Coastal Flooding Adaptation & Resilience (COFAR) Challenge

Challenge Brief

Organised by:

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Version Control

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1.0	11/08/25	N/A

Table of Contents

Preface

The inaugural Coastal Flooding Adaptation & Resilience (COFAR) Challenge, organised by the Securities Commission Malaysia (SC) and ICAEW Malaysia, in partnership with SD Guthrie Berhad (Guthrie) and SEADPRI-UKM, brings Malaysia's young minds together to tackle one of the country's most significant climate risks – coastal flooding.

As a tropical nation with over 4,675 km of coastline,[1] Malaysia faces mounting threats from coastal exposure, extreme weather, and sea-level rise. These risks challenge Malaysia's economy, ecological integrity and the socio-economic stability of coastal communities, particularly in vulnerable areas such as the western coast of Selangor. While infrastructure exists for adaptation, much of it is costly and offers limited financial returns, posing a challenge to development and implementation.

The COFAR Challenge invites students to design a scalable flood adaptation solution for the challenge site – Carey Island – on the western coast of Selangor. This challenge is grounded in interdisciplinary collaboration, requiring teams to integrate technical solutions and financial strategies to develop a scalable idea. We encourage teams to explore a range of financing pathways for marginally bankable projects leveraging private sector instruments such as (but are not limited to) green bonds and other capital market instruments to build long-term resilience.

[1] Abdullah, S. (1993). *Coastal developments in Malaysia: Scope, issues and challenges*. Department of Irrigation and Drainage, Malaysia.

1.0 Introduction & Background

1.1 Malaysia's Coastal Vulnerability

As a tropical climate nation, Malaysia is susceptible to the impacts of climate change especially through sea-level rise, extreme weather, and coastal exposure. These slow onset hazards have increased the frequency and intensity of fast-onset natural hazards, with flooding accounting for 85% of all disasters in Malaysia since 2000 (International Disaster Database). The December 2021 floods alone caused RM6.1 billion in damages, displaced 400,000 people,[2] and triggered the largest insurance payout in Malaysian history, yet only a fraction of the total losses was covered by insurance.[3]

Malaysia has more than 4,675 km of coastline. As such, among the various climate threats, coastal zones are particularly at risk. Communities along the west coast of Peninsular Malaysia, including in Selangor, Penang, and Kedah, are already experiencing the effects of these hazards through higher erosion and saltwater intrusion into rivers and aquifers. Low-lying areas face an existential threat from rising seas, especially when combined with high tides and storm events that result in tidal floods and infrastructure damage. These hazards are occurring now and are expected to worsen in the coming decades.

Policy and financial efforts to address climate change have primarily focused on mitigation, which aims to reduce greenhouse gas emissions. However, adaptation is becoming increasingly urgent due to the frequency and severity of climate risks. Investing in adaptation can help safeguard lives, ecosystems, and economic assets. In the case of adaptation for coastal flooding, this can involve implementing both hard infrastructure (e.g. seawalls, dikes, retention ponds) and nature-based solutions (e.g. mangrove restoration, wetland buffers, sustainable land use) to reduce exposure and build resilience across landscapes.

However, adaptation remains significantly underfinanced, in part because a major share of international climate funds is still directed toward mitigation.[4] This imbalance

[2] Rahman, S. (2022). *Malaysia's Floods of December 2021: Can Future Disasters be Avoided?* ISEAS Yusof-Ishak Institute. No. 26 ISSN 2335-6677.
[3] Zhe, K.S. (2024). *Climate risks, particularly floods, under focus*. The Edge Malaysia.
[4] United Nations Environment Programme (UNEP) (2024). *Adaptation Gap Report 2024*.

needs to be revisited, as pursuing adaptation-driven measures can facilitate the integration of both mitigation and adaptation strategies to build long term resilience.

Many adaptation projects do not offer immediate financial returns and are viewed as marginal and/or non-bankable, despite their high public value. Traditional financing sources such as federal or state budgets and development aid typically have limited fiscal capacity, and are often constrained by short-term planning cycles, competing priorities, as well as fragmented funding streams. Hence, mobilising capital markets as a complementary source of financing is essential to attract longer-term, blended capital that can de-risk and scale adaptation solutions.

1.2 Focus on Carey Island, Selangor

1.2.1. Background

The challenge site for the COFAR Challenge is **Carey Island, Selangor**. Initially a mangrove swamp, Carey Island was developed for rubber and coffee plantations about 100 years ago. Today, the island is primarily cultivated with oil palm.

Carey Island's geography poses significant exposure to climate threats through its low elevation, with some parts of the island six to eight feet below sea level. Its low-lying coastal areas face increasing pressure from saltwater intrusion and storm surges.

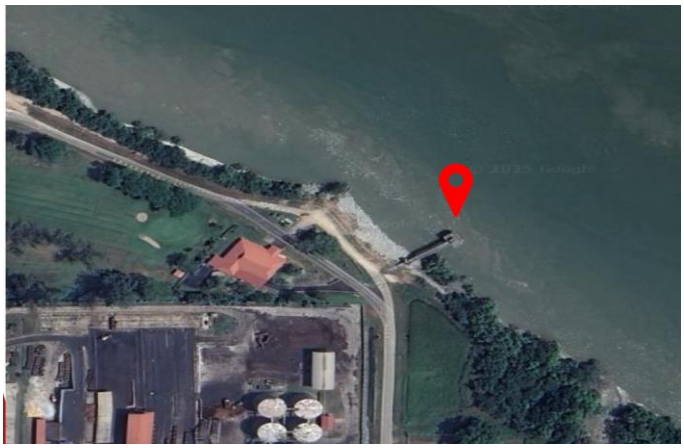
Photo by SD Guthrie (The Edge, 2024)

1.2.2. Existing solutions: Protection from earth bunds

Carey Island is surrounded by 120 km of earth bunds to keep out surrounding water. 82.2 km of these are in the West and East Estates, the most vulnerable areas. During high tide, parts of the island lie six to eight feet below sea level, making these bunds essential for flood protection.

Your objective is to strengthen flood mitigation through resilient, climate-smart strategies for long-term protection of Carey Island.

1.2.3. Site: West Estate Jetty



Challenge Site: West Estate Jetty (2°54'26"N 101°21'40"E Google Earth)

West Estate Jetty has a high exposure to tidal forces, evidence of bund structural vulnerability, and serves as critical infrastructure for operations and emergency access. **Participating teams are required to design a flood mitigation solution for the site.** The table below summarises the problem statement, climate risks and vulnerabilities, climate-related financial impacts, and gaps in existing solutions.

Problem Statement	The Jetty is vital for logistics and emergency response. Its safety and function are at risk due to: • **Strong wave and current actions** causing faster wear and storm damage. • **Disrupted sediment flow**, leading to unstable foundations and navigation issues. Sea level rise threatens to intensify the impacts of the above risks. This highlights the need for targeted improvements to strengthen resilience against climate impacts.

Climate Risk and Vulnerabilities	• **Wave Action & Tidal Surges**
	  ○ Direct exposure risks damage and disruptions;
	  ○ Strong currents (>1.0 m/s) affect navigation and structures.
	• **Sediment Disruption:** Impacts foundation stability and causes navigation hazards.
	• **Low Adaptive Capacity:** No elevated designs or warning systems reduce resilience to extreme weather.

Climate-related financial impacts	• **High Repair Costs:** From wave and tidal damage to structures. • **Logistics & Emergency Disruptions:** Risking delays, safety, and economic losses. • **Rising Operational Costs:** Due to frequent sediment management and dredging. • **Development Delays:** Compromised infrastructure may slow future projects and increase costs.
Gaps in current solutions	• Nature-based solutions are underused due to limited local data and feasibility studies. • Adaptation efforts are reactive, not designed for future climate scenarios. • Poor coordination across sectors like logistics, coastal planning, and emergency response. • Financial planning is lacking, limiting long-term sustainability. • Knowledge and implementation gaps hinder effective climate adaptation in vulnerable coastal zones.

1.2.4. SD Guthrie's Existing Adaptation Approach

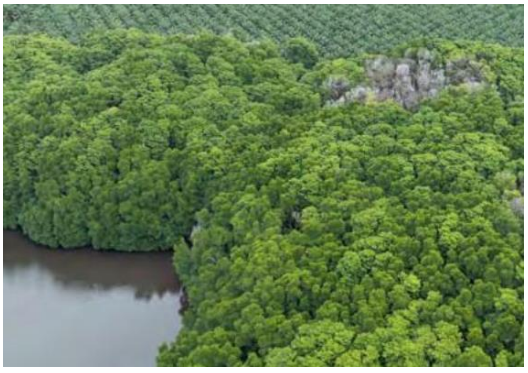
SD Guthrie's existing adaptation approach involves:

1. **Constructing earth bunds**
   - Construct upgrade and heighten bund.
   - Armour rocks revetment used in bund reinforcement.
   - Hydrological studies and topography profiling for bund design.

2. **Monitoring water levels:** Monitoring systems piezometer, water level marker, water quality assessments, and proposed IoT sensors.

3. **Bund maintenance**
   - Allow natural vegetative/vetiver grass/covers to grow on bund slopes to prevent bund cracking and improve bund stability.
   - Strengthening weak point along bunds by pilling with coconut trunk.
   - Raised bund height where the clearance between the highest tide level and the top of the bund.

4. **Nature-based solutions:** Mangrove restoration in gentle slope zones and behind gabions.



While these measures demonstrate a strong foundation in climate resilience, the current approach lacks the scalability and modularity necessary to respond to increasingly complex climate risks.

Moving forward, SD Guthrie aims to adopt a more proactive maintenance strategy, strengthen the integration between nature-based solutions and existing infrastructure, and enhance its planning capabilities through the application of predictive modelling and GIS tools.

Problem Statement

Coastal regions such as Carey Island in Selangor are increasingly exposed to compound climate risks, including sea-level rise, storm surges, and saltwater intrusion. There is an urgent need for localised, resilient and scalable adaptation solutions to strengthen climate risk management at the community level, while being able to generate returns or at least recover their capital.

2.0 Challenge Objectives and Overview

The COFAR Challenge encourages students to design innovative and scalable solutions to address coastal flooding in Carey Island, Selangor.

2.1 Challenge Scope & Solution Requirements

Your solution should include the following:

Technical and Design Aspects	• Present a solution that **mitigates saltwater intrusion, storm surge, and sea-level rise**. • Ensure the design is **scalable** for broader application across Selangor's west coast and **modular**, allowing phased construction over time. • Include **engineering or technical visuals** (e.g. schematics, site plans, renderings) that clearly communicate form, materials, and function. • Account for local topography, soil, infrastructure, and land-use sensitivities.

Financial Model and Cost Recovery	• Propose a revenue-generating solution, which may include revenue streams from:
	  ○ Eco-tourism or recreational facilities
	  ○ Aquaculture or fish farming
	  ○ Solar or hydropower integration
	• The financial component of the brief may include a clear financial model with:
	  ○ Estimated capital expenditure (CapEx) and operational expenditure (OpEx)
	  ○ Feasibility study assumptions
	  ○ Blended finance approach
	  ○ Maintenance and long-term cost considerations
	  ○ Projected returns and repayment timelines

Minimum Technical Performance Requirements

Category	Minimum Requirement
Finance Requirements: *Financial viability and cost recovery expectations*	
1. Cost Recovery	Must achieve a minimum of 10% cost recovery through a viable revenue-generating mechanism.
2. Financial Model	Must present estimates for CapEx, OpEx, maintenance costs, and repayment timeline.
Technical Requirements: *Design criteria that must be met to ensure technical resilience*	
1. Sea-level Rise	Must withstand a projected 0.7 meters by 2100, based on RCP6.0 emissions scenario.
2. Storm Surge	Structures must buffer at least 0.5 meters or more above mean sea level to protect against surge and wave impacts.
3. Coastal Erosion	Must reduce projected shoreline retreat, particularly under scenarios that combine sea level rise and erosion stressors.
4. Saltwater Intrusion	Must include measures that prevent saltwater intrusion.

Things to consider:

- Submissions should be **interdisciplinary**, demonstrating strong collaboration between students from different faculties or schools, e.g. engineering and finance.
- Submissions must be **grounded in real-world feasibility**, with an emphasis on implementation potential and scalability. We encourage you to participate in the Checkpoints to test your solution with industry and technical experts.
- Teams should **consider the judging criteria** (see Appendix) for detailed expectations on deliverables and evaluation.

2.2 Eligibility

To participate in the COFAR Challenge, teams must meet the following requirements:

- The challenge is open to students from all universities in Malaysia and Malaysian students enrolled in universities abroad.
- A team must consist of five to six members.
- One team member must come from the engineering faculty and another from the accounting / finance faculty.
- Teams must be gender-diverse, in line with efforts to encourage broader participation in STEM disciplines.
- Each team is encouraged to be accompanied by a mentor such as a faculty advisor, industry expert, or graduate/professional engineer.

3.0 Competition Structure & Timeline

3.1 Competition Timeline

Date	Event	Venue/Mode
4 August 2025	Information Session with ICAEW	Online
11 August 2025	COFAR Launch & Introductory Webinar	Online
25 August 2025	Application deadline	Register via email at Malaysia@icaew.com
11 September 2025	Preliminary Visit to Carey Island	In-person (8am-11:30am) *(Highly encouraged)*
19 September 2025	Checkpoint 1	Online
14 October 2025	Checkpoint 2	Online
17 October 2025	Final Submission Deadline	Submit via Submissions Portal at https://forms.office.com/r/ZWJL2J7hW4.
27 October 2025	Announcement of Finalist	Online, via email
4 November 2025	Finalist Pitch	ICAEW-ASEAN Sustainability Summit 2025
6 November 2025	Announcement of Winners	ASEAN Capital Markets Forum (ACMF) International Conference 2025

Note: All dates are subject to change.

3.2 Competition Details

3.2.1 Pre-Competition

In the lead-up to the COFAR Challenge, two pre-competition engagements will be held to introduce the challenge and equip participants with the necessary background and expectations.

1. Information Session by ICAEW Malaysia [4 August 2025]

This virtual session will serve as a teaser and orientation for potential participants. It will cover the challenge theme, objectives, and help students understand the scope and expectations of the competition.

2. Official COFAR University Challenge Webinar [11 August 2025]

The webinar includes an exciting lineup of experts to discuss the Malaysia's climate risks and adaptation changes, financing solutions through capital market instruments, the official challenge launch, and exclusive tips and resources for the. Speakers include:

- **Dato' Mohammad Faiz Azmi**, Executive Chairman, Securities Commission Malaysia
- **Dr. Gary Theseira**, Adjunct Associate Professor at the Asia School of Business (ASB), Chairman of Climate Governance Malaysia
- **Anjali Viswamohanan**, Director, Policy, Asia Investor Group on Climate Change (AIGCC)
- **Mohd Zamri Ridzuan**, Manager, Water Management and Irrigation, SD Guthrie Berhad
- **Navakanesh M Batmanathan**, Research Assistant, Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM), Universiti Kebangsaan Malaysia.
- **Shenola Gonzales**, Head of ICAEW Malaysia
- **Kaveena Maniam**, Assistant General Manager, Securities Commission

3.2.2 Team Registration

Team leaders / accompanying lecturer needs to **complete the Registration Form at forms.gle/j1BXMEL6JQfj6LWu8.**

3.2.3 Preliminary Visit

The preliminary visit is to allow participating teams to personally observe the proposed site for the challenge and engage directly with the West Estate Manager for any inquiries, ensuring a thorough understanding. The visit is scheduled for **Thursday, 11 September 2025**. This date has been specifically chosen based on the tide level, providing optimal conditions for teams to clearly identify existing issues or challenges at the site.

Time	Programme
8:00 am	**Arrive at Palm Oil Experience Centre (POEC), Carey Island**
8.30 am	**Guided Tour by Tuan Md Rapit Suman (West Estate Manager) - West Estate Jetty with Q&A Session.** ** Participating teams will be accompanied to the jetty in designated group batches, with all movements carried out in compliance with established safety protocols to ensure the safety and well-being of all individuals involved.*
10.00 am	**Morning Tea @ Dapo Carey**
11.30 am	**End of Visit**

Teams will be contacted regarding registration for the preliminary visit.

3.2.3 Checkpoint 1

An online support session will be held to help participating teams clarify technical aspects of the challenge, financial modelling expectations, and submission requirements. More details will be shared soon.

3.2.4 Checkpoint 2

The Securities Commission Malaysia will host the Climate Adaptation & Resilience Conference to provide teams with real-world insights on climate finance and infrastructure adaptation. More details will be shared soon.

3.2.5 Submission Deadline

Teams must upload their submissions via the Submission Portal with the following information **by 17 October 2025:**

10-page Design Brief (PDF) including:
• Technical concept & flood resilience strategy • Capital market financing model (CapEx, OpEx) • Revenue generation strategy (≥10% recovery) • Visuals: architectural renderings / schematics / diagrams
3-minute Video Pitch (MP4) summarising:
• Problem & concept • Anticipated impact of proposed solution • Financial/implementation model

3.2.6 Finalist Pitch & Showcase

The top-performing teams will be selected to advance to the Finalist Pitch stage, where they will present their solutions to an expert panel of judges.

Date	Detailed Information
27 October 2025	Shortlisted teams will be notified via email.
2 November 2025	Finalist teams must submit a PowerPoint deck for a 10-minute pitch. The pitch should clearly articulate: • The identified problem and proposed solution • Technical feasibility and anticipated impact • Financial model and implementation strategy Detailed pitch guidelines will be shared with the finalists upon selection. *Note: Teams are required to share their final deck and any other materials by 23:59, 2 November 2025.*
4 November 2025	Final Presentations at ICAEW-ASEAN Sustainability Summit
6 November 2025	The Top 3 teams will be formally announced and awarded at the ASEAN Capital Markets Forum (ACMF) International Conference 2025.

3.3 Terms and Conditions

All participants must comply with the official Terms & Conditions of the COFAR Challenge. For more details, refer to the **Terms & Conditions** here.

3.4 Access to Resources

Site-Specific Data: Carey Island, Selangor

	Type of Data	Sources
1	Topography & elevation maps	Free GIS Data – Physical Geography
2	Shoreline exposure and tide data	PSMSL Data Explorer
3	Land use classification	Esri Sentinel-2 Land Cover Explorer
4	Climate projections	NASA Sea Level Projection Tool

4.0 Prizes & Recognition

The top three winning teams will receive cash prizes and exclusive dinner with representatives from the SC and ICAEW Malaysia.[5]

Prizes	Cash Prizes
Winner	RM25,000
1st Runner Up	RM15,000
2nd Runner Up	RM10,000

5.0 Contact & Support

For further information, please visit the Challenge Website at www.sc.com.my/cofar/cofar-challenge or contact Malaysia@icaew.com.

[5] Selection of winning teams is subject to conditions outlined in the Terms and Conditions.

6.0 Appendix

Appendix A: Glossary of Terms

Term	Definition
Aquaculture	The farming of aquatic organisms such as fish or shellfish; proposed as a potential revenue stream.
Blended Finance	A financing approach that combines public, private, and philanthropic funds to attract investment into development or climate projects.
CapEx (Capital Expenditure)	Initial investment or upfront costs required to build infrastructure or implement a project (e.g., cost of materials, equipment, construction).
Cost Recovery	The process of recovering project costs through revenue-generating activities (e.g., tourism fees, aquaculture, solar energy sales).
Eco-Tourism	Environmentally responsible travel to natural areas that conserves the environment and supports local people.
Feasibility Study	A preliminary analysis that assesses whether a proposed solution is viable technically, economically, and legally. Often includes risk analysis, timelines, and assumptions.
Green Bonds	Bonds issued to raise funds for environmentally sustainable projects.
Modularity	The ability to design a solution in smaller, independent phases or units that can be implemented over time.
OpEx (Operational Expenditure)	Ongoing costs required to operate and maintain a project or infrastructure over time (e.g., salaries, maintenance, utilities).
Saltwater Intrusion	The movement of saline water into freshwater aquifers, which can degrade water quality and harm agriculture.

Schematics	Technical diagrams representing design layout, systems, or flows.
Sea-Level Rise	The long-term increase in the average sea level due to climate change.
Shoreline Retreat	The loss of land along the coast due to erosion, sea-level rise, or human activity.
Solar Integration	Use of solar panels in infrastructure design for energy generation and possible revenue.
Storm Surge	A rise in sea level caused by strong winds and low pressure during storms, often leading to coastal flooding.
Tidal Flooding	Flooding that occurs when high tides combine with sea-level rise or storm surge to inundate low-lying areas.

Appendix B: Judging Criteria

Component	Criteria	Weightage	Description
Technical	Feasibility and Technical Soundness	20%	Assesses how well the solution fits Selangor's west coast context, including climate and coastal risks. Evaluates technical strength, modularity, scalability, and real-world practicality.
	Scalability and Implementation Potential	15%	Assesses potential for the solution to be scaled, phased, or replicated in other coastal areas. Looks at clarity of implementation pathway and practical rollout considerations.
Finance	Cost Recovery Stream	20%	Evaluates clarity and viability of the cost recovery strategy, requiring at least 10% cost recovery with benefits for higher profitability.
	Finance and Capital Market Readiness	15%	Assesses how ready the solution is for capital market financing. Looks at clarity of CapEx/OpEx planning, use of instruments like green bonds, and strength of financial metrics (e.g., risks, investor types).
General	Innovative Solutions	10%	Assesses originality and creativity in the proposed solution. Looks for innovative use of technology, nature-based design, hybrid approaches, or integration of community and revenue features.
	Community and Stakeholder Integration	10%	Assesses how well the solution involves and benefits local communities and stakeholders.
	Presentation and Communication	10%	Assesses clarity, structure, and delivery of the presentation (video and/or live). Looks at team coordination, visual effectiveness, messaging, and time management.