pollutions in the sea can be developed and applied. It will focus on the develop the innovative approach to block macro- and microplastics before entering the sea by using solar-powered air bubble screening device through installing at the wastewater canal that discharges to the sea of Sihanoukville, Cambodia. Each design configuration and operation conditions will be firstly tested in the laboratory ensuring the plastic separation performance. The device will be placed in different canal which discharge to the sea. Therefore, both government and private sectors are the key actors for using the newly developed device.

Innovation

To prevent sea pollution from plastics, there are various possible actions. Among them, blocking plastics before they enter the sea is one of the effective and applicable approach. Therefore, an idea of installing the barrier at the discharge wastewater canal to reduce both macro- and microplastic pollutions in the sea can be developed and applied. Therefore, the proposed solution will focus on the develop the innovative approach to block macro- and microplastics before entering the sea by using solar-powered air bubble screening device installing at the wastewater canal that discharges to the sea of Sihanoukville, Cambodia. This newly developed device will be innovated on bubble barrier together with solar power system and movable waste collection carrier. A wall of air bubble will create by pumping air through tube diffuser located at the bottom of the river making the bubble curtain from the bottom to the surface. This upward flow will float the particles to the surface. When placed diagonally, the natural current guide the plastic to the side of the river, making it accessible for collection and removal. In this project, various air bubble size will be investigated to enhance both macro- and microplastic flotation and removal. From the project, it is expected that the innovative device will be effective plastic removal efficiency, scalable, ship and fish friendly, and low-cost requirement.

Business Model

Based on the nature of the project, it is focused on installation of solar-powered air bubble screening device at the wastewater canal that discharges to the sea, which is our newly developed product. It can be used at different scales and locations such as the effluent from each canal, community stream, and industry/factory effluent sewage canal. Therefore, the key target users of this product can be related ministry (e.g., ministry of environment, ministry of tourism, etc.) and committee (e.g., The National Committee for Coastal Management and Development (NCCMD), etc.), governors of coastal provinces, community leader, and private industries or factories. The business plan will be started from the prototype scale installation through this project and its application and performance will be used as a promotion material to the target users. A complete set of the device and training will be provided as a package for interested customers or institution.

Market

The below list are the potential stakeholders of the project:

- Member of NCCMD
- Officer of Department of Environment Krung Preah Sihanouk
- Officer of Department of Public Works and Transport of Krung Preah Sihanouk
- Governors of Krung Preah Sihanouk
- Private company work on wastewater construction in Krung Preah Sihanouk, x-water technology Co., Ltd
- Community along the wastewater discharge canal

Vision

- A leading laboratory providing an update and accurate research outcome in Water & Wastewater Treatment and Management
- University-industry linkage (UIL) laboratory for research and development in Water & Environmental Engineering and Management in Cambodia and the region

Investment

- Starting from research institution for technology development with the fund support of USD 18,000.00 to produce the commercial device for first year incubation
- Starting the start-up business for 2-year operation with partial fund support from different partner and partial support from produce or self-service of about USD 20,000.00 per year

(cont.)

- Continues operation for ensuring the sustain of the business about another 3 years with the cost of USD 30,000.00 per year
- Fully operation after 6th year with the cost of USD 50,000.00 per year

Impact Model

For our team experience, there was a project related to analysis of macro- and microplastic particles in different environmental mediums of Cambodia including in marine water, freshwater, and salt made from sea water. The team has developed the Manta net used for plastic samples collection and successfully tested. Moreover, our project team in Cambodia also joined the project work with our team from Chulalongkorn University (Thailand) on microplastic particles separation from water. Hence, these projects allow us well acknowledge on device development for different plastic sizes collection as well as its separation/removal process from water. These experiences
from laboratory scale development will be beneficial for develop a new air bubble screening device of this project. The device will be tested for ensuring the design configuration and operation condition in the real scale. Moreover, this project outcome is surely scalable and replicable since there is a similar characteristic (size, flow, loading, etc.) of each wastewater canal flow into the sea in Cambodia (include in Sihanoukville, Kep, Kamport, Koh Kong) as well as in other part of ASEAN countries.

The product help to support three main SDGs:
• SDG11: Sustainable cities and communities: making cities and human settlements inclusive, safe, resilient and sustainable.
• SDG12: Sustainable consumption and production: ensure substantially reduce waste generation through prevention, reduction, recycling and reuse.
• SDG14: Life Below Water: the product helps to prevent and reduce marine pollution through collecting plastic debris at the waste water canal before entering to the seas, in order to improve ocean health and sustainable management of fisheries and tourism.

Traction & Key Metrics

- In 2022, the team has successfully developed and applied in the real scale of Manta net used as a device to collect Macro- and Microplastic particles in Mekong River and Ocean of Cambodia.
- Between 2020 and 2023, the team has investigated the decentralize wastewater treatment system as an eco-friendly and low-cost technology, and 2023, it was purchased to apply for real scale from an NGO to install at more than 30 sites.
- In 2020, the team has successfully developed and applied the local effective microorganism ball (EM ball) for wastewater treatment plant bioremediation.

Contact

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GreenTile

Combating Plastic with "Recycled Tiles"

Team

Ms. TE Hengly
Co-founder (based in Cambodia)

Bachelor in Education at the Institution of Foreign Languages, Royal University of Phnom Penh. Experience in tiles making and teaching environmental course.

Ms. LO Kimsivgech
Co-founder (based in Cambodia)

Bachelor in International Business Management at the Royal University of Phnom Penh. Experience in digital marketing and organizing environmental events.

Mr. TEP Keven
Co-founder (based in Cambodia)

Bachelor in Information Technology at the Royal University of Phnom Penh. Experience in software development and machine operation.

Plastic Pollution Challenge

In our city, Sihanoukville, of the total waste generated, plastic is a major contributor, with approximately 40,236 metric tons generated annually. Unfortunately, only about 3,446 metric tons are estimated to be recovered through the informal sector. Plastic bags and plastic bottles are the most significant contributors to plastic waste, accounting for 60% and 19% of total plastic, respectively.

Solution

Green Tiles has introduced a groundbreaking technology that converts PET and HDPE plastic waste into sustainable floor tiles suitable for construction and infrastructure development.

A prototype product has been developed in Cambodia with the capacity to reduce around 40 tons of plastic waste in our first year launch. The floor tiles are not only sustainable but also durable, cost-effective and offer low water absorption.

Innovation

Green Tiles aims to overcome the problem of plastic waste by converting them into highly durable and lightweight floor tiles made from recycled plastic together with sand and UV stabilizer through a process called extrusion.

The goal of this project is to promote access to sustainable and affordable floor tiles while reducing the amount of plastic waste. The Green Tiles project will not only reduce the cost of tile manufacturing by excluding cement from the process, but also save on costs when it comes to landfill cleanup and plastic reduction activities.

We are currently developing other means of recycling plastic, and in the future, we hope to expand our portfolio to other products, including flower-pots, bricks, and roof-tiles.

Business Model

Our revenue stream will come from selling our products—floor tiles—to our potential customers. We intend to target informal settlers and low-income households in need of tiles for the construction of houses that require high-quality tiles at reasonable prices. Besides, small and medium enterprises (SMEs) play a vital role in adopting our eco-friendly floor tiles, considering the level of development in Sihanoukville and the need for floor tiles in construction and tourism. Also, we will partner with retailers by selling our products to reach a larger audience and increase brand awareness.

Market

According to a World Bank report from 2022, 22% of Cambodians still lack access to decent housing. Approximately 2 million houses throughout the country require critical improvement to meet minimal quality standards. Furthermore, housing affordability remains a significant concern, with prices out of reach for 60 to 70% of the population. Furthermore, with Sihanoukville's rapid development, the city has become a major tourist destination, resulting in the creation of numerous hotels, resorts, and restaurants.

By utilizing recycled plastic waste, these eco-tiles can provide a sustainable, cost-effective, and durable alternative to traditional construction materials, potentially making housing more accessible to a wider segment of the population.

Vision

To provide sustainable and affordable floor tiles for everyday construction while minimizing plastic waste in coastal areas.

Contact

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Impact Model

SDG 1: No poverty
SDG 8: Decent Work and Economic Growth - Improving livelihoods through providing locals in Sihanoukville stable employment
SDG 5: Gender Equality - Providing local women with employment opportunities to assist us with the production process
SDG 9: Industry, Innovation and Infrastructure - Utilizing technical advancements to minimize plastic pollution and supply durable materials for construction
SDG 12: Responsible Consumption and Production - Integrating sustainability into business practices by recycling and reusing plastic waste as raw materials
SDG 14: Life below Water - Contributing to the reduction of plastic pollution, safeguarding marine ecosystems, and the preservation of coastal areas

Traction & Key Metrics

The initiative is still in the early stages of development. However, we have some accomplishments, including:

- Develop prototype in November 2023
- TOP 15 of the Ending Plastic Pollution Innovation Challenge 2023 (EPPIC), UNDP
- TOP 10 of the Youth Solutions Micro-Grant 2023, Asia-Pacific Youth Assembly

Investment

We are seeking a total investment of USD 95,000 for

- Machinery (30%)
- Research and Development (10%)
- Operation and materials (25%)
- Market development and team training (20%)
- Community projects and waste collection activities (10%)
- App development and utility expenses (5%)

GOMI Recycle

Be a Hero to Save the Earth

Team

Mr. Okumura Yusuke
CEO (based in Cambodia)

Ms. Phavan Va
Communication Lead (based in Cambodia)

Ms. Thun Lynita
Administrator (based in Cambodia)

Plastic Pollution Challenge

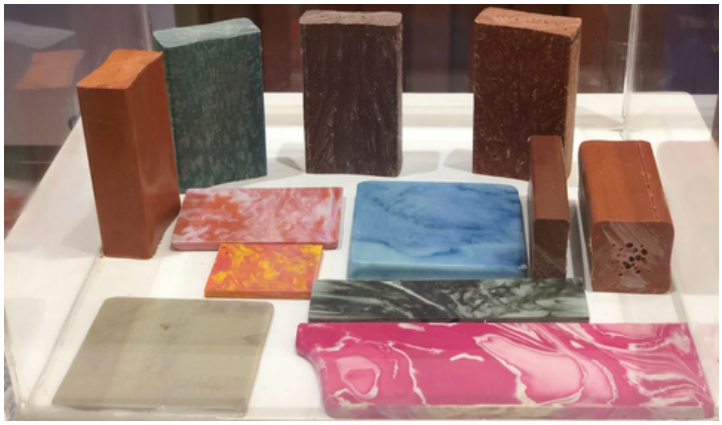
According to the World Bank, Cambodia generates 200 tons of plastic waste annually, and only 10% of that is handled in a sanitary manner. As a result, the rest ended up burned or dumped illegally.

Solution

GOMI Recycle offers a simple solution. We collect general waste and industrial waste, and recycle what can be recyclable. We turn your discarded plastic waste into high quality building materials and stylish furniture that are durable, beautiful and can be recycled countless times without degrading.

Innovation

The raw materials that we produce from plastics is called PLAYCLE. It can supplant traditional wood materials while sustaining the shape and color under the sun. It can be molded, extruded, or cut into various shapes and forms, allowing the customization and flexibility in creating indoor and outdoor furniture. By utilizing PLAYCLE, the demand for wood can be decreased, thereby preserving forests and biodiversity.



Business Model

Our current model is partnership with institutes to collect the plastic waste and recycle them into PLAYCLE. With the partnership, clients pay labor commissions in exchange for crafting the furniture and renovating the spaces such as the cafeteria, playground.

- The gross margin on our current building materials ranges from 25% to 50% depending on the size and design.
- The four major operational costs are staff salaries, water and electricity bill, machinery maintenance, and fuel/cars.

Revenue streams:

- Selling our products - PLAYCLE (raw materials) and furniture
- Commission from institutional partnership

Potential customers:

- Institutions such as schools, shopping malls, supermarkets, cafe, park
- Retails: people who are passionate about environmen

Market

Each person in Cambodia is assumed to use about 2000 single use plastic annually. With this in mind, the call for proper waste management is in huge demand. There are many solid waste collectors in Cambodia, but their methods of collecting and payment will not reduce the amount of waste if this continues. Our collection plan is cheaper compared to the present methods while also reducing the amount of waste with the weighing system. Moreover, being able to convert the single use plastic into an innovative material, our solution is the guarantee of environmentally friendly products and making sure the zero waste concept is achieved.

Contact

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Impact Model

Our system contributes to:
SDG 12 - Substantially reduce waste generation through prevention, reduction and recycling
SDG 9 - Promote inclusive and sustainable industrialization by raising industry's share of employment and gross domestic products
SDG 8 - Productive employment for all including people with disabilities
SDG 11 - Reduce the environmental impact of cities through proper waste management
SDG 17 - Strengthen partnership with all stakeholders and keep accountability

Traction & Key Metrics

- 2023: 27 full time employees - 6 people are in the back office and 21 are working in operations.
- 2024: Collaborate with cafe to minimize the increasing plastic waste from cup and straws
- 2024-2030: Working with factories and companies in Phnom Penh Special Economic Zone (PPSEZ) in collecting and recycling waste in effort to review the current waste management system.

Vision

Our vision is **"BE A HERO TO SAVE THE EARTH"**. We want to create a system that can protect our planet for our next generations.

Investment

For 2024, we are seeking $USD 30,000 in funds to introduce waste sorting machines for our productive waste collection and separation system once we start our project towards Zero Emissions.

TONTOTON

Leave Nothing and No One Behind

Team

Mr. Barak EKSHTEIN
Founder & CEO (based in Thailand)

Founder and CEO, ecopreneur, expert advisor to Uplink world economic forum. Over 18 years experience in plastic packaging, Public Relations and international trade.

Ms. Loemchou SAY
Project Manager & Team Member (based in Cambodia)

Project manager of TONTOTON's Sihanoukville center. Loemchou worked with NGOs and Youth programs and has a Bachelor degree of Environmental Science.

Ms. le Sheila
Environmental Compliance & Certification Manager (based in Vietnam)

Environmental compliance and certification manager - Sheila managing the OBP program and logistics operations of TONTOTON.

Plastic Pollution Challenge

Sihanoukville and Cambodia's coastline face a significant plastic pollution challenge, with environmental and social consequences. Traditional waste management systems struggle to cope with the volume and diversity of plastic waste generated; commercially non-recyclable plastic is discharged into the open environment leading to pollution of land and water bodies.

Solution

TONTOTON offers a pioneering and holistic solution to plastic pollution, combining awareness for the reduction and responsible use of plastic, source segregation to prevent plastic leakage, and legacy plastic collection from the coastal environment, Material Recovery Facility transforms hard-to-recycle plastic into valuable building materials, contributing to community development, and innovative funding systems to address every type of plastic and create a sustainable, community-focused impact.

Innovation

TONTOTON innovatively connects companies, tourists, and students to our end-to-end solution for plastic pollution. Through a verified plastic recovery system, everyone contributes to addressing every type of plastic with a focus on commercially non-recyclable plastic, transforming it into hope with new classrooms and school furniture, all united by the goal of a cleaner environment and empowered communities.

Business Model

Our business model incorporates three revenue streams. Recyclable plastic is sold to recyclers, hard-to-recycle plastic is transformed into building materials and impact products like classrooms and school furniture, and a Verified Plastic Recovery (VPR) financial system allow companies and individuals to contribute to a pollution-free environment, TONTOTON's MRF also operates as a learning visitor center for tourist and students. This diversified approach ensures economic sustainability while addressing various types of plastic waste.

Market

Our market encompasses not only local and international businesses but also environmentally-conscious tourists and students. TONTOTON's innovative solutions resonate with individuals and organizations seeking sustainable transparent impact and contribution to a plastic-free environment.

Vision

TONTOTON envisions a future where Sihanoukville is a model for effective plastic waste management, with a thriving community empowered by sustainable practices. We aspire to expand our model to other regions facing similar challenges, creating a network of environmentally and socially responsible initiatives.

Investment

TONTOTON, a self-funded startup, has already invested USD 450,000 of its profits in building advanced Material Recovery Facilities (MRF) and production lines. Now, we are actively seeking strategic partnerships and investments to scale our operations, implement advanced technologies, and amplify our impact.

Contact

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Ms. Loemchou SAY
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Impact Model

TONTOTON's impact extends beyond waste management. We have established a Material Recovery Facility that turns hard-to-recycle plastic into building materials for constructing classrooms and repairing houses. Additionally, our network of over 800 waste pickers and households provides jobs and income for vulnerable families. The introduction of waste segregation at households and businesses further reduces plastic leakage.

The TONTOTON Visitor Center is a key component of our impact model, offering tours and workshops for tourists, students, and the local community. Each visitor contributes to our mission by paying for the tour and workshop, with the funds directly correlating to the kilograms of plastic collected from the environment. This creates a tangible link between the visitor experience and the positive impact on local communities and the environment.

Traction & Key Metrics

- March 2019: Founded with a mission to combat plastic pollution.
- August 2019: Certified as the first carbon-neutral company worldwide by OBP.
- October 2019: Expanded plastic collection efforts to the Vietnam islands.
- February 2021: Launched a plastic-free coastline initiative in Cambodia.
- May 2021: Recognized as a top innovator by the World Economic Forum's Uplink platform.
- December 2021: Achieved the milestone of collecting 600 tons of plastic.
- December 2022: Surpassed expectations by collecting 2100 tons of plastic.
- September 2023: Built the first classroom made of recycled plastic.
- December 2023: Launched the Impact Visitor Center

Bodhi Tree Naturals

Natural. Inclusive. Empowering

Team

Mr. Ian JONES
Business Development & Team Leader (based in Cambodia)

12 years experience in innovation and inclusive business development and leadership.

Ms. Thearoth ITH
Venture Support Coordinator & Team Member (based in Cambodia)

High level of proficiency in effective assisting facilitation ventures.

Mr. Rob Esposito
Production Team & Team Member (based in Cambodia)

15 years as founder of Coco Khmer, an all-natural coconut-based impact venture with a commitment to people and the planets. Coco Khmer began as a triple-bottom-line social enterprise, and the first commercial producer of virgin coconut oil in Cambodia.

Solution

BTN offers environmentally friendly cleaning products that transform the way consumers use cleaning products for significant positive impact on the environment and the health of our oceans. By reimagining the traditional approach to purchasing and disposing of cleaning product containers, we have devised a system that eliminates single-use plastic waste but also promotes a circular economy.

The 'Swap and Go' and refills solution aligns with the principles of the circular economy and the need to rethink business models. Bodhi Tree Naturals promotes a more sustainable approach to consumption to shift away from single-use plastics and reducing waste generation and reliance on non-biodegradable materials.

Plastic Pollution Challenge

Millions of single-use cleaning product containers are flooding the market that are going to end up in landfills and ultimately making their way to the ocean.

Innovation

Our innovation lies in providing price competitive, environmentally friendly cleaning products via a unique swap and go model that reduces single use plastic consumption and tracks real time impact data to customers to use in their own marketing strategies.

Business Model

We sell our cleaning products via Swap and Go stations and direct online sales. Our clients have a range of cleaning products to choose from including floor, window and toilet cleaners. Our most popular product is an All Purpose Cleaner and we are currently testing Dishwashing Liquid.

All products are available in 3 different sizes 1 , 5 and 20 liters with graduated pricing to encourage the consumer to buy in bulk and gain a cheaper per litre price. The price ranges between $3.50 to $20, and our primary places of purchase are 'Swap and Go' stands in aligned businesses who earn commission, and direct sales to corporates. The model is easily scalable due to its simplicity in marketing, production and distribution, and can be easily implemented across industries as they seek to reduce their environmental footprint.

Market

In 2023, the revenue in the Home & Laundry Care market in Cambodia is estimated to reach US$176.80m, and it is projected that the market will experience an annual growth rate of 4.13% (CAGR 2023-2028), with 4.0% of the total revenue will come from online sales.

Cambodia's growing middle class is driving demand for eco-friendly and organic home and laundry care products.

Vision

We aim to set up a national brand of Swap and Go refill stations across Cambodia to create wide scale behavior change, provide savings for our customers and increase plastics reduction.

Through the B2B model we aim to recruit 10-20 corporate customers to to reduce large scale single use plastic packaging and prevent plastic going into landfill and oceans, and promote each as a champion to contribute to behavior change and further convince B2C consumers of the movement towards plastics reduction.

Our inclusive recruiting includes supporting women entrepreneurs living with disabilities. This initiative serves as an additional source of income, enabling them to enhance their overall earnings and provide greater financial support for their families.

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Impact Model

The relevance of this solution lies in its ability to address the pressing issue of plastic waste while offering a viable, convenient and competitive alternative. By providing sustainable options and utilizing technology for measurement and reporting, Bodhi Tree Naturals empowers businesses and individuals to make informed decisions that contribute to a greener environment. The potential impacts of this solution by scaling to Sihanoukville, in the EPPIC project site include reduced plastic consumption, minimized waste generation, and increased awareness and adoption of sustainable practices among businesses and individuals in Cambodia.

Traction & Key Metrics

In 2022, together with the US-based RARE Centre for Behaviour Change, and supported by ICM Falk Foundation, Bodhi Tree Naturals interviewed 15 small and medium enterprises across Cambodia to assess attitudes to the reduction of plastics use in business, and the desirability of reporting their impact to their customers. We currrently have 5 Swap and Go stations.

The report also helped us develop our cutting-edge technology - an ecommerce platform and impact tracking dashboard that enables us to measure our customers' impact. In addition to tracking unit sales, our efforts have resulted in the reduction of 1200 plastic bottles, 500 kilograms of plastic waste, the avoidance of 3 tons of CO2 emissions, and conservation of 30 liters of water typically used in bottle manufacturing processes.

Investment

Our primary objective is to secure $30,000 for the next stage of our growth.

This will allow us to designate:

i) $10,000 in funding specifically designated for staff recruitment purposes (marketing and operations) and marketing to update our website to integrate with the ordering system.
ii) establish 20 swap and go stations strategically positioned throughout Cambodia within the upcoming year with a primary focus on Sihanoukville.

Each station will require an estimated budget of around $500, encompassing the costs of all necessary materials and equipment, plus additional transport and marketing costs. This investment not only facilitates the setup of these stations but also enables us to procure new equipment essential for enhancing our bulk production capabilities. By allocating funds in this manner, we aim to expand our operational reach while simultaneously improving our manufacturing efficiency and capacity.

We do not require additional capital to launch the Impact Tracker.

SkySweeper

Innovation. Conservation. Transformation

Team

Ms. SOK PANHA CHEUNG
Founder & Project Manager
(based in Cambodia)

Mr. CHANNEATH ROS
DevOps & Technician
(based in Cambodia)

Ms. HELLAN VIN
Business Development & HR
(based in Cambodia)

Mr. TEMPANHA TIM
Co-founder & Data Analytics
(based in Cambodia)

Ms. REAKSMEY PIN
Marketing & Finance
(based in Cambodia)

Mr. VATHANAK BOTRA DOS
Web Dev
(based in Cambodia)

Plastic Pollution Challenge

Currently, approximately 10 million metric tons of plastic waste enter the ocean each year. If no measures are taken to address this issue on land, especially in coastal areas, then these quantities will result in the accumulation of trash. Consequently, not only will the amount of plastic pollution on land triple, but it will also significantly contribute to the existing volume of plastic in the ocean.

Solution

By using our services, we are able to provide our clients and the community with:

- Daily clean up operations
- Ensure a clean beach (no waste within underneath the sand)
- Incorporation of technology for environmental conservation
- Reduce the negative impacts of plastic pollution on marine ecosystem
- Raising public awareness on environmental issues

Innovation

Through the implementation of technology, we provide an innovative, efficient way to clean up the beach such as:

- A manual Sand sweeping tool for collecting ocean bound plastic beneath the surface of the sand
- A drone equipped with a quality camera to scan and map for trash hotspots
- A sand filtered bot/car for collection of plastic waste

Business Model

Skysweeper's main focus is to offer beach clean-up services in coastal areas which can be bought as a monthly subscription or as a one time service.

Skysweeper's target customers include:

- Private Beach Owners
- Hotel/Resort Owners
- Government (Ministry of Environment, MOEYS, Tourism, Post-Telecommunication)

Market

Across the four phases of the project, we will target different segments of the market.

- Phase 1 focuses on manual beach cleanup, appealing to coastal communities, environmental organisations, and local authorities.
- Phase 2, introduces a drone for trash detection and data collection, targeting environmental agencies and research institutions.
- Phase 3's sand-filtering bot appeals to beach cleaning service providers and hospitality/tourism industries.
- Phase 4, synchronising the drone and Bot, attracting various stakeholders, including government agencies, environmental NGOs, research institutions and coastal management authorities seeking advanced beach cleanup solutions.

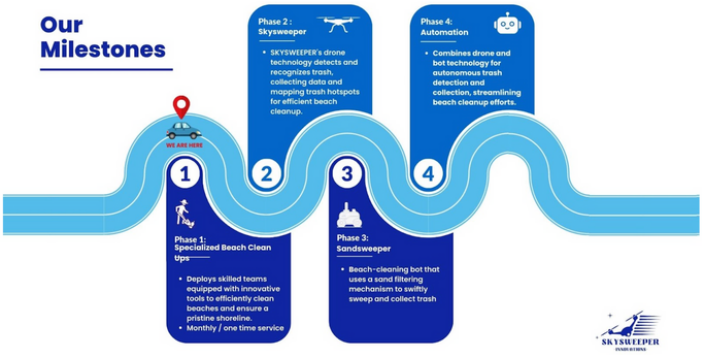
Vision

Our vision is to be a technology company that revolutionises beach cleanups and improves coastal communities' lives through the development and deployment of efficient, autonomous equipment capable of collecting and filtering plastic of all sizes.

Traction & Key Metrics

We will be operating in 4 different phases :

- Phase 1 : The deployment of crew teams together with our innovative tools to clean the beach.
- Phase 2: The introduction of Skysweeper's drone that can detect trash, map hotspots and collect data.
- Phase 3 : The introduction of our Bot with a sand-filtering bot, enhancing the cleaning process.
- Phase 4: The synchronization of our drone and bot that can work autonomously - mapping out spots and effectively collecting trash.



Our project will be supported by American University of Phnom Penh's School of Digital Technologies (SDT) led by Dr. Tekming Ng and robotics professor Mr. Morokot Sakal. The SDT team will provide us with valuable assistance for our project, while Mr. Morokot Sakal will offer his expertise and guidance in the field of robotics. We believe that together, these collaborations will greatly contribute to the success and advancement of our project.

Contact

Ms. Sok Panha Cheung

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Impact Model

SDG 14 - Life Below Water : Driven by the need to address the often-overlooked yet alarming threat posed by OBP (Ocean Bound Plastic) fragments to marine life due to its size, we are committed to implementing innovative technologies to enhance the productivity and efficiency of Cambodian's beach cleanup operations. We aim to remove plastic and foster a healthier ecosystem for our marine habitats.

SDG 12 - Responsible Consumption and Production: By upscaling the beach cleaning process, we are also raising the community's awareness towards plastic waste management practices. This contributes to a more sustainable and cleaner coastal environment with the contributions of the community itself as well.

SDG 9 - Industry Innovation and infrastructure: SKYSWEEPER employs innovative technologies to improve beach clean ups processes.

Investment

Phase 1: Deployment of Cleanup Services (12 - 18 months)

- Equipments
- Operations
- Marketing

Phase 2: Research and Development of Drone (12 - 18 months)

- Research & Development
- Data Collection, Mapping Algorithm & Technology
- Maintenance & Utilities/Testing & Prototype

Phase 3: Research and Development of Bot (12 - 18 months)

- Research & Development
- Bot Sand Filtering Mechanism & Technology
- Maintenance & Utilities/Testing & Prototype

Phase 4: Synchronisation of Drone & Bot

- Linkage of Drone & Bot Development
- Research & Development
- Maintenance & Utilities/Testing & Prototype

Trash to Cash

A Smart and Fun Way to Separate your Waste and Earn Rewards

Team

Mr. Kosal Cholsa
Founder & CEO (based in Cambodia)

Research and Development. Robotic and Automation Engineers. SMEs management.

Ms. Pisey Boronn Chesda
Co-Founder, Finance & Operations (based in Cambodia)

Research and Development. Data science and AI engineering.

Ms. Rith Sovandalin
STO (based in Cambodia)

Development. Data Science and AI Engineering.

Ms. Do Chan Raksmey
Developer (based in Cambodia)

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CTO *(based in Cambodia)*

Development. Data Science and AI Engineering.

Plastic Pollution Challenge

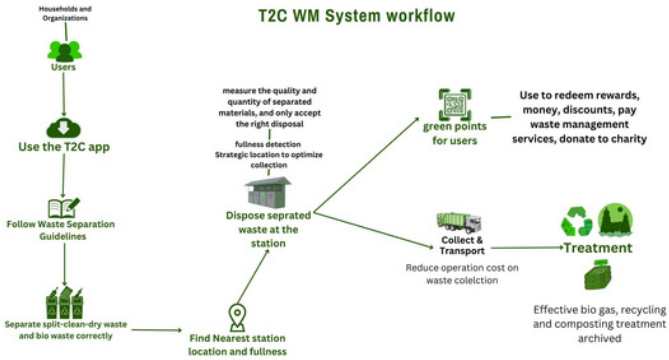
According to the ministry of environment in Cambodia, only 65% of all 4 million tons of solid waste is collected per year. The remaining 35% are not properly collected or transported to landfills or dumpsites. It is reasonable that around 1.4 million tons of solid waste is in the environment. This is massive pollution to the environment that impacts human health and the ecosystem. Furthermore, the current waste management system in Cambodia is not sufficient enough to capture all the value from waste. The research on the value of the organic is said to be 25 million dollars a year that Cambodia is losing.

(cont.) For other recyclable materials, the number can't be estimated. The reason is simple. The disposal behavior of solid waste by citizens across Cambodia is the root cause of the issues. There is a very high percentage of citizens that do not dispose of their solid waste properly.

Only a very few percent of citizens know how to do the correct disposal, which is to separate different types of waste, clean, dry and unbundle their waste and then put it in the correct trash bin at the correct location. However, there is still the lack of motivation, trust and conveniences to do the correct disposal of solid waste. In short, there is an unhealthy culture of waste disposal in Cambodia.

Solution

The solution for this challenge is to create a new culture of solid waste disposal through the use of technology. T2C is a start-up with the goal of changing solid waste disposal behavior in Cambodia. We provide education, awareness and motivation services for waste disposal; Infrastructure and logistic services for waste disposal, and incentives and rewards services for waste disposal. By giving users the gamified app and disposal stations for them to dispose of their waste and then get various rewards including money. We also provide systematic services on solid waste disposal to all organizations. The outcome that we want is that all citizens separate their waste into two types, split-clean-dry waste and bio waste and then dispose of it at the correct location.



Innovation

Our innovation is the use of technology in shaping the culture of solid waste disposal.

Trash to Cash waste management systems utilize the power of a mobile app, smart bin technologies and conventional trash bin technology. Our T2C app and disposal stations give users the conveniences and motivation in doing waste separation at source.

(cont.) There is a small difference between households and organizations' waste separation guidelines. The organization has the option to install or not install our disposal station at their organization. Their admin department is a T2C user, so the account they have with us represents their organization, which means they can measure their impact through using our system.

Business Model

T2C's business model is simple: we sell recyclable materials that the users dispose of at our stations. However, our model goes beyond buy and sell, it is a partnership model in which we will partner with all stakeholders that play a role in the solid waste value chain. We will partner up with the government because they are facing the issues with implementing waste separation law; We will partner up with waste collection service providers and waste recyclers who are facing the issues with their operation.

Market

The T2C market is in the recyclable materials market. This is a huge market, because in Cambodia the market size for recyclables that exclude biowaste is around 100 million dollars per year. We aim to capture at least 10% for our final objective.

Vision

T2C vision is to solve waste separation at source issues in Cambodia by changing the waste disposal behavior through the use of smart technology.

Impact Model

T2C impact model is the change of the solid waste disposal behavior and the implementation of a better waste management system.

SDG 1: No Poverty. T2C contributes to target 1.4, which is to ensure that all people have access to basic services and social protection.
SDG 3: Good Health and Well-being. T2C contributes to target 3.9, which is to reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

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SDG 6: Clean Water and Sanitation.T2C contributes to target 6.3, which is to improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials.
SDG 9: Industry, Innovation and Infrastructure. T2C contributes to target 9.4, which is to upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes.
SDG 10: Reduced Inequalities. T2C contributes to target 10.2, which is to empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.
SDG 11: Sustainable Cities and Communities. T2C contributes to target 11.6, which is to reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.
SDG 12: Responsible Consumption and Production. T2C contributes to target 12.5, which is to substantially reduce waste generation through prevention, reduction, recycling and reuse.
SDG 13: Climate Action. T2C contributes to target 13.2, which is to integrate climate change measures into national policies, strategies and planning.

Traction & Key Metrics

We received support from Khmer Enterprise and CamTech University for our idea in the Innovative Tech Challenge competition. The prize we received was 4th place with a fund of 1000$. This is proof that our ideas have potential. But most importantly we have the potential in partnering up all waste value chain stakeholders from government to businesses.

Investment

We are in the fortunate position that our idea is a part of the CamTech University Project based learning program. Most of our team are CamTech University students, which means we will receive all the support we need to execute this solution. There are opportunities to meet investors and sponsors, however, we don't rely on money. We believe that this is not a problem with money, it is the problem with motivation, infrastructure, conveniences

We started to research this problem and solution in April 2023, and received 1000$ fund from Khmer Enterprise as a proof of potential. But we have to admit to the fact that this challenge is not easy to solve, and we would like to receive all the support that we can.

Rukkhak-Packages

Compostable. Convenience. Planet

Team

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Co-founder (based in Cambodia)

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Researcher in Material Science and Structure Unit, ITC, Cambodia

Ms. NAT Yukleav
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MSc. in Chemical Engineering, SIIT, Thailand.
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Ms. THENG Sokuntheary
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MSc. in Microbiology, Montana State Uni., USA.
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Ms. DOEURN Seyha
Co-founder (based in Cambodia)

MSc. in Environmental Management, Kyoto Uni., Japan.
Researcher in Water and Environment Unit, ITC, Cambodia.

Plastic Pollution Challenge

Ninety-three percent of plastics are derived from fossil fuel feedstock, a non-renewable resource that is projected to be depleted within the next 50 to 100 years (1,2,3 The production and lifecycle of plastic contribute to the greenhouse gas emission of 1.8 gigatons of CO2 equivalent. This poses a significant threat to the global community's ability to limit global temperature rise to below 1.5°C. Additionally, the decomposition process of single-use plastics can take hundreds to thousands of years, resulting in the accumulation of vast quantities of plastic waste and microplastic pollution.

Solution

Rukkhak-Packages, with the name in itself as "Rukkhak" meaning "Plants", seeks to replace the conventional single-use plastic packaging with the alternative plastics made from renewable resources such as plants, thus reducing the amount of greenhouse gas emitted, and the plastics with the production and overall life cycle stages releases less greenhouse gas emissions, and able to biodegrade and compost in a shorter time frame.

Innovation

Rukkhak-Packages is replacing single-use plastic food packaging with environmentally friendly biodegradable packaging made of PLA and starch. We provide biodegradable and compostable food packaging, particularly bags, straws, and coffee cups to food-service operators, as a main part of reducing plastic pollution, locally and globally. We distribute high-quality and reliable bioplastic products to our business partners and customers in Sihanoukville.

We aim to be the first biodegradable and compostable plastic manufacturer in Cambodia by formulating Polylactic Acid (PLA, a plant-based component) with starch-based agricultural products, especially cassava. With injection molding and extrusion technology, the raw material's properties synthesize the hydrophobic characteristics of our biodegradable food packaging, inhibiting the growth of microorganisms which is good for preserving the food longer. Our products are 100% compostable and act like traditional plastics. Our biodegradable plastics have some advantages over petroleum-based plastics in terms of low carbon footprint, energy efficiency, biodegradability, and versatility.

Business Model

The campaign "Today I will not use plastic" and the ongoing efforts to charge for plastic bags in supermarkets in Cambodia have been instrumental in raising awareness and motivating many individuals and businesses to shift away from conventional single-use plastics. To support these ongoing initiatives, our business focuses on distributing biodegradable and compostable plastic packaging products, including straws, cups, and carry bags. We specifically target food service businesses in Sihanoukville and other parts of Cambodia. Our model operates on a business-to-business (B2B) basis, where we sell our biodegradable and compostable plastic packaging products to establishments such as coffee shops, tea shops, restaurants, pubs, hotels, guesthouses, and casinos. Since our initial product focus is on biodegradable and compostable plastic straws, cups, and bags, we are currently targeting coffee and tea shops as our primary customers. Our revenue is generated through the sale of our biodegradable packaging. We offer flexible pricing plans based on varying product quantities to ensure a diverse customer base. We also offer contract-based services that include options for printing and labeling customization, ensuring that we meet the unique needs of each customer.

Market

The global biodegradable market is experiencing growth due to increasing environmental consciousness among customers. As a B2B business targeting food service establishments, specifically coffee shops, our focus is on engaging with businesses that prioritize environmental sustainability and demonstrate a commitment to reducing plastic pollution. Therefore, our primary target market consists of those types of coffee shops located in Sihanoukville and Phnom Penh which represent approximately 30% of the total coffee shop market with the criteria we targeted.

Vision

Leveraging our research capabilities in laboratory practices and driven by a deep passion for addressing environmental challenges, especially the issue of plastic pollution in Cambodia, we have a vision for Rukkhak-Packages to emerge as the foremost producer and distributor of biodegradable and compostable bio-based plastic packaging in the country. We aim to offer a diverse range of biodegradable and compostable plastic products to cater to various needs.

In line with our vision, we are committed to supporting local manufacturing by establishing factories within Cambodia. This approach allows us to source raw materials from local farmers, fostering economic growth and contributing to the development of the country. Additionally, by recruiting local workers, we aim to empower individuals and communities, helping them uplift themselves from poverty and create a sustainable livelihood.

Impact Model

SDG 14 - Life Below Water: Reduce marine pollution by distributing and producing our biodegradable and compostable plastics as a replacement for petroleum-based plastics that contribute to the problem of floating plastic in the ocean and the subsequent microplastic pollution.

SDG 13 - Climate Action: Promote the use of biodegradable and compostable plastic packaging as a strategy to enhance resilience in the face of climate-related hazards and natural disasters. Unlike petroleum-based plastics, the production of biodegradable and compostable plastics relies solely on renewable sources and emits fewer greenhouse gases.

SDG 4 - Quality Education & SDG 5 - Gender Equality: As researchers-lecturers, we are committed to supporting learning opportunities by inviting engineering students, both males and females, to join our teams during technical experiments and laboratory works, providing them with invaluable incubation experiences. The representation within our team, comprising four highly capable female researchers, aims to empower the next generation of female scientists to address social and environmental challenges, just like us.

SDG 8 - Decent Work and Economic Growth & SDG10 - Reduce Inequality: With the ambition to establish a factory for the production of biodegradable and compostable plastics in Cambodia, we aim to contribute to the development of domestic manufacturing. This endeavor will create job opportunities for a range of individuals, from unskilled workers to skilled staff members, thereby providing them with increased income and positively impacting the country's economy.

SDG17 - Partnerships for the Goals: Our team actively shares and collaborates with national institutes, such as the Ministry of Education (MoE), and participates in international programs, including short training sessions overseas. These endeavors are aimed at fostering knowledge sharing, cooperation, and access to science, technology, and innovation.

Traction & Key Metrics

We have been simultaneously focused on two main activities related to our traction and key metrics:

1. Production process: Currently, we are in the research and development (R&D) stage of our product prototype. We have successfully obtained suitable properties for our semi-product, which is a biodegradable and compostable plastic film. Our R&D efforts include planning for various types of final product manufacturing. Recently, our team participated in a training program in Thailand that specifically focused on cassava starch production and its application. This training has provided valuable insights and knowledge to further enhance our product development efforts. Furthermore, we are pleased to announce that we have been granted the Takahashi 2023 fund, which will enable us to advance our product development even further.

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2. Market: In addition to our production process, we have actively conducted several interviews and engaged with targeted coffee shops that share our concerns about plastic pollution and are interested in adopting environmentally friendly packaging solutions. We have also explored the possibility of sourcing the target biodegradable and compostable plastic packaging and distributing them to our target customers for market testing purposes. This approach allows us to gather valuable feedback and insights from our customers, ensuring that our products meet their needs and preferences.

Investment

As a start-up, we are actively seeking funds to support various stages of our business:

1. Prototype Development and Initial Implementation: We require funding to support the development of our product prototype and the initial implementation of our business operations.
2. Manufacturing Scale-Up: To transition into the manufacturing stage, we estimate a funding requirement of approximately USD 200K. This amount is allocated as follows: 90% for capital expenses, 6% for fixed costs, and 4% for costs of goods.

We are looking forward to the investment opportunities and engaging in fundraising efforts.

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