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World Wide Fund For Nature International: WWF
Phisit Building, 9 Soi Pradiphat 10 (Prachanimitr),
Pradiphat Road,
Phyathai, Phyathai
Bangkok 10400,
Thailand
Tel: +662 618 4303-05
Fax: +662 618 4306
www.wwf.or.th

**TERMS OF REFERENCE
DEVELOPING ALTERNATIVE PACKAGING TO REPLACE SINGLE-USE PLASTIC
FOR PSC-TVA PROJECT**

Title : Expert/Researcher
Goal : Conduct technical research on the development of alternative packaging to replace single-use plastic in F&B, hotels, and other businesses in Plastic Smart Cities
Contracting Agency : WWF Thailand
Department : Plastic team, Conservation Unit
Work Location : Songkla and Hat Yai cities OR Surat Thani and Koh Samui cities, Thailand
Type of Contract : Consultancy Agreement
Contract Duration : 9 Months

A. BACKGROUND

Thailand is one of the world's largest contributors to plastic pollution, producing approximately 1.03 million tons each year. Combined with four other Asian countries (China, Indonesia, Vietnam, and the Philippines), it is responsible for more than half of the eight million metric tons of plastic waste dumped into the world's oceans annually (Ref: Action Plan on plastic waste management Phase 1 2020-2022 by Pollution Control Department, Thailand). The main source of plastic pollution in Thailand is single-use plastic bags. It is estimated that 500 million plastic bags are used per year, averaging 8 plastic bags per person per day (survey 2017 by the Pollution Control Department). In 2018, The Department of Marine and Coastal Resources estimated that approximately 50,000 – 60,000 tons (or 750 million plastic items) end up in the seas annually.

The government of Thailand has taken a proactive approach to reducing plastic pollution by initiating the Roadmap on Plastic Waste Management for 2018 – 2030. Despite the importance of this road map as a guideline for implementing plastic pollution reduction, implementation remains uncertain. Key challenges identified in the roadmap's document include the lack of legal instruments and mandates for plastic labelling systems, restrictions on single-use plastic packaging and products, and regulations that encourage waste separation and recycling practices.

The impact of plastic pollution in Thailand is significant, especially to marine biodiversity and now threatens the nation's main economic driver- the tourism industry. Data from the Department of Marine and Coastal Resources shows that more than 300 endangered marine animals die from consuming plastic waste and from being caught by fishing gear per year. Furthermore, around

60% of marine species (including dolphins and whales) die from ingesting plastic, and 70% of sea turtles, manta ray and whale shark die entangled in disposed fragmented fishing gear.

In response to this emerging threat, WWF Thailand, together with other WWF offices in the region (Indonesia, Vietnam and the Philippines) will focus on plastic pollution reduction through strengthening **the Plastic Smart Cities pillar**, one of the three main pillars of **WWF's Global Strategy: No Plastic in Nature** which aims to address the city level waste management and to establish best practices to reduce, reuse and recycle plastic pollution. The program will also contribute to **Sustainable Development Goal, SDG 12**, Target 12.5, to substantially reduce waste generation through prevention, reduction, recycling and reuse in 2030; and **SDG 14**, Target 14.1, to prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

Contribution to WWF Global Conservation Program

This project will contribute significantly to the **Ocean Practice Goals** to ensure productive and resilient ocean ecosystems, sustain human wellbeing and conserve biodiversity by 2030 and the **No Plastic in Nature Initiative Goals** to reduce plastic leakage from the cities by 30% from 2020 baseline by 2022 and to achieve 0% leakage by 2025. The project will also contribute to **Sustainable Development Goal, SDG 12**, Target 12.5, to substantially reduce waste generation through prevention, reduction, recycling and reuse in 2030; and **SDG 14**, Target 14.1, to prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

The Plastic Smart Cities Project in Thailand financially supported by WWF Norway is at present has **the overall objective** to reduce 30% of plastic pollution in 4 major cities: Surat Thani, Koh Samui, Songkhla and Hat Yai, in Thailand. The action will focus on reducing plastic pollution through establishing clear policy, strengthening community awareness to reduce plastic consumption, installing effective waste collection in the community, and establishing plastic recycle entrepreneurship. The plan is initiated to create a collaboration and partnership between communities and the local administrative agencies, business sector, and local NGOs in the pilot areas.

The specific objective of the action is to improve the supply of plastic waste into recovery streams by changing consumer behavior, promoting circular economy, improving waste collection, access and strengthening community based solid waste management.

Value Chain Approach

Thailand is the sixth largest contributor of plastic waste in the ocean. An estimated 87% of recyclable plastic in Thailand is improperly recycled or disposed of, leading to an estimated 322,000 tons of plastic in the ocean, materials that could be worth approximately US\$ 4 billion of potential yet untapped value. To better value these materials, the Thai government is beginning to invest in processes that recycle waste plastic into new products as part of its National Roadmap Plastic Waste Management (2018-2030). Presently, Thailand is entering the National Roadmap on Plastic Waste Management Action Plan Phase II 2022-2027 which puts a

strong focus on an upstream circular economy to promote prevention and preparation for reuse measures, whilst the downstream approach (recycling, recovery and disposal measures) still remains and pushes for a better post consumption plastic management.

A simple solution to ensure the benefits of adopting a circular economy that flows more evenly to communities is to bridge the existing gaps in the waste management life cycle: connecting Informal Waste Workers (IWW) or waste pickers with 1) communities who need more family income through selling collected high/low value plastic household wastes to the IWW; and with 2) manufacturers who need plastic materials to create their products. Across Asia, these IWWs contribute to over 95% of plastics that are recovered for recycling.

In the circular economy waste hierarchy, preventing waste is the most preferred measure because it is the most resource-efficient and environment friendly strategy whilst sending waste to landfill for disposal should be the last resort. However, at present, Thailand's waste management hierarchy is upside down to the circular economy waste hierarchy.

The Project will then address the prevention scheme in the above-mentioned four pilot cities with high population density. The project actions will initiate changes of behavior leading to the prevention of plastic leakage by following the circular economy waste hierarchy as recommended for Thailand. Such a waste hierarchy puts prevention and reuse first by starting from the segregation at source and then differentiates between different forms of recycling. In addition, there is widespread recognition that urgent action in the prevention scheme is to minimize the use of conventional plastics for applications in which they are not essential. The potential of replacing conventional plastics with alternative materials in certain applications is then considered as part of a wider strategy of reducing marine plastic litter and microplastics. It is a necessity to be informed about what alternatives to plastic exist because it is clear that the traditional linear production, use and disposal model for conventional plastics is not sustainable and results in unacceptable harm.

B. OBJECTIVE

An external expert will undertake technical research focusing on the development of alternative packaging to replace conventional plastics intended for short-term use such as food and drink containers in Songkla and Hat Yai cities OR Surat Thani and Koh Samui cities. The expert team will also work with local government agencies or other stakeholders to produce, procure, and establish a market for these alternative packaging.

The overall objectives of the assessment study include:

- a) To research and develop alternative packaging from plants or other bio-based material by considering 1) availability of local raw materials, 2) functionality of the product, 3) economically viability of production i.e. price analysis, 4) Basic LCA and 5) product hygiene/ storage life

- b) To identify a ready-to-scale solution for alternative packaging production using the existing local materials, equipment, resources, and capacity.
- c) To procure or produce alternative packaging and collaborate with local government and non-government agencies to establish local markets (local F&B, hotel, and other businesses) to uptake 10 tons of alternative packaging
- d) To develop a sustainable business model that is replicable, scalable, and sustainable by local governments/ community group other stakeholders
- e) To develop a transition plan to local government or community group to ensure sustainability of the model

C. SCOPE OF WORK

The Expert will be responsible for:

C1. Conducting technical research reflecting the above-mentioned objectives;

C2. Develop a business model that is replicable, scalable, and sustainable

- Identify source of raw materials, along with the costs and logistic
- Conduct capacity assessment and identify resources needed to produce alternative packaging
- Identify potential market in collaboration with local government and non-government agencies
- Identify Willingness to Pay of the product to develop pricing strategies
- Develop a technological transfer plan to local government or community group

C3. Procure, produce, and bring product into the market. Ensure that local businesses uptake 10 tons of alternative packaging

C4. Foreseeing and preventing unintended consequences, for example

- Food safety i.e. using staple food crops such as cassava for non-food uses, the possibility of the product getting moldy
- Develop a clear storage instruction of the product (i.e. humidity, storage time)

C5. Identifying and testing functionality criteria of proposed option (s)/ model with case study in collaboration with governments and businesses.

D. TENDER PROCESS TIMELINE

- Wednesday, 27th March 2024: Application close date
- Friday, 29th March 2024: Announcement of selected proposal
- Monday, 1st April 2024: Contract signing

E. DURATION OF THE CONTRACT

1st April 2024 – 31st December 2024

F. DELIVERABLES

No.	Activity	Expected outputs	Deadline
1.	Establish a workplan with budget to roll out the program		
	- Detailed workplan should include goal, objectives, activities, timeline, KPIs, verification, and budget allocation for each activity	- Detailed workplan with Gantt Chart and budget	15 th April 2024
2.	Conduct the technical research on alternative packaging		
	- Research outline reflecting the scope, analytical inputs, outcomes;	- 1 Abstract	15 th May 2024
3.	Develop business model		
	- A business model that is replicable, scalable, and sustainable - A technological transfer plan to local government or community group	- 1 Business model/ plan - 10 tons of alternative packaging uptakes - 20 businesses adopt alternative packaging	15 th August 2024
4.	Develop a final report		
	- Comprehensive inputs reflecting achievement of the mission - Transition plan to local agencies	- 1 Technical research paper	2 nd December 2024

Remarks: Language of reports/plans/abstract/study is English.

G. REQUIRED TECHNICAL SKILLS AND EXPERIENCE

The research team should comprise professional experts with the following qualifications:

Professional Experience:

- Minimum of 5 years in the technical innovation research, applied science & technology projects;
- Master's degree and/or PhD in the fields of material science, engineering agronomy, chemical engineer, industrial packaging design and related fields.
- Experience in testing and validating innovation ideas and solutions.
- Experience in business model development

Desired skills:

- Excellent communication skills
- Integrity and timeliness
- Fluent English skill

H. SELECTION CRITERIA

The following criteria are generally applicable for evaluation of the potential consultant:

No.	Particular	Marks
1	Academic and professional capacity to carry out the assignment	25
2	Relevant skills, knowledge, work experience	25
3	Proven track record of services provided and achievement	25

4	Financial proposal	25
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I. REQUIRED DOCUMENTS

All bidding experts are required to submit the following documents:

- A detailed and updated CV of consultants, experts, researchers
- A financial proposal for the required timeframe as provided by this TOR
- A summary of relevant services provided, and milestones achieved during the past 3 years including daily/hourly rate of each of the assignments using the table format below:

Consulting/Employment or Assignment Undertaken	Organization/Client name/location and contact person	Duration of assignment	Daily/hourly rate charged by consultant	Accomplishment /Deliverables
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- It is mandatory to submit documentary evidence demonstrating their legal, taxation and financial status. This includes:
 - Tax identification number (TIN);
 - Proof of a segregated account (providing the name and address of such account);
 - A signed statement testifying that all information contained within the proposal is correct and true.

Interested consultant should submit the above-mentioned documents **by Wednesday, 27th March, 2024** to Boonchanitw@wwf.or.th and jutamartn@wwf.or.th. The subject line of the email must be marked with the title: **“DEVELOPING ALTERNATIVE PACKAGING TO REPLACE SINGLE-USE PLASTIC FOR PSC-TVA PROJECT”**.