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PROJECT FORMULATION GRANT AGREEMENT

"Strengthening Resilience and Adaptive Capacity by Piloting Nature Based Solutions for Water Management in Malaysia" Project in Malaysia

between

THE ADAPTATION FUND BOARD

and

UNITED NATIONS DEVELOPMENT PROGRAMME

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PROJECT FORMULATION GRANT AGREEMENT

Formulation of the "Strengthening Resilience and Adaptive Capacity by Piloting Nature Based Solutions for Water Management in Malaysia" Project in Malaysia

between

THE ADAPTATION FUND BOARD

and

UNITED NATIONS DEVELOPMENT PROGRAMME

***Whereas*,** the Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) in its Decision 10/CP.7 decided that an Adaptation Fund (AF) shall be established to finance concrete adaptation projects and programmes in developing countries;

***Whereas*,** the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) in its Decision 1/CMP.3 decided that the operating entity of the AF shall be the Adaptation Fund Board (Board), with the mandate to supervise and manage the AF under the authority and guidance of the CMP;

***Whereas*,** in its Decisions 5/CMP.2 and 1/CMP.3, paragraph 5 (b), the Board adopted the AF *Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund* (AF Operational Policies and Guidelines[1]), including the *Fiduciary Risk Management Standards to be Met by Implementing Entities*;

***Whereas*,** in its Decision B.46/25, the Board decided to endorse the concept of the project "Strengthening Resilience and Adaptive Capacity by Piloting Nature Based Solutions for Water Management in Malaysia" (the Project) in Malaysia submitted by the United Nations Development Programme (UNDP) and to make a project formulation grant available to support the UNDP in formulating the Project, as set out in Schedule 1 to this Agreement; and

***Whereas*,** the International Bank for Reconstruction and Development (IBRD) has agreed to serve as the Trustee of the AF Trust Fund (Trustee) and, in that capacity, to make transfers of the Grant to the UNDP on the written instructions of the Board;

The Board and the UNDP have agreed as follows:

[1] https://www.adaptation-fund.org/documents-publications/operational-policies-guidelines/

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1. DEFINITIONS

Unless the context otherwise requires, the several terms defined in the Preamble to this Agreement shall have the respective meanings set forth therein and the following additional terms shall have the following meanings:

1.01. “Grant” means the AF resources approved by the Board for the formulation of the Project under this Agreement and to be transferred by the Trustee to the Implementing Entity on the written instructions of the Board;

1.02. “Designated Authority” means the authority that has endorsed on behalf of the national government the Grant request by the Implementing Entity seeking access to AF resources to finance the formulation of the Project;

1.03. “Executing Entity” means the UNDP that will execute the formulation of the Project under the overall management of the Implementing Entity;

1.04. “Implementing Entity” means the UNDP, which is a party to this Agreement and the recipient of the Grant;

1.05. “Implementing Entity’s Regulatory Framework” means the regulations, rules, policies and procedures of the Implementing Entity;

1.06 “Implementing Entity Grant Account” means the account to be established by the Implementing Entity to receive, hold and administer the Grant;

1.07. “Secretariat” means the body appointed by the CMP to provide secretariat services to the Board, consistent with decision 1/CMP.3, paragraphs 3, 18, 19 and 31, which is currently the secretariat of the Global Environment Facility; and

1.08. “AF Trust Fund” means the trust fund for the AF administered by the Trustee in accordance with the *Terms and Conditions of Services to be Provided by the International Bank for Reconstruction and Development as Trustee for the Adaptation Fund*.

2. PROJECT FORMULATION AND THE GRANT

2.01. The Board agrees to provide to the Implementing Entity the Grant in a maximum amount equal to One Hundred Fifty Thousand United States Dollars (US$ 150,000.00) for the purposes of the formulation of the Project. The Implementing Entity shall ensure that the Grant funds will exclusively be used to carry out the Project formulation activities, and finance the expenditures, as set out in Schedule 2 to this Agreement.

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2.02. The Trustee shall transfer the Grant funds to the Implementing Entity on the written instructions of the Board. The transfer shall be made in one lump sum to the following bank account of the Implementing Entity:

Legal Owner: UNDP

Account Title: UNDP Contributions Account

Account No: 36349562

Bank Name: Citibank, N.A.

Bank Code: 021000089

Bank Address: 111 Wall Street, New York, NY 10043, USA

Bank Swift Code: CITIUS33

Bank Routing Instructions: ABA/ACH Routing number: 021000089

2.03. The Implementing Entity shall make the Grant funds available to the UNDP in accordance with Implementing Entity's Regulatory Framework.

2.04. The Implementing Entity may convert the Grant into any other currency to facilitate its disbursement to the Executing Entity.

2.05. Grant funds made available to the Implementing Entity for the purposes of the Project in Malaysia shall be kept separate and apart from all non-Adaptation Fund funds dispersed to the Implementing Entity. No Grant funds shall be transferred, loaned, exchanged, pledged, delivered, gifted, between or among projects approved for the Implementing Entity.

2.06. Any investment income earned from the Grant funds shall be held in the Implementing Entity Grant Account and used for the same purposes and administered in accordance with the terms of this Agreement.

3. ADMINISTRATION OF THE GRANT

3.01. The Implementing Entity shall be responsible for the administration of the Grant and shall carry out such administration with the same degree of care used in the administration of its own funds, taking into account the provisions of this Agreement.

3.02. The Implementing Entity shall carry out all its obligations under this Agreement in

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accordance with Implementing Entity's Regulatory Framework that should enable it to substantially comply with the AF Operational Policies and Guidelines effective April 2025[2], Evaluation Policy[3], Policy on Project Post-Approval Request for Changes in Projects and Programmes[4], Policy for Project and Programme Delays[5], Implementation Fees and Execution Costs[6], Project Reporting Process Requirements[7], Requirements for Projects/Programmes with Unidentified Sub-Projects (USPs)[8], and Risk Management Framework[9] to fulfill its obligations under this Agreement.

3.03. The Implementing Entity represents and warrants, on the date of signing this Agreement and throughout the Project implementation, that the Implementing Entity's Regulatory Framework, applicable to fulfill its obligations under this Agreement, is substantially consistent with the AF Operational Policies and Guidelines, Evaluation Policy, Policy on Project Post-Approval Request for Changes in Projects and Programmes, Policy for Project and Programme Delays, Implementation Fees and Execution Costs, Project Reporting Process Requirements, Requirements for Projects/Programmes with Unidentified Sub-Projects (USPs), and Risk Management Framework.

3.04 The Implementing Entity:

(a) undertakes to use reasonable efforts, consistent with the Implementing Entity's Regulatory Framework, including those pertaining to combating financing for terrorists, to ensure that the Grant funds provided to the Implementing Entity by the Trustee are used for their intended purposes and are not diverted to terrorists;

(b) shall not use the Grant funds for the purpose of any payment to persons or entities, or for the import of goods, if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, including under United Nations Security Council Resolution 1373 and related resolutions;

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[2] https://www.adaptation-fund.org/documents-publications/operational-policies-guidelines/ .

[3] Ibid.

[4] Ibid.

[5] Ibid.

[6] https://www.adaptation-fund.org/document/proposed-adjustments-to-implementation-fees-and-execution-costs/.

[7] https://www.adaptation-fund.org/projects-programmes/project-performance/.

[8] https://www.adaptation-fund.org/apply-funding/project-funding/project-proposal-materials/ .

[9] https://www.adaptation-fund.org/documents-publications/operational-policies-guidelines/.

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(c) shall immediately inform the Board in the event the Grant funds are not being used or have not been used for the implementation of the Project or of any illegal or corrupt practice. The Implementing Entity consistent with the Implementing Entity's Regulatory Framework and integrity of the investigative process shall keep the Board informed of the progress of any formal investigation concerning the misuse of Grant funds and provide a final report to the Board on the findings of such investigation upon its conclusion; and

(d) shall include provisions corresponding to subparagraphs (a) – (b) above in any agreements that the Implementing Entity enters into with executing entities and/or consultants to which the Implementing Entity makes Grant funds available.

3.05 If, during the course of administering the Grant, the Implementing Entity identifies a material inconsistency between the AF Operational Policies and Guidelines, and the other standards, policies and procedures provided in this Agreement and the Implementing Entity's Regulatory Framework, the UNDP shall:

(a) immediately notify the Board, through the Secretariat, of such inconsistency, and submit an assessment of the potential impact of such possible material inconsistency on the Project objectives, implementation, and compliance;

(b) promptly take any action necessary or appropriate, taking into account the Implementing Entity's Regulatory Framework, to mitigate or resolve such material inconsistency, as per the Board's guidance; and

(c) covenant that, in the event of such material inconsistency, which cannot be mitigated or addressed in accordance with Section 3.05 (b) above, the Implementing Entity shall consult with the Board. For the avoidance of doubt, during such period of consultation, the Implementing Entity shall continue to apply the Implementing Entity's Regulatory Framework as was applicable prior to the revision of the AF Operational Policies and Guidelines, Evaluation Policy, Policy on Project Post-Approval Request for Changes in Projects and Programmes, Implementation Fees and Execution Costs, Project Reporting Process Requirements, Requirements for Projects/Programmes with Unidentified Sub-Projects (USPs) and Risk Management Framework.

3.06. In the event that the Implementing Entity makes any disbursements of the Grant in a manner materially inconsistent with the AF Operational Policies and Guidelines, Evaluation Policy, Policy on Project Post-Approval Request for Changes in Projects and Programmes, Policy for Project and Programme Delays, Implementation Fees and Execution Costs, Project

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Reporting Process Requirements, Requirements for Projects/Programmes with Unidentified Sub-Projects (USPs), or Risk Management Framework, and the potential impact of such material inconsistencies cannot be mitigated or resolved as provided in paragraph 3.05, the Board, through the Secretariat, may elect to: (a) extend reasonable time for the Implementing Entity to rectify the material inconsistency(ies) regarding any such disbursements; and/or (b) request the Implementing Entity to refund to the AF Trust Fund, through the Trustee, any such disbursements; and/or (c) terminate this Agreement by giving notice to the Implementing Entity pursuant to the terms of Section 14.01 of this Agreement.

4. IMPLEMENTATION OF THE PROJECT FORMULATION

4.01. The Implementing Entity shall be responsible for the overall management of the formulation of the Project, including all financial, monitoring and reporting responsibilities.

4.02. The Implementing Entity shall ensure that the Grant is used exclusively for the purposes of the formulation of the Project, and shall refund to the AF Trust Fund, through the Trustee, if any disbursements made for other purposes. Where the Board believes that the Grant has been used for purposes other than the formulation of the Project, it shall inform the Implementing Entity of the reasons supporting its view and provide the Implementing Entity an opportunity to provide any explanation or justification for such use.

4.03. The Implementing Entity shall submit a request for any minor or material changes in the original budget allocation for the Project formulation (as set out in Schedule 2 to this Agreement), in consultation with the Executing Entity, to the Board for its approval. These requests must conform to, and be processed in accordance with the Operational Policies and Guidelines of the Fund and the Policy on Project Post-Approval Request for Changes in Projects and Programmes. A “material change” shall mean any cumulative total budget modification, either as a single request or through separate consecutive requests, at output-level where the variance between the revised budget and the original budget amounts to twenty per cent (20%) or more of the total original budget for the formulation of the Project. A “minor change” is defined as any cumulative budget modification at the output level that results in less than twenty per cent (20%) of the total original budget for the formulation of the Project.

4.04. The Implementing Entity shall promptly inform the Board, through the Secretariat, of any conditions that may seriously interfere with its management, or the Executing Entity’s execution, of the Project formulation or otherwise jeopardize the achievement of the objectives of the Project formulation, providing detailed information thereof to the Board for its information.

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4.05. The Implementing Entity shall be fully responsible for the acts, omissions or negligence of its employees, agents, representatives and contractors under the formulation of the Project. The Board shall not be responsible or liable for any losses, damages or injuries caused to any persons under the formulation of the Project resulting from the acts, omissions or negligence of the Implementing Entity's employees, agents, representatives and contractors.

5. SUSPENSION

5.01. The Board may suspend the formulation of the Project for reasons that include, but are not limited to:

(a) financial irregularities in the implementation of the formulation of the Project, or

(b) a material breach of this Agreement and/or poor implementation performance leading the Board to conclude that the formulation of the Project can no longer achieve its objectives;

provided, however, that before the Board makes its final decision (i) the Implementing Entity shall be given an opportunity to present its views to the Board, through the Secretariat; and/or (ii) the Implementing Entity may make any reasonable proposal to promptly remedy the financial irregularities, material breach or poor implementation performance.

6. PROCUREMENT

6.01. The procurement of goods and services (including consultants' services) for activities financed by the Grant shall be carried out in accordance with the Implementing Entity's Regulatory Framework, including its procurement and consultants' guidelines. In the event that the Implementing Entity makes any disbursements in a manner which the Board considers to be inconsistent with the AF Operational Policies and Guidelines and the other policies and procedures provided in this Agreement, the Board shall so inform the Implementing Entity giving the reasons for its view and seeking a rectification of the inconsistency. If the inconsistency cannot be resolved, the Implementing Entity shall refund to the AF Trust Fund, through the Trustee, any such disbursements.

7. RECORDS AND REPORTING

7.01. The Implementing Entity shall provide to the Board, through the Secretariat, the following reports and financial statements:

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(a) A notification of project start[10] shall be submitted within one (1) month of the Project start date, in accordance with Policy for Project and Programme Delays[11]. The Project start date is considered to be the date of first disbursement towards an activity related to the Grant; and

(b) Project monitoring reports for the Project formulation shall be submitted one (1) year from the Project start date, and every one (1) year thereafter from the date of the last project monitoring report.

7.02. Copies of the reports referred to in Section 7.01 shall be forwarded by the Implementing Entity to the Designated Authority for information.

7.03. The Implementing Entity is required to submit a fully developed proposal for the Project to the Board within twelve (12) months of receiving the Grant. If the Implementing Entity anticipates being unable to meet the twelve-month deadline, it must submit a request for an extension no later than two (2) months before the project completion date, using the template provided in Annex B to the Policy for Project and Programme Delays[12]. The request must conform to and be processed in accordance with the Policy for Project and Programme Delays.

7.04. The Implementing Entity shall provide to the Board, through the Secretariat:

(a) a summary of the actual expenditures incurred by the Implementing Entity including net investment income earned from the Grant funds and the associated expenditures for the Project formulation within fifteen (15) months of the effectiveness date of this Agreement as documented by means of a final Statement of Expenditure (in the standard form of Annex 1 to the Agreement), signed by the Implementing Entity's chief financial officer, controllership or the authorized financial officer. Originals of all receipts shall be retained by the Implementing Entity as part of its accounting records and made available to the Trustee upon request; or

(b) if the Project is approved within the said fifteen (15) month period, and the Board so agrees in writing, a final audited financial statement together with the first audit due under the approved Project.

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[10] The notification of project start should be submitted using the template in Annex X to document AFB/B.34-35/6, available at https://www.adaptation-fund.org/document/policy-for-projectprogramme-delays/.

[11] https://www.adaptation-fund.org/document/policy-for-projectprogramme-delays/

[12] https://www.adaptation-fund.org/document/policy-for-projectprogramme-delays/

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7.05. Grant funds are subject exclusively to the internal and external audit of the Implementing Entity. The Implementing Entity shall make available to the Board through the Secretariat a copy of any audit report of the Implementing Entity's external auditor(s) containing any observations pertaining to the Grant as soon as such report is available.

7.06. The Implementing Entity shall submit any other reports related to the Grant and/or the Project to the Board, through the Secretariat, as may be requested by the Board.

8. MANAGEMENT FEE

8.01. The Board authorizes the Implementing Entity to deduct from the total amount of the Grant and retain for its own account the management fee specified in Schedule 2 to this Agreement.

9. OWNERSHIP OF EQUIPMENT

9.01. If any part of the Grant is used to purchase any equipment, such equipment shall be transferred upon the completion of the formulation of the Project to any such entity as the Designated Authority may designate.

10. CONSULTATION

10.01. The Board and the Implementing Entity shall share information with each other, at the request of either one of them, on matters pertaining to this Agreement.

11. BRANDING

11.01. The Implementing Entity shall, where feasible, endeavor to maximize opportunities for acknowledging the identity of the Grant provided by the Adaptation Fund (e.g., through use of the Adaptation Fund logo, and appropriate references in reports, publications, information given to beneficiaries and press, related publicity materials, and any other forms of public information).

12. COMMUNICATIONS

12.01. All communications between the Board and the Implementing Entity concerning this Agreement shall be made in writing, in the English language, to the following persons at their addresses designated below, by letter or by facsimile:

For the Board:

Adaptation Fund Board Secretariat

1818 H Street, NW

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Washington, D.C. 20433

USA

Attention: Adaptation Fund Board Chair

Fax: +1 202 522 3240

For the Implementing Entity:

United Nations Development Programme

304 East 45th Street FF Building 9TH Floor, Room 918 Bureau for Policy and Programme Support (BPPS) United Nations Development Programme New York, NY 10017 USA

Attention: Nancy Bennet, Director, Quality and Impact Hub and Executive Director, Vertical Funds Bureau for Policy and Programme Support (BPPS)

Tel : +1 (917) 774-6577

13. EFFECTIVENESS AND AMENDMENT OF THE AGREEMENT

13.01. Upon receipt by the Adaptation Fund Board of this countersigned copy, this Agreement shall become effective as of the date of countersignature by the Implementing Entity.

13.02. This Agreement may be amended, in writing, by mutual consent between the Board and the Implementing Entity.

13.03. Nothing in this Agreement is intended to be a waiver or should be construed as a waiver of the privileges and immunities of the Parties or their officers and employees, which privileges and immunities are hereby specifically reserved.

14. TERMINATION OF THE AGREEMENT

14.01. This Agreement may be terminated by the Board or the Implementing Entity, by giving prior written notice of at least ninety (90) days to the other.

14.02. This Agreement shall automatically be terminated in the event of:

(a) cancellation of the Implementing Entity’s accreditation by the Board; or

(b) receipt of a communication from the Designated Authority that it no longer endorses the Implementing Entity, the endorsed concept of the Project, or the Project.

14.03. Upon termination of this Agreement, the Board and the Implementing Entity shall consider the most practical way of completing any ongoing activities, including meeting any

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outstanding commitments incurred prior to the termination. The Implementing Entity shall promptly refund to the AF Trust Fund, through the Trustee, any unused portion of the Grant, including any net investment income earned therefrom. No Grant funds shall be disbursed after termination.

14.04. In the event of expiration of accreditation and/or the Board's decision to not re-accredit the Implementing Entity, the responsibilities and obligations in this Agreement survive and shall be unaffected, and the Implementing Entity shall continue to disburse the Grant funds, in accordance with the Implementing Entity's Regulatory Framework and the AF Operational Policies and Guidelines to the extent necessary to fulfill the Implementing Entity's obligations hereunder.

15. SETTLEMENT OF DISPUTES

15.01. Any dispute, controversy or claim arising out of or relating to this Agreement, or the breach, termination or invalidity thereof, shall be settled amicably by discussion or negotiation between the Board and the Implementing Entity.

15.02. Any dispute, controversy or claim arising out of or relating to this Agreement, or the breach, termination or invalidity thereof, which has not been settled amicably between the Board and the Implementing Entity, shall be settled by arbitration in accordance with the UNCITRAL Arbitration Rules as at present in force.

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THE ADAPTATION FUND BOARD

Ali Mohamed | 08-Jul-2026

Ali D. Mohamed, Chair | Date

UNITED NATIONS DEVELOPMENT PROGRAMME

Nancy Bennet | 08-Jul-2026

Nancy Bennet, Director | Date

Quality and Impact Hub and Executive Director

Vertical Funds Bureau for Policy and Programme Support (BPPS)

[The following Schedules will be attached to the Agreement: Schedule1 (Project Concept) and Schedule 2 (Project Formulation Proposal)].

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ANNEX 1: TEMPLATE FOR THE STATEMENT OF EXPENDITURE

Statement of Expenditure

Implementing Entity Name: _____
Country: _____
AF Project ID: _____
Project Title: _____

Reporting Period [DATE] to [DATE]

Budget Category	Expenses for total grant amount			
	Currency	Budgeted	Amount Spent (Reporting period)	Total Grant Undisbursed (Reporting period)
Sub-total				**(A)**
Total Investment Income earned (Reporting		Instead of budgeted, please indicate the total amount accumulated here		**(B)**
Budget Grand Total (A+B)				

I/We hereby certify that the above amounts have been expended for Eligible Expenditures for the proper execution of the Project [concept] formulation in accordance with the terms and conditions of this Agreement dated (_____).

Certified by[13]: _____ [Name]_____

Title: _____

Signed: _____ Dated: _____

[13] Equivalent to Chief Financial Officer

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SCHEDULE 1

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ADAPTATION FUND

CONCEPT NOTE PROPOSAL FOR SINGLE COUNTRY

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Strengthening Resilience and Adaptive Capacity by Piloting Nature Based Solutions for Water Management in Malaysia
Country:	Malaysia
Thematic Focal Area:	Nature Based Solutions, Flood Management
Type of Implementing Entity:	Multilateral Implementing Entity
Implementing Entity:	United Nations Development Programme Malaysia, Singapore and Brunei Darussalam
Executing Entities:	Forest Research Institute Malaysia (FRIM)
Amount of Financing Requested:	$10,000,000 (in U.S Dollars Equivalent)
Project Formulation Grant Request:	Yes ☒ No ☐

Amount of Requested financing for PFG: $150,000 (in U.S Dollars Equivalent)

Letter of Endorsement (LOE) signed: Yes ☒ No ☐

NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: https://www.adaptation-fund.org/apply-funding/designated-authorities

Stage of Submission:

☐ This concept has been submitted before

☒ This is the first submission ever of the concept proposal

In case of a resubmission, please indicate the last submission date: Click or tap to enter a date.

Please note that concept note documents should not exceed 50 pages, including annexes.

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Project/Programme Background and Context

A. Country context and Climate Change rationale

Malaysia is an urbanized, upper-middle-income country with a diverse population of 34.1 million (2024), driven by its services and manufacturing sectors. The nation is recognized as one of the world's 17 megadiverse countries; however, this biodiversity is threatened by deforestation, pollution, and escalating climate change impacts.

Malaysia faces profound and escalating challenges related to national water security, food production systems, and urban resilience, driven by intensifying climate extremes. The country is exposed to a wide spectrum of natural hazards amplified by climate change, including extreme weather events, flooding, drought, sea-level rise, and increasing temperatures. These pressures necessitate systematic adaptation action to enhance national resilience, benefiting people, livelihoods, and ecosystems.

1. Climate impacts and hazards[1]

Climate change has heightened the frequency and destructive impact of both sudden-onset disasters and slow-onset events, imposing substantial socioeconomic and environmental losses across Malaysia.

- **Intensifying flooding:** Flooding events are becoming increasingly frequent and severe, causing catastrophic loss of lives and livelihood. Official flood reports have increased exponentially, from 91 in 2002 to 1,057 in 2021. Currently 10.1% of the country's total land area (approximately 33,300 km2) is identified as flood prone. This intensification is a primary driver of sudden-onset disasters across the peninsula and East Malaysia.
- **Drought and catastrophic fire risk:** Prolonged dry spells and rising heat accelerate soil-moisture depletion, causing irreversible desiccation in peatlands. This threat is demonstrated by events such as the 2021-2022 drought, which precipitated a significant water crisis across Selangor and elevated the risk of severe peatland fires. This vulnerability is historically evident in the Kuala Langat North Forest Reserve (KLNFR), where approximately 360 hectares were burnt between 2012 and 2017.
- **Coastal and marine threats:** Coastal zones face acute vulnerability to storm surges and inundation influenced by sea-level rise, causing significant coastal erosion. Furthermore, marine ecosystems, notably coral reefs, suffer from coral bleaching during extreme temperature events.
- **Increasing temperatures:** Malaysia is experiencing a steady rise in surface temperatures, which acts as a force multiplier for existing vulnerabilities. Beyond the environmental impact on water evaporation rates and crop yields, high temperatures pose a severe risk to public health, including a surge of vector-borne diseases, such as dengue. Under high-emission scenarios, heat-related mortality is projected to increase significantly, potentially reaching 45 deaths per 100,000 by 2080.

2. Vulnerability assessment[2]

The adverse impacts of these climate hazards are felt unevenly, concentrating risk within specific geographic areas, economic sectors, and demographic groups.

- **Urban exposure:** 75% of the population resides in cities, facing intensifying threats from recurrent flash floods and escalating urban heat island effects. While typical heat island

[1] Ministry of Finance, Ministry of Natural Resources and Environmental Sustainability, National Disaster Management Agency, Sarawak Forestry Department, World Bank report "Climate Risk Country Profile: Malaysia" (2021), World Bank and Bank Negara Malaysia, 2021 "Floods and Finance: Building Resilience of Malaysian Businesses".

[2] Department of Statistics Malaysia (DOSM) National Population & Housing Census (2020), Department of Agriculture, Muda Agricultural Development Authority (MADA), World Bank "Country Climate and Development Report (CCDR) for Malaysia (2022), "Murdiyarso et al. (2010). The opportunity of peatlands in global climate change mitigation."

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increases are 2–3°C, observed increases have reached up to 6.33°C in some cities significantly increasing the sensitivity of urban dwellers to heat stress. This vulnerability is compounded by rapid urbanization and the loss of natural 'sponge' capacity in catchments, which reduces the landscape's ability to absorb and slow down flood waters.

- **Vulnerable ecosystems and Indigenous Peoples:** Intensifying climate variability undermines strategic forest and peatland ecosystems, threatening their vital role in water security and carbon storage. This directly jeopardizes the livelihoods and cultural practices of Indigenous Peoples (e.g. Orang Asli Temuan) who are dependent on these ecosystems and highly exposed to water scarcity and fire hazards.
- **Agricultural livelihoods:** The agriculture sector is highly sensitive to climate shifts. Paddy farmers face potential yield reductions of up to 31% by 2050. Recent localized catastrophes, such as the 2024 floods in major agricultural zones, highlight the immediate threat to national food security and the high-stakes necessity for resilient infrastructure.
- **Water security and the "water paradox":** Critical catchments are functionally compromised by land degradation, jeopardizing stable water supply for millions. This creates a current water stress paradox: 97% of the population relies on surface water, making them simultaneously vulnerable to flood-driven sediments that clog infrastructure and drought-driven depletion that cuts off supply. Degraded peatlands face severe fire risk, compromising massive carbon stores (estimated at 9.1 billion tonnes nationwide).
- **Economic loss:** Between 2021 and 2023, flood-related losses alone amounted to RM 7.9 billion (approx. USD 1.872 billion), highlighting the vulnerability of national financial stability to climate shocks.
- **Social and gender vulnerability:** Climate-induced losses and stress disproportionately affect female-headed households and the poorest farmers. The increased burden of water collection for domestic use during drought events falls primarily on women and girls. Further, women's ability to participate in and influence formal water governance and adaptation planning is limited, compounding their climate vulnerability.

3. Climate trends and projections[3]

The necessity for adaptation action is supported by quantitative climate data illustrating ongoing and projected risks based on available scientific information. Malaysia is experiencing clear and accelerating impacts of climate change, with historical data showing a consistent temperature rise of 0.13-0.24° C per decade over the past 50 years. National projections indicate the average annual temperature will rise by 1.1° - 1.5°C by 2050, with higher increments expected in Sabah and Sarawak.

Climate models project that the intensification of the water cycle will lead to more frequent and intense heavy precipitation events, significantly increasing flood risk, and further exacerbating the "water stress paradox" where catastrophic flooding coexists with chronic water scarcity. While 10.1% of the land area faces increased flooding, northern regions face projected dry-season rainfall reductions of up to 22% by 2050. This scientific volatility confirms that chronic water shortages and catastrophic flooding will increasingly coexist. Further, the coastline also faces the long-term threat of sea level rise, projected to reach a maximum of 0.74 meters by 2100.

Table: Key climate trends and projections for Malaysia

Climate hazard	Observed trend	Projections for the 2050s
Rising temperatures and heatwaves	Increasing 0.13°-0.24° C/decade.	Certain increase. National policy projects a rise of 1.1°C to 1.5°C by 2050. Climate models indicate a range of +0.8°C to +1.5°C (medium scenario) to +1.8°C to +3.0°C (high scenario) for the 2050s period, with higher warming in East Malaysia.

[3] Sources: Met Malaysia, NADMA, Malaysia's National Communication to UNFCCC, IPCC AR6.
Scenarios: Medium/Low (RCP4.5), High (RCP8.5).

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Extreme rainfall and flooding	More intense heavy rain events; 10.1% of land is flood-prone.	Certain increase in intensity. Heaviest 1-day rainfall events are projected to intensify by ~8-15% (medium scenario) to >15-30% (high scenario), making extreme floods more frequent and severe.
Drought and water scarcity	More pronounced and frequent dry spells.	Likely increase in risk. Dry season (March-May) rainfall in northern regions may decrease by ~10-15% (medium scenario) to ~15-22% (high scenario), increasing drought frequency and severity, significantly compounding water stress.
Sea-level rise	Measured increase in coastal inundation.	Certain increase. Continued and accelerated rise of 0.2-0.5m by 2050 (relative to 1995-2014), with the level significantly higher under the high-emission scenario, leading to accelerated coastal erosion, flooding, and salinization.

4. Adaptation and Climate resilience pathways

To effectively counteract the identified climate impacts and vulnerabilities, the Programme proposes a three-pathway strategy that systematically addresses these risks through Nature-Based Solutions (NbS), institutional strengthening, and local empowerment.

Pathway 1: Institutionalizing Adaptive Governance and Evidence-Based Scaling

This pathway ensures the long-term sustainability, dynamic adjustment, and national scalability of adaptation successes by establishing the necessary data, intelligence, and policy frameworks. This involves developing and operationalizing an integrated climate data and intelligence system, which systematically combines real-time field data with scientific projections and gender-disaggregated vulnerability assessments. The evidence generated by this system can then be used to develop and formalize a strategic, gender-responsive NbS policy scaling framework for guiding risk-based planning. This process culminates in the strengthening of targeted national and sub-national institutions, ensuring they formally adopt these tools and frameworks, thereby creating the blueprint for multi-city replication and preventing maladaptation.

Pathway 2: Integrated NbS Deployment for Water Security and Resilience

This pathway delivers concrete, on-the-ground physical adaptation measures across all target sites, addressing acute shared hydrological risks and vulnerability in three distinct landscapes: upstream catchments, key natural storage areas, and downstream urban zones. The strategy involves deploying innovative, localized NbS. Specifically, this includes installing modular floating water storage units to establish distributed water retention and storage in peatlands for fire mitigation, which is crucial for significantly reducing catastrophic fire hazards and securing reliable water for indigenous communities. Concurrently, Ecosystem-based Adaptation (EbA) measures, such as Forest Enrichment and Erosion Control, will be implemented in degraded upstream forested catchments to improve hydrological function, delay runoff, and strengthen water security. Finally, in urban areas, Nature-Based Infrastructure, including the ecological upgrading of retention ponds, vegetated berms, and drainage channels into multi-functional blue-green infrastructure, will be implemented to enhance flood buffering capacity and provide measurable microclimate regulation and urban cooling benefits.

Pathway 3: Strengthening Local Capacity, Livelihoods, and Sustainability

This pathway focuses on the "human dimension" of adaptation, ensuring local ownership, economic empowerment, and sustainability. This is achieved by establishing climate-smart livelihood models, such as Women-Led Community Nurseries, to provide sustained, diversified income and ensure planting material for ecosystem restoration. Furthermore, the Programme will foster community-level adaptive capacity through citizen science initiatives (e.g., bioacoustic monitoring) and formalizing inclusive local decision-making mechanisms (Water User

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Associations) to manage NbS assets and secure community benefits. The pathway is completed by strengthening institutional and community capacity (training 300 individuals) and establishing a National Climate Knowledge Portal to systematically capture, package, and disseminate adaptation knowledge and lessons learned across the country, ensuring the long-term viability of the project's investments.

5. Integration with Malaysia's policies/strategies[4]

The Programme is designed for full alignment with Malaysia's adaptation mandate, directly supporting the upcoming National Adaptation Plan (MyNAP 2026–2035), the Nationally Determined Contribution 3.0 (NDC 3.0), National Climate Change Policy 2.0 and the Thirteenth Malaysia Plan (2026–2030) by focusing on integrated, risk-based planning and resilience measures in water, infrastructure, and ecosystems.

- **National Adaptation Plan (MyNAP 2026–2035):** The programme provides the foundational data, technical expertise, and institutional protocols necessary for the effective, evidence-based implementation of Malaysia's first NAP (expected finalization in 2026)
- **Nationally Determined Contribution 3.0 (NDC 3.0. 2025):** The Programme directly supports adaptation strategies outlined in the NDC 3.0., focusing on resilience in water resources, agriculture, infrastructure, and ecosystems.
- **National Climate Change Policy 2.0 (NCCP 2.0. 2024):** The strategy directly supports Strategic Thrust 3 (to emphasize adaptation and climate resilience measures) by mandating risk-based planning and undertaking integrated approaches.
- **Thirteenth Malaysia Plan (2026–2030):** The approach is fully consistent with the Thirteenth Malaysia Plan (2026–2030), directly supporting the objective of strengthening Climate Mitigation and Adaptation.

However, despite the strong national policy framework for climate change action, a number of systemic, non-climatic barriers impact the effective implementation of adaptation measures. These barriers—rooted in governance fragmentation, reliance on non-contextual data, challenges in land-use enforcement, and socio-economic inequities—currently prevent local successes from translating into national, scalable resilience:

- **Policy/institutional fragmentation:** Effective adaptation is hindered by fragmented governance and policy misalignment across federal, state, and local levels. This gap hinders inter-institutional coordination, making it difficult to translate successful pilots into standardized, scalable national policy frameworks. The jurisdictional complexity of regions like Sarawak and Sabah exacerbates this challenge to unified national action.
- **Gaps in applied, context-specific Nature-based Solutions (NbS):** Implementation of NbS is impacted by a significant knowledge gap regarding their efficacy in Malaysia's tropical environment. A heavy reliance on non-contextual data from temperate regions risks the oversimplification and misuse of NbS by decision-makers. This absence of proven local models increases the risk of maladaptation and poor environmental outcomes.
- **Weak enforcement and land-use instability in critical catchments:** Ecosystem resilience is fundamentally compromised by the lack of enforcement of sustainable land-use practices in critical areas like the Ulu Muda watershed. Land conversion and logging cause severe erosion and sedimentation, which directly threatens national water security and food production. Addressing this requires institutional frameworks to target the root drivers of land-use change beyond traditional mandates.
- **Insufficient climate data integration and adaptive management:** Decision-making is constrained by a data fragmentation gap across agencies, preventing the effective fusion

[4] Malaysia NDC 3.0 to UNFCCC 2025, National Climate Change Policy 2.0, Ministry of Natural Resources and Environmental Sustainability (NRES), World Bank

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of real-time field data with climate projections. This lack of Integrated Climate–Forest Intelligence impacts evidence-based planning and risk-informed decision-making. Furthermore, protocols often lack the adaptive governance mechanisms necessary to adjust infrastructure maintenance based on dynamic ecological indicators.

- **Socio-economic inequity and gender-differentiated vulnerability:** Climate impacts disproportionately affect marginalized groups. This is rooted in pre-existing social norms, which impose the primary burden of water security on women while limiting their representation in formal governance. This necessitates dedicated efforts to apply principles such as Free, Prior, and Informed Consent (FPIC) for Indigenous Peoples and enforce mandatory social inclusion mechanisms.
- **Technical capacity and financial resource mobilization:** Scaling successful local innovations is challenged by significant barriers in knowledge transfer and capacity building. Critically, Malaysia faces a large climate financing gap estimated at nearly RM 392 billion or approximately USD 83.3 billion for adaptation over the next 50 years *(NPCC 2.0)*. This systemic challenge in mobilizing long-term investment undermines the sustainable operation and maintenance of climate resilience systems.

B. Programme sites

Focusing on Peninsular Malaysia, the Programme will implement interventions in the states of Selangor and Kedah, alongside the Federal Territory of Kuala Lumpur (KL). These sites are linked by their severe exposure to water-related climate threats (flash floods, drought, and heat stress) and represent critical ecosystems requiring urgent Nature-based Solutions (NbS). The Programme strategically targets NbS adaptation across three critically vulnerable systems:

- Peat Swamp Forests (Selangor): Essential for carbon storage and securing water for indigenous communities.
- Terrestrial catchments (Kedah/Ulu Muda): Vital for regulating water supply for national rice production and millions of downstream users.
- Vulnerable urban/peri urban areas (Kedah/Kubang Pasu, Selangor, Kampung Cempaka, Petaling Jaya and Kuala Lumpur/Kampung Pasir Baru): Requiring NbS to enhance flood mitigation and urban cooling.

Map of programme sites:

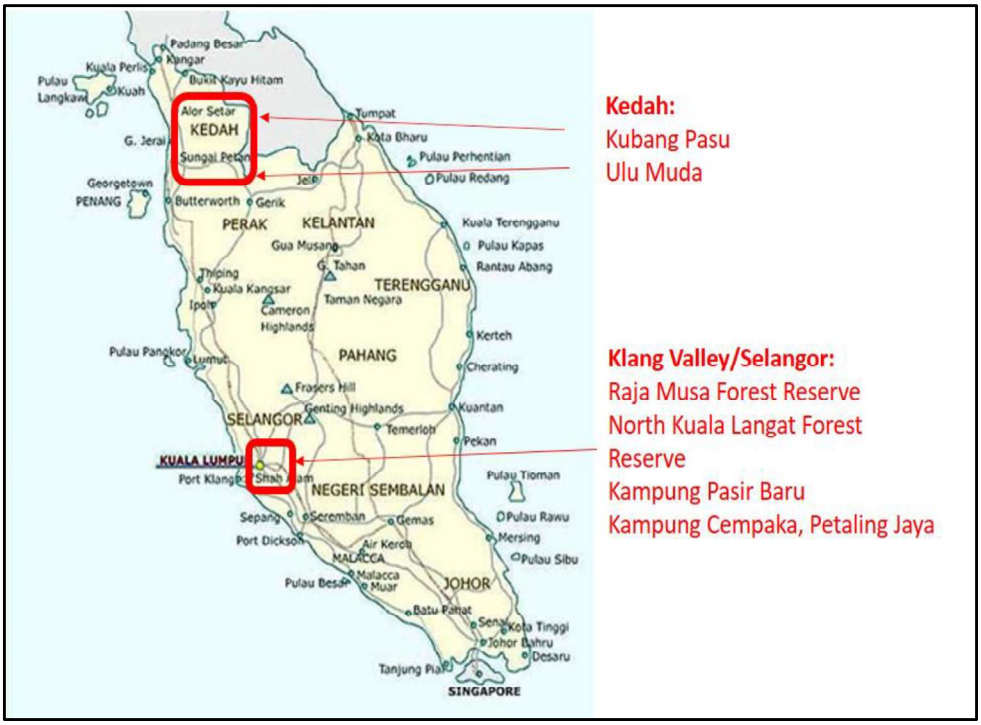


Table: Programme sites and component linkages

State	Programme Site	Programme Component(s)
Nationwide (Cross-cutting)	National Institutions and all programme sites	**Component 1:** Focuses on national relevance by establishing the Integrated Climate–Forest Intelligence System (ICFIS) and the National Vulnerability Atlas. This system integrates data from all physical sites to provide evidence-based decision-making tools and institutionalize adaptive planning capacity at the national and state levels.
Selangor	Raja Musa Forest Reserve and Kuala Langat Utara Forest Reserve (KLNFR) (Rural Site)	**Component 2:** Physical deployment of the AquaVault Nature-based Solution (NbS) to stabilise peat moisture and reduce fire risk while providing reliable water supplies for the indigenous Orang Asli Temuan communities. **Component 3:** Local capacity and citizen science monitoring, specifically focused on peatland ecosystem monitoring, co-management, and maintenance of the NbS infrastructure.
Selangor	Kampung Cempaka, Petaling Jaya (Urban Site)	**Component 3:** Local capacity, citizen science, women-led livelihood initiatives, and small-scale NbS pilot for validating the Urban Resilience Toolkit and collecting data relevant to urban water security and flood risk reduction.
Kedah	Ulu Muda Watershed (Rural Site)	**Component 2:** Physical pilot for upstream catchment management, including forest restoration and erosion control (EbA) to enhance the water security of the Muda Dam. **Component 3:** Local capacity and citizen science monitoring, providing ecological monitoring and community support for the upstream Nature-Based Solutions (NbS).
Kedah	Kubang Pasu District (Urban/Municipal Site)	**Component 2:** The urban resilience pilot for Northern Malaysia, including upgrading retention ponds with NbS and deploying mini-forests for flood and heat reduction. **Component 3:** Local capacity, citizen science, and the establishment of Women-Led Community Nurseries to support the implementation and long-term maintenance of the urban NbS infrastructure.
Kuala Lumpur	Kampung Pasir Baru (Urban Site)	**Component 3:** Local capacity and citizen science monitoring, including the small-scale NbS pilot for validating the Urban Resilience Toolkit, and collecting data relevant to high-density urban flood risk.

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Description of programme sites

Kuala Langat North Forest Reserve (KLNFR), Selangor

The Kuala Langat North Forest Reserve (KLNFR), Selangor, is one of the last remaining peat swamp ecosystems in Peninsular Malaysia, though it has been severely reduced to just 957.6 hectares due to decades of drainage and fragmentation. Ecologically, it is highly significant for its role in carbon sequestration (protecting massive carbon stores), groundwater regulation, and biodiversity support, hosting endangered species such as the Malayan Sun Bear. Critically, the Temuan Orang Asli communities—totaling approximately 750 people across Kampung Busut Baru and Kampung Bukit Tadom—rely heavily on this ecosystem for their water, food sources, cultural practices, and daily livelihoods, making them directly vulnerable to any further peatland degradation. The reserve is under severe climate-related stress: hydrological disruptions combined with climate-induced droughts and high heat anomalies accelerate peat drying. This has resulted in a high risk of catastrophic fire events, notably in 2014 when over 350 hectares were lost, compromising the massive carbon sink and local air quality.

Kampung Cempaka, Petaling Jaya, Selangor

Kampung Cempaka is a compact residential settlement situated within the active floodplain of the Kayu Ara River, highly vulnerable to sudden flash floods and heat stress. Climate change-driven high-intensity storms are now more frequent, causing the river to respond rapidly; for instance, a two-hour storm in 2025 delivered 103 millimeters of rain and caused sudden flooding that entered 40 homes. A similar situation occurred in 2024 when the river exceeded its alert level during a severe downpour. Hydrological studies show that the catchment has one of the fastest runoff responses in the region. Flood histories and community accounts describe repeated inundation dating back to the early 1990s, often occurring with little warning. These acute events are compounded by decades of upstream urbanisation. The settlement has a large proportion of elderly residents, increasing its social sensitivity to these rapid-onset disasters. Environmental conditions along the river corridor show stress from sedimentation and pollution events, but the corridor retains ecological value.

Ulu Muda Watershed, Kedah

The Ulu Muda forested catchment, Kedah plays a vital role in ensuring water security for northern Peninsular Malaysia, supplying raw water to the Muda and Pedu dams. The forest reserve's ecosystem services are crucial for the region's population and economy, providing essential water for domestic, industrial, and agricultural use in three states: Kedah, Penang, and Perlis. In total, the Ulu Muda Forest Reserve provides water for an estimated population of over 4.15 million people across the three states. A gender analysis for the MADA region indicates that 35% of smallholder farmers are women (MADA, 2023), who are overrepresented in informal agricultural work and bear the primary responsibility for household water security, yet face limited access to formal climate information and irrigation resources. This social context requires a fully inclusive, gender-responsive approach to water management to address the underlying hydrological instability of critical water source catchments.

Kubang Pasu District, Kedah

The Kubang Pasu District, Kedah is a strategically important administrative and economic hub in northern Peninsular Malaysia, featuring a population of approximately 250,000 residents. Its economy is underpinned by agriculture, with 35% of land (33,773 hectares) under the Muda Agricultural Development Authority's (MADA) irrigation system, contributing substantially to Kedah's rice production. Further, the district includes the Bukit Kayu Hitam ICQS Complex, a critical national asset, serving as Malaysia's busiest land crossing with over 1.2 million cross-border movements annually. Climate change presents escalating threats, demonstrated by the catastrophic 2024 floods which ranked Kubang Pasu among Kedah's top three most affected districts for residential damages. The floods inflicted severe damage, causing RM 9.4 million (approx. USD 2.2 million) in residential losses and paralyzing the vital Bukit Kayu Hitam ICQS

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Complex for over 72 hours. Scientific projections warn of a potential 3° C temperature increase by 2100, which could diminish rice yields by 15-20% and exacerbate existing agricultural vulnerabilities.

Kampung Pasir Baru, Kuala Lumpur
Kampung Pasir Baru is a long-established, dense urban settlement in Kuala Lumpur, highly exposed to recurrent deep flooding and intensifying heat stress. It comprises approximately 433 homes with a population of 1,339 people (2024). Recent severe rainfall events (e.g. >100 mm in three hours) have caused significant impacts, including the evacuation of 146 people to temporary shelters during the 2021 and 2022 storms. The primary climate risks are compounded by a low elevation beside the Klang River, rapid runoff from the Bukit Gasing catchment, and long-standing vulnerabilities in constrained drainage outlets and the reliability of the pump house system. These pressures affect daily life, with disruptions to work and mobility, and are exacerbated by the fact that households and small businesses typically have no access to flood insurance, increasing financial exposure. Despite these challenges, Kampung Pasir Baru exhibits strong social cohesion, with the Residents' Association having initiated community disaster plans and volunteer response teams.

Project/Programme Objectives

The Programme is designed as a robust and scalable national adaptation strategy for Malaysia that systematically links targeted, on-the-ground interventions with strengthened national and sub-national institutional capacity. The Programme Objective is achieved through three interconnected outcomes:

Programme Objective: To strengthen the climate resilience and adaptive capacity of vulnerable communities and national/sub-national institutions in Malaysia through the integration of evidence-based policy frameworks, the deployment of scalable Nature-Based Solutions for enhanced water security, and targeted capacity building and gender-responsive livelihood empowerment.

- **Outcome 1:** Adaptive Governance and Scaling: National and sub-national institutions utilize evidence-based climate intelligence and gender-responsive NbS policy frameworks to guide scalable adaptive planning and multi-city replication.
- **Outcome 2:** Physical Resilience and Water Security: Nature-Based Solutions are deployed across peatland and urban landscapes, resulting in enhanced hydrological resilience, reduced flood/fire risks, and strengthened ecosystem services for water security and vulnerability reduction.
- **Outcome 3:** Capacity, Livelihoods, and Sustainability: Local capacity, community-level livelihoods, and economic empowerment are enhanced, fostering inclusive water governance and strengthening the sustainability of all programme interventions through targeted knowledge transfer.

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Project/Programme Components and Financing

Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
Component 1: Adaptive Governance and Data for Climate-Informed Decision-Making	**1.1:** Foundational Risk Assessment and Integrated Intelligence System Operational (Gender-segregated Vulnerability and Risk Assessment and hydrological Assessment). **1.2:** National Climate Vulnerability Atlas (GIS-based tool) developed and endorsed by national agencies. **1.3:** Multi-City Adaptive Governance Institutionalization and Scaling Framework formally adopted by target municipalities, including local adaptation governance structures and NbS financing strategies.	**Outcome 1: Adaptive Governance and Scaling:** National and sub-national institutions utilize evidence-based climate intelligence and gender-responsive NbS policy frameworks to guide scalable adaptive planning and multi-city replication.	1,750,000
Component 2: Integrated NbS for Climate Change Adaptation	**2.1:** Climate-Resilient Water Storage and Infiltration Infrastructure deployed in priority peatlands to reduce fire risk and secure community water access. **2.2:** Ecosystem-Based Adaptation (EbA) and Forest Enrichment implemented in upstream watersheds to strengthen hydrological resilience and reduce sedimentation. **2.3:** Integrated Urban and Peri-Urban NbS Assets deployed across multi-city sites for flood/heat resilience, including the ecological upgrading of retention ponds.	**Outcome 2: Physical Resilience and Water Security:** Nature-Based Solutions are deployed across peatland and urban landscapes, resulting in enhanced hydrological resilience, reduced flood/fire risks, and strengthened ecosystem services for water security and vulnerability reduction.	5,000,000
Component 3: Capacity Building, Livelihoods, and Sustainability	**3.1:** Community Livelihoods, Economic Empowerment, and Adaptive Water Governance established, including Women-Led Community Nurseries.. **3.2:** National and Sub-National Institutional and Community Capacity Strengthened through tiered training programs and the operationalization of a Citizen Science system. **3.3:** National Climate Knowledge Portal established to centralize, disseminate, and ensure the long-term sustainability of programme knowledge and tools.	**Outcome 3: Capacity, Livelihoods, and Sustainability:** Local capacity, community-level livelihoods, and economic empowerment are enhanced, fostering inclusive water governance and strengthening the sustainability of all programme interventions through targeted knowledge transfer.	1,591,014
Total component cost			8,341,014
Project/Programme Execution cost			875,576
Total Project/Programme Cost			9,216,590
Project/Programme Cycle Management Fee charged by the Implementing Entity			783,410
Amount of Financing Requested			10,000,000

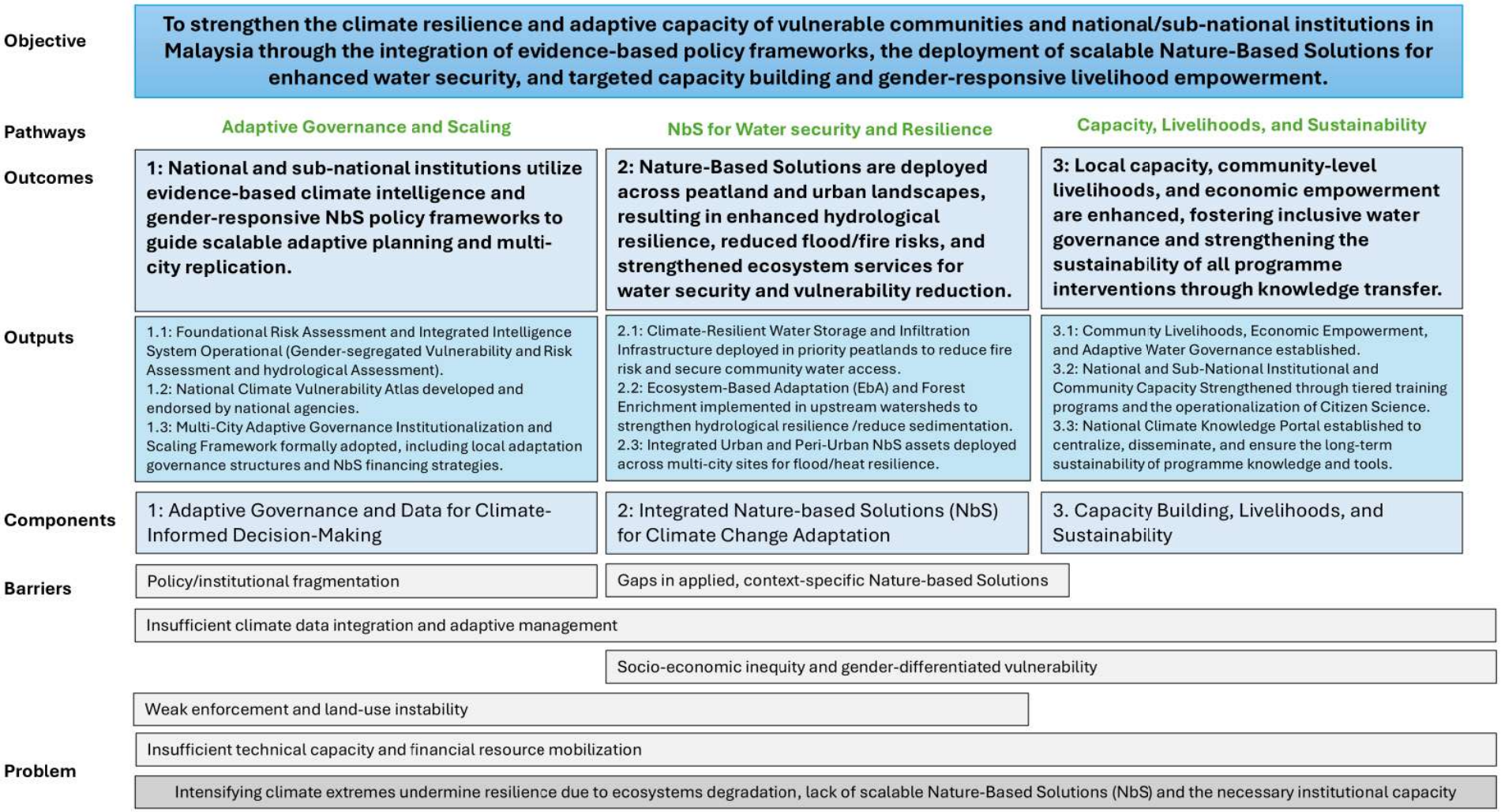
Projected Calendar and milestones

Milestones	Expected Dates
Start of Project/Programme Implementation	1 November 2026
Mid-term Review (if planned)	1 May 2029
Project/Programme Closing	31 October 2031
Terminal Evaluation	1 February 2032

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Figure: Theory of change



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PART II. PROJECT/PROGRAMME JUSTIFICATION

A. Description of programme components

This Programme is designed to fundamentally strengthen Malaysia's long-term climate resilience and adaptive capacity. It achieves this by systematically linking targeted, on-the-ground interventions with strengthened national and sub-national institutional capacity. At its core, the Programme pioneers innovative, context-specific Nature-Based Solutions (NbS) for water management across critical landscapes, directly combating escalating climate challenges like frequent floods, prolonged dry spells, and rising urban heat.

Crucially, the Programme is structurally designed as a National Scaling Model: site pilots (Component 2) generate validated performance data and lessons that are directly fed into the policy framework (Component 1), thereby enabling rapid replication across Malaysia. The entire Programme is organized around three interconnected operational components:

- **Component 1: Climate-Informed Governance and Adaptive Planning** This component establishes the policy, data, and institutional foundations necessary to achieve scalable, adaptive planning.
- **Component 2: Implementing Integrated Nature-Based Solutions (NbS) for Water Resilience** This component focuses on the physical execution of NbS assets and resilience measures across target sites.
- **Component 3: Capacity Building, Sustainable Livelihoods, and Knowledge Management** This component carries out the training, livelihood development, and knowledge sharing activities to ensure sustainability.

Component 1: Climate-Informed Governance and Adaptive Planning
Objective: National and sub-national institutions utilize evidence-based climate intelligence and gender-responsive Nature-based Solutions (NbS) policy frameworks derived from the NbS pilot interventions (component 2) to guide scalable adaptive planning and multi-city replication.

Component 1 serves as the strategic core and intelligence backbone of the Programme. It fundamentally resolves the issue of fragmented climate data and governance by establishing an innovative, adaptive data-governance linkage. This linkage provides the institutional blueprint necessary to ensure all adaptation efforts are evidence-based, pioneering a nationally transferable model that systematically embeds the NbS policy framework across key Malaysian municipalities.

Output 1.1: Foundational Risk Assessment and Integrated Intelligence System operational
This output establishes the cross-cutting foundation of the programme: a central, unified platform synchronizing all incoming data streams for actionable intelligence.

A detailed gender-disaggregated Vulnerability and Risk Assessment (VRA) and Hydrological Assessment is completed across all programme sites (Component 2: peatland, watershed, urban sites). This analysis combines predictive climate analysis (extreme rainfall, drought) with on-ground surveys and economic modelling to accurately map physical risk hotspots. Critically, the assessment analyses household-level data to quantify economic losses and identify how water stress creates differentiated impacts across communities, such as on female-headed households and the poorest farmers. This comprehensive assessment serves as the foundation for the design and targeting of all community-based actions, ensuring interventions are tailored to those most in need.

A central data management and analysis hub and system, the Integrated Climate–Forest Intelligence System (ICFIS) is fully developed and launched, serving as the coordination and

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intelligence backbone. The system integrates and synchronizes 100% of key data streams, fusing real-time Internet of Things (IoT) sensor data from physical interventions (Component 2), high-resolution remote-sensing indicators (PRI, LWCI, NDVI, NDMI), satellite data, and structured citizen science observations (from output 3.2). The central dashboard and server infrastructure will be fully operational, explicitly tracking and visualizing at least three core gender and social-disaggregated indicators (e.g., women's representation in adaptation committees, differentiated water access benefits), making social equity data immediately accessible to decision-makers. To ensure long-term sustainability, the ICFIS infrastructure and data hosting will be formally anchored within a mandated national agency, such as the National Hydraulic Research Institute of Malaysia (NAHRIM), under a long-term maintenance agreement.

The programme will also support the establishment or strengthening of a high-level inter-institutional platform (e.g., a Steering Committee or Technical Working Group) to foster strategic alignment and share cross-sectoral priorities for water-related climate adaptation. This platform will serve as the initial venue for ministries/departments (e.g., Ministry of Natural Resources and Environmental Sustainability (NRES), Ministry of Water and Environmental Sustainability, Ministry of Economy, and others) to jointly review and validate adaptation strategies, ensuring that national policy direction on climate resilience is co-developed and communicated consistently across all relevant agencies, thereby reducing policy fragmentation.

Output 1.2: National Climate Vulnerability Atlas developed and institutionalised
This output focuses on overcoming the fragmentation barrier related to inconsistent technical data and information sharing across agencies. It ensures that all subsequent climate adaptation planning and investments—especially for NbS—are built upon a common, scientifically credible evidence base, guided by a unified procedure.

The programme will undertake a comprehensive assessment of the current institutional data landscape for climate, water, and socio-economic vulnerability across collaborating agencies. This foundational work is essential to identify existing data gaps and inconsistencies that drive fragmented planning. Based on this assessment, the project will establish a common framework for knowledge sharing and actively work to harmonize key climate and water datasets among collaborating agencies. This focus on data harmonization and accessibility ensures that all technical decisions are built upon a common foundation, which is a prerequisite for effective inter-agency coordination.

Based on this harmonized data foundation, a high-resolution, digital Forest-Climate Vulnerability Atlas (Geographical Information System-based) will be developed. This Atlas is designed to translate complex scientific data into a user-friendly national planning tool. The Atlas will integrate 30 years of historical data (1990-2026) with future climate projection models (2026-2100). Crucially, the Atlas will conduct multi-regional vulnerability assessments, explicitly including gender and social vulnerability layers derived from the VRA (Output 1.1). This tool will directly guide resource allocation and policy interventions toward the most vulnerable ecosystems and communities in support of the National Adaptation Plan (MyNAP 2026–2040).

To ensure the technical coordination and utilization of the Atlas, the project will develop and institutionalize Integrated Water-Resilience Planning Protocols. These national protocols will establish a mandatory, unified procedure for technical staff across sectors (e.g., Forestry Department Peninsular Malaysia (JPSM), the National Hydraulic Research Institute of Malaysia (NAHRIM), Department of Drainage and Irrigation, the Forest Research Institute Malaysia (FRIM)) to jointly screen, design, and validate all water-related NbS investments and harmonize technical standards. These protocols serve as the *how-to* manual, forcing a common, evidence-based planning approach that eliminates the fragmentation arising from siloed technical practices. To ensure its high-level institutional uptake, the Atlas and the accompanying planning protocols will

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be officially endorsed by at least three key national agencies (e.g., the Ministry of Natural Resources and Environmental Sustainability (NRES), the Ministry of Water and Environmental Sustainability, and others). This endorsement process ensures the Atlas becomes the single source of authoritative data for climate-resilient water planning in Malaysia.

Output 1.3: Multi-City Adaptive Governance Institutionalization and Scaling Framework
This output is the critical bridge for scaling up the programme's impact, systematically consolidating the knowledge and policy lessons from the local pilot Nature-Based Solutions (NbS) interventions (Output 2.3) into a nationally replicable framework. It develops and formally embeds an Integrated Policy-to-Practice Scaling Framework (IPPSF) within three key governing bodies: the Kubang Pasu Municipal Council (MPKP), the Kuala Lumpur City Hall (DBKL), and the Petaling Jaya City Council (MBPJ). The IPPSF is a nationally replicable policy template being piloted across three contrasting municipal settings (urban, peri-urban, federal territory) specifically to maximize learning and transferability to other states supporting the National Adaptation Plan (MyNAP).

By pioneering a transformative policy shift, this initiates a whole-of-society blueprint for NbS management, formally linking bottom-up Locally Led Adaptation (LLA) community management with top-down municipal policy adoption and connecting localized physical protection with policy adoption across four distinct levels of action:

- **Community Level:** By establishing and formally recognizing Locally Led Adaptation (LLA) Co-Management Bodies (linked to output 3.2), the programme ensures community ownership, sustained local management, and inclusive, gender-responsive decision-making.
- **District/City Level:** The formalization of Adaptive NbS Governance Protocols and the embedding of data-driven Dashboards create the operational blueprint and Standard Operating Procedures (SOPs) for the condition-based management of physical assets (Output 2.3). These protocols will be accompanied by an official ministerial Circular to ensure mandatory adoption across all municipal departments responsible for asset management and public works.
- **State/Regional Level**: Securing Official Policy Adoption of the IPPSF principles and Operational Handbooks institutionalizes the framework within regional governance, creating the model for horizontal scaling across Malaysia.
- **National Level:** Consolidation of validated performance data and the Urban Resilience Toolkit creates a nationally transferable model and knowledge product to support the National Adaptation Plan (MyNAP) and resource allocation for future adaptation investment.

The initial phase of this output focuses on establishing the essential Policy and Governance Structures needed for scalable adaptation. This includes securing the Official Policy Adoption of the core Integrated Policy-to-Practice Scaling Framework (IPPSF) principles by the three implementing municipal/federal territory authorities: the Kubang Pasu Municipal Council (MPKP), the Kuala Lumpur City Hall (DBKL), and the Petaling Jaya City Council (MBPJ). Complementing this top-down institutional work is a commitment to local empowerment: the output is also responsible for the establishment and formal recognition of the 3 Locally Led Adaptation (LLA) Co-Management Bodies across the targeted sites, involving necessary stakeholder mobilization and formal recognition by the relevant local councils.

To operationalize this new governance, a second crucial set of deliverables focuses on Adaptive Protocols and Dashboards: formalizing the Adaptive NbS Governance Protocols and establishing three local Climate Risk & NbS Performance Dashboards. These dashboards are critical technical tools, designed to synchronize citizen-collected bioacoustic data (collected under Output 3.2) with municipal hydrological systems, providing local decision-makers with actionable, real-time risk

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intelligence necessary for the adaptive maintenance and management of the physical interventions (Output 2.3).

The final set of deliverables is centered on Tools, Finance, and Replication to ensure the programme's long-term sustainability and scalability. This involves consolidating all cross-cutting knowledge into a comprehensive Urban Resilience Toolkit, which documents the NbS designs (Output 2.3), the bioacoustic procedures (Output 3.2), and the protocols for establishing LLA Decision-Making Bodies. This toolkit is designed to facilitate the rapid adoption and upgrading of estimated more than 10,000 retention ponds nationwide. To ensure institutional permanence, this is complemented by the production of three dedicated Municipal NbS Operational Handbooks consolidating all cross-cutting knowledge into a ready-to-use replication package for other local councils nationwide.

Crucially, to address sustainable financing, the programme will partner with the Climate Finance Innovation Lab (CFIL) to develop tailored NbS Financing Strategies/Toolkits. The CFIL's whole-of-ecosystem approach—connecting projects, policymakers, experts, and funders—will be leveraged to specifically explore and outline innovative mechanisms such as Green Bonds, blended finance (public-private partnerships), and payment for ecosystem services (PES) schemes. These tailored NbS Financing Strategies/Toolkits directly address the major national barrier of financing adaptation and provide a clear, transferable financial mechanism for scalable replication beyond the grant period.

Output	Targets
Output 1.1: Foundational Risk Assessment and Integrated Intelligence System Operational	Vulnerability and Risk Assessment (VRA) and Hydrological Assessment completed across all programme sites (Peatland, Watershed, Urban sites). Integrated Climate–Forest Intelligence System (ICFIS) fully operational, synchronizing 100% of key data streams (IoT, remote-sensing, citizen science) and institutionally anchored in a national agency. Central dashboard explicitly tracks and visualizes 3 core gender and social-disaggregated indicators.
Output 1.2: National Climate Vulnerability Atlas developed and institutionalised	High-resolution, digital Vulnerability Atlas (GIS-based) developed, integrating 30 years of historical data and future climate projections (2026-2100). Atlas is completed and officially endorsed by at least three key national agencies. Integrated Water-Resilience Planning Protocols officially developed, institutionalized, and endorsed by relevant national agencies.
Output 1.3: Multi-City Adaptive Governance Institutionalization and Scaling Framework	Official Policy Adoption of the Integrated Policy-to-Practice Scaling Framework principles by three municipal councils (MPKP, DBKL, MBPJ). 3 Locally Led Adaptation (LLA) Co-Management Bodies established and formally recognized. 3 Municipal NbS Operational Handbooks and tailored NbS Financing Strategies/Toolkits produced (exploring Green Bonds/blended finance). 3 local Climate Risk & NbS Performance Dashboards operational (synchronizing Output 3.2 data).

Component 2: Implementing Integrated Nature-Based Solutions for Water Resilience
Objective: To deliver and deploy integrated, high-impact, site-based Nature-Based Solutions (NbS) across critical landscapes, resulting in enhanced hydrological resilience, significantly

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reduced flood/fire risks, and strengthened ecosystem services for water security and vulnerability reduction.

This component constitutes the core physical investment of the programme, deliberately targeting three contrasting, high-vulnerability landscapes—peatland, watershed, and urban—to demonstrate the efficacy and scalability of NbS against Malaysia's primary climate challenges. The interventions are designed to provide tangible, measurable improvements that directly reduce climate-induced risks. The physical assets created here serve as the practical foundation for the adaptive governance system (component 1) and are sustained by the capacity-building efforts (component 3). All physical works will utilize high-quality native vegetation supplied by the Women-Led Community Nurseries (output 3.1) and will be continuously monitored using the data systems established under output 1.3 and output 3.2.

Output 2.1: Climate-Resilient Water Storage and Infiltration Infrastructure in Priority Peatlands

This output deploys the "AquaVault" modular floating system, a validated and specialized Nature-Based Solution piloted and validated by the Forest Research Institute Malaysia (FRIM). The system is designed to enhance hydrological resilience and is able to reduce peat fire risk by integrating nature-based design with an IOT-enabled, climate-responsive mechanism (integrated in output 1.1). Functioning as a floating structure, this technology addresses hydrological imbalance by capturing and supporting localized flood risk reduction through temporary water retention and passively releasing it gradually during dry periods, mitigating prolonged dry season risk.

This approach was chosen because it utilises a successful, custom-built NbS that has been validated through trials by FRIM[5] as an effective strategy for peatland rewetting. In line with the IUCN Global Standard for Nature-based Solutions[6], this technique qualifies as an NbS because it is a validated strategy to protect, sustainably manage, and restore a natural ecosystem to address societal challenges, specifically disaster risk reduction, while simultaneously providing human well-being and biodiversity benefits. By mimicking natural flood-pulse dynamics and avoiding hard-engineered drainage, the system maintains the ecosystem's natural functionality in accordance with the IUCN Global Standard.

The trials conducted by FRIM confirmed a high Technology Readiness Level (TRL 7-8) and validated the system's long operational lifespan above 20 years in acidic peat environments. With its modular configuration, the system can be flexibly scaled to match site-specific hydrological conditions, making it an ideal solution for various peatlands. This system is designed to operate passively, adapt to seasonal water-level fluctuations, and function within sensitive peat ecosystems without extensive land modification. Furthermore, the modular concept offers robust potential for replication, leveraging locally available materials and community-based management models. The readiness for implementation is significantly enhanced by FRIM's existing site access and established relationships with local stakeholders. Moreover, the system's long-term sustainability will be secured by embedding its management under trained local Community Management Committees (output 3.1).

This intervention is targeted at the highly critical peat ecosystems of the Raja Musa Forest Reserve and Kuala Langat Utara Forest Reserve, storing significant carbon, and which are also

[5] Mohd Rizuwan M., Marryanna L., Nurul Faihira K. & Abdul Razak A.R. (2024). Inovasi Floating Nursery dan Floating Lotus untuk konservasi teratai di Tasik Chini. FRIM Technical Information Handbook No. 60. Institut Penyelidikan Perhutanan Malaysia (FRIM). ISBN 978-967-2810-82-7

[6] IUCN 2020: Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. 1st ed. Gland, Switzerland, IUCN.

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the customary lands of the Temuan Orang Asli Indigenous communities. These areas are subject to repeated catastrophic fire events, suffering from chronic vulnerability where groundwater levels frequently drop into the high-risk range (12–95 cm below ground). Immediate intervention is required to address the escalating risk of catastrophic peat fires, which are exacerbated by drier seasons and El Niño events, threatening both carbon stocks and regional air quality.

The deployment consists of four units (total approximately 16,000 m3 capacity annually) operating under two distinct configuration models:

- Fire Risk Mitigation (Rewetting Units): Two units will be installed within the Raja Musa peatland buffer zone to stabilize surface moisture against fire-risk. These units capture and store surplus monsoon water and release it gradually during dry periods. This action is expected to maintain peat moisture above the fire-risk threshold (<40 cm below ground for 90% of the dry season, thereby safeguarding carbon stocks and providing indirect environmental benefits to approximately 17,000 people in seven surrounding villages through reduced fire hazards.
- Water Security (Water Use Units): Two units will be positioned near communities such as Kampung Cheeding, Kampung Busut Baru, and Kampung Pulau Kempas. These units operate as a stabilising buffer by supplying treated water through a four-stage nature-based filtration chain. This ensures reliable access to safe water during supply interruptions, stabilizing water access for approximately 8,000 people (including approximately 750 vulnerable Temuan Orang Asli residents), and directly reducing the domestic water-collection burden disproportionately placed on women and girls.

An Integrated Monitoring and Early-Warning System will be established, deploying a sensor network across both sites (under output 1.1). The primary purpose is to directly track hydrological and surface-moisture dynamics across approximately 500 critical hectares, ensuring adaptive management based on real-time data.

Output 2.2: Ecosystem-Based Adaptation (EbA) and Forest Enrichment Implemented in Upstream Watersheds

This output addresses the long-term integrity of the nation's water supply by focusing on the adaptive management of a critical watershed.

The approach selected utilizes Forest Enrichment Planting and Erosion Control as an Ecosystem-based Adaptation (EbA)—a cost-effective, long-term solution—to address the root cause of hydrological instability: degradation from historical logging and erosion. This NbS will significantly strengthen the forest's natural water-retention function and reduce sedimentation, which is a more sustainable solution for reducing climate-induced flood and drought losses than purely engineering-based measures. The core objective is to achieve climate-resilient water security by improving watershed and ecosystem resilience.

This NbS is highly targeted at the Ulu Muda Forest Reserve catchment because it is the core water source for Malaysia's "rice bowl." The degradation of this area causes water instability that severely affects downstream agricultural areas. This climate stress translates to an existential socioeconomic vulnerability for downstream paddy farmers, who face projected yield reductions of up to 31% by 2050. Furthermore, the risks are disproportionately felt by vulnerable groups, particularly female-headed households, given that 35% of smallholder farmers are women who are often excluded from irrigation management decisions.

Action is required to pre-empt these devastating yield reductions by improving upstream water regulation and mitigating erosion that directly threatens the lifespan of the Muda Dam. Prompt intervention is essential to secure water productivity for the national rice bowl and simultaneously address the identified governance barrier by ensuring women's equitable participation in

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watershed governance and adaptation planning (linked to Output 3.1).

The physical work involves implementing assisted natural regeneration and enrichment planting across at least 800 hectares of forested catchment, prioritizing steep slopes and riparian zones within the Ulu Muda forest reserve. This work is expected to strengthen the forest's water-retention function and reduce sedimentation rates at the Muda Dam and key river sections by 10% thereby enhancing long-term water quality and extending the reservoir's lifespan. The commitment to social inclusion and equitable economic benefits is secured by training and employing 150 local community members (at least 50% women) in EbA tree-planting and maintenance techniques (output 3.1), thereby directly linking asset creation to livelihood strengthening and improving the climate resilience of the national rice production chain.

Beyond reducing sedimentation, the enriched forest cover is expected to significantly mitigate the impacts of flash flooding by increasing the forest floor's sponge capacity, slowing runoff velocity and regulating baseflow during the dry season. This improved hydrological regulation translates directly into enhanced drought resilience for the downstream rice cultivation areas (MADA), reducing reliance on costly water transfers and protecting agricultural productivity against increasing climate variability.

Output 2.3: Integrated Urban and Peri-Urban NbS Assets Deployed for Multi-City Flood/Heat Resilience

This output delivers direct, high-impact, site-based Nature-based Solutions (NbS) to address the escalating climate threats of flooding and urban heat stress in Malaysia's dense municipal settings.

This output employs a high-impact, low-cost scaling approach focused on leveraging and ecologically upgrading existing urban drainage assets, such as 200 retention ponds and drainage corridors. This cost-effective methodology is estimated to be 50–100 times cheaper than traditional new construction, making this Nature-based Solution (NbS) highly replicable for budget-constrained local councils seeking immediate flood and heat resilience benefits. Crucially, the success of this model demonstrates a massive national scaling potential, with an estimated 10,000 or more retention ponds nationwide available for similar ecological upgrading.

The interventions are designed to achieve measurable results, specifically targeting 20-25% reduction in flood damage and 1.5-3.0°C local cooling in adjacent areas (50-150m radius). To proactively manage risks, the programme incorporates a clear Risk Mitigation Strategy mandating rigorous validation by FRIM and an adaptive maintenance plan upheld by strong coordination with municipal and community partners.

The intervention targets three contrasting municipal settings—Kubang Pasu (MPKP), Kuala Lumpur (DBKL), and Petaling Jaya (MBPJ)—to maximize learning and replicability to pilot the national policy scaling framework (output 1.3). These urban and peri-urban areas are critically exposed to recurrent monsoon flooding and escalating urban heat stress, necessitating immediate protection. Intervention is crucial to provide immediate flood and heat protection to high-density areas, and the physical assets serve as the live testing grounds for the Adaptive NbS Governance Protocols being institutionalized under output 1.3 and monitored by the citizen science system under output 3.2. Specific interventions include the ecological upgrading of 200 retention ponds and establishment of small-scale, high-density forest plots in Kubang Pasu, the strengthening of 1 bio-engineered vegetated berm in Kuala Lumpur, and the restoration of 1 urban drainage corridor through bank stabilization and riparian planting in Petaling Jaya. The NbS assets form the core physical adaptation infrastructure for multi-city scaling.

- **Kedah – Kubang Pasu (MPKP):** Focuses on peri-urban agricultural and village drainage systems. Interventions include the ecological upgrading of 200 retention ponds using NbS

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measures, such as bio-engineered bank stabilization, enhanced water retention, and vegetated buffer zones. Additionally, Miyawaki mini-forests (using high-quality native plants supplied by the Output 3.1 community nurseries) will be established at selected pilot pond sites to strengthen ecological connectivity and deliver localized cooling.

- **Kuala Lumpur – Kampung Pasir Baru (DBKL):** In this river-adjacent settlement, the programme will strengthen 1 bio-engineered vegetated berm to improve river flood protection.
- **Selangor – Petaling Jaya, Kampung Cempaka (MBPJ):** Focuses on a dense neighborhood. The program will restore 1 urban drainage corridor through bank stabilization, riparian planting, and shade trees.

Together, these physical assets will be continuously evaluated using hydrological, microclimate, and citizen science monitoring (output 3.2) to provide predictive, data-driven insights for long-term urban resilience planning.

Outputs	Targets
Output 2.1: Climate-Resilient Water Storage and Infiltration Infrastructure in Priority Peatlands	4 units (2 Rewetting, 2 Water-Use) installed and fully operational, providing a combined annual capacity of approximately 16,000 m3. The system ensures peat moisture remains above the fire-risk threshold (<40 cm below ground) for 90% of the dry season across the 500 ha monitored zone.
Output 2.2: Ecosystem-Based Adaptation (EbA) and Forest Enrichment Implemented in Upstream Watersheds	800 hectares of delineated upstream catchments enriched with NbS planting. Sedimentation rate in the Muda Dam and key river sections reduced by 10%.
Output 2.3: Integrated Urban and Peri-Urban NbS Assets Deployed for Multi-City Flood/Heat Resilience	200 retention ponds ecologically upgraded in Kubang Pasu, Kedah. 1 bio-engineered vegetated berm strengthened in KL. 1 urban drainage corridor restored in PJ. 20-25% reduction in flood damage and 1.5-3.0^{o}C local cooling achieved in targeted sites (measured against controls).

Component 3: Capacity, Livelihoods, and Sustainability

Objective: Local capacity, community-level livelihoods, and economic empowerment are enhanced, fostering inclusive water governance and strengthening the long-term sustainability and local replication potential of all programme interventions through targeted knowledge transfer and social resilience building.

This component builds the essential social capital, resilient supply chain, and human capacity required for the long-term maintenance, equitable management, and scaling of the programme's physical assets (component 2) and policy systems (component 1). It focuses on empowering vulnerable groups, particularly women and indigenous residents, to become active co-managers of climate resilience infrastructure and data.

Output 3.1: Community Livelihoods, Economic Empowerment, and Adaptive Water Governance

This output directly supports local resilience through economic empowerment and institutionalized equity in resource management, recognizing that building human capacity and a resilient supply chain is essential for the long-term sustainability and equitable management of all programme interventions. The focus is on empowering vulnerable groups, particularly women and indigenous residents, to address their socioeconomic vulnerabilities and become active co-managers of climate resilience infrastructure.

- **Women-Led Supply Chain and Livelihoods:** Establishing three Women-Led Community

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Nurseries across the target urban and peri-urban areas (Kubang Pasu, Kampung Pasir Baru, and Kampung Cempaka) is a crucial step for both livelihood creation and supply chain resilience. These nurseries create sustained income for at least 30 vulnerable women, directly addressing their economic fragility, while simultaneously providing the high-quality, native vegetation supply required for all large-scale NbS planting needs in the Watershed (output 2.2) and Urban (output 2.3) sites. The women's groups receive capacity building in technical horticultural skills, financial management, and co-management protocols to ensure the longevity of these enterprises.

- **Watershed Employment and EbA Skill Transfer:** In relation to the Forest Enrichment (output 2.2), the commitment to social inclusion and equitable economic benefits is secured through direct job creation related to the physical interventions. Specifically, the programme commits to training and employing 150 local community members (at least 50% women) in EbA tree-planting and maintenance techniques to support the forest enrichment work in the Ulu Muda catchment, thereby directly linking asset creation to livelihood strengthening and ensuring local ownership of the rehabilitation process.

- **Adaptive Water Governance and Equity:** Formalizing Adaptive Water Governance is critical for overcoming systemic social exclusion and ensuring resource equity. This action is implemented in both the MADA region and peatland sites by mandating 50% women representation in local water management committees (Water Users Associations, WUAs, and Community Management Committees, CMCs). This mandate addresses the barrier of women being systemically excluded from irrigation management decisions, ensuring that decisions on water allocation are inclusive and reflect the needs of all users. For the Peatland sites, this includes training and certifying at least 20 local community/indigenous representatives in the co-management and maintenance of the floating water storage systems , thereby building the local capacity required to sustain the asset over its lifespan (output 2.1).

- **Community-Based Adaptation (CBA) Package:** A targeted Community-Based Adaptation (CBA) Package addresses the long-term socioeconomic risks in the MADA farming community (linked to output 2.2 site), which is characterized by a strong reliance on a single crop, an aging workforce, and limited financial preparedness. Addressing the disproportionate impacts faced by female farmers (up to 35% of smallholder farmers) is central. The programme delivers training to a cumulative total of 350 farmers, including specialized disaster finance literacy workshops for 200 vulnerable households to improve budgeting for climate shocks. Furthermore, a Young Farmers Mindset Transformation Program for 30 young farmers is included to foster future leadership and encourage the adoption of sustainable practices necessary for long-term watershed resilience.

Output 3.2: National and Sub-National Institutional and Community Capacity Strengthened
This output implements comprehensive training and monitoring capacity development to build multi-level capacity and establish a real-time, socially inclusive feedback loop into the national decision-making system. This work is critical to overcome institutional and community barriers to utilizing climate intelligence, ensuring that the data systems (Component 1) and physical assets (Component 2) are sustained by skilled personnel at every level.

A decentralized, community-driven Citizen Science Adaptive Monitoring System is established with community-based Eco-Warden monitoring teams and 400 local volunteers (minimum 50% women/vulnerable groups). These teams and volunteers will collect real-time data on asset performance and ecosystem health with low-cost technology (e.g., bioacoustic sensors, water quality kits). This data feeds directly into the ICFIS (Output 1.1) and the local Performance Dashboards (Output 1.3), creating a continuous, data-driven feedback loop for adaptive maintenance. This institutionalizes a low-cost, local-level monitoring system, replacing reliance on

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expensive external consultants.

Comprehensive Institutional and Technical training programs will be implemented at three levels:

- **National Level:** 200 staff (50% women) at the national level across at least three key institutions/departments to build the capacity of technical staff on ICFIS data interpretation (O 1.1) and adaptive planning, feeding into the Atlas development and use (O 1.1, 1.2).
- **Municipal/State Level:** 30 municipal/state level staff (30-40% women) trained on the Adaptive NbS Governance Protocols and Climate Risk & NbS Performance Dashboards established under O 1.3, demonstrating practical use of the adaptive system for routine inspection, maintenance prioritization, and flood-risk interpretation.
- **Community Level:** The Eco-Warden/citizen scientist training (400 people) operationalizes the community Bioacoustic Monitoring System as an innovative, low-cost citizen science tool that feeds real-time ecological data directly into the ICFIS (O 1.1) and informs local NbS adaptive maintenance.

Output 3.3: National Climate Knowledge Portal Established
This output ensures that all project knowledge, methodologies, and data tools are systematically maintained and publicly accessible for long-term national dissemination, scaling, and institutional capacity building.

A user-friendly National Climate Knowledge Portal is fully operationalized, serving as the primary conduit for disseminating the Atlas (output. 1.2), user-friendly GIS tools, and the Urban Resilience Toolkit (consolidated under output 1.3). To maximize utility for local and vulnerable groups, the portal will include at least 5 capacity building modules specifically tailored for local communities and made accessible in appropriate local languages and formats for women's groups and indigenous communities. The Knowledge Portal will also host the NbS Financing Strategies/Toolkits (from Output 1.3), providing future implementers and municipalities with practical guidelines on how to structure projects to attract public funds, private sector investment, and other grant resources for replication.

Sustainability is secured by formalizing at least 3 long-term data sharing agreements with key national agencies (e.g., DID, Forestry Department, Meteorological Department), ensuring the portal is continuously updated and officially recognized as a central climate intelligence resource. This output also facilitates the formal recognition of the LLA Decision-Making Bodies established under output 1.3 to ensure community stewardship of the knowledge.

Output	Targets
Output 3.1: Community Livelihoods, Economic Empowerment, and Adaptive Water Governance	50% women representation achieved in local water management committees (WUAs/CMCs). 30 vulnerable women with sustained income from nursery operations (link to output 2.2). 150 local community members (min 40% women) trained/employed in EbA techniques (link to output 2.2). 20 local community/indigenous representatives trained in co-management (link to output 2.1). 350 farmers trained in specialized disaster finance concepts and adaptive budgeting for climate shocks, including 50% women and 30 young farmers (link to output 2.2).
Output 3.2: National and Sub-National Institutional and Community Capacity Strengthened	200 national staff trained (across at least 3 institutions/departments), min 50% women. 30 municipal/state level staff trained (on Adaptive Governance Protocols/Dashboards), min 30-40% women. 400 citizen scientists/Eco-Wardens trained, min 50% women (link to output 2.3).

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Output 3.3: National Climate Knowledge Portal Established	National Knowledge Portal fully operational. 5 capacity building modules tailored for local/vulnerable groups. Long-term data sharing agreements formalized with 3 key national agencies.

Inter-component linkages

The cohesion of the Programme is established through explicit feedback loops that link the project's three Components, creating an adaptive, self-reinforcing system that ensures scalability and long-term sustainability. In essence, Component 2 (Physical Assets) and Component 3 (Capacity & Livelihoods) generate the evidence and human capital needed, while Component 1 (Adaptive Governance) transforms that evidence and capital into scalable policy and institutional systems, ensuring a complete, circular cycle of adaptation, learning, and replication.

Data and Intelligence Flow (Component 2 & 3 to Component 1)

The system is fundamentally driven by data generated from the ground-level activities.

- **From Physical Assets (component 2):** Component 2 assets, such as the modular floating water storage systems and the urban NbS infrastructure, are instrumented with IoT sensors and hydrological monitoring. This real-time, site-specific performance data (on peat moisture, water retention, and local cooling) feeds directly into the Integrated Climate–Forest Intelligence System (ICFIS) (Output 1.1) under Component 1.
- **From Communities (component 3):** Component 3, through the trained citizen scientists/Eco-Warden Teams (Output 3.2), generates community-validated ecological (bioacoustic) and site observation data. This essential human intelligence also streams directly into the central ICFIS (Output 1.1).

Policy, Validation, and Adaptive Feedback (Component 1 to Component 2 & 3)

Component 1 acts as the synthesis and validation hub, translating raw data into actionable policy and guidance.

- **Validation and Policy Scaling:** By integrating all data streams, Component 1 validates the effectiveness and cost-efficiency of the Component 2 NbS models. This evidence is formalized and translated into the Integrated Policy-to-Practice Scaling Framework (IPPSF) and Municipal NbS Operational Handbooks (Output 1.3). These formalized tools are then used by local governments (trained under O. 3.2) to manage, maintain, and replicate the physical assets of Component 2.
- **Adaptive Management:** The ICFIS generates predictive risk models and early warnings that are relayed back to the sites to guide the adaptive management of the physical interventions (e.g., adjusting water management protocols in the peatlands or prioritizing maintenance on urban assets).
- **Knowledge Transfer:** The National Climate Knowledge Portal (Output 3.3) is established specifically to disseminate the National Climate Vulnerability Atlas (Output 1.2) and the Urban Resilience Toolkit (containing O. 1.3 policy protocols), ensuring institutional knowledge transfer.

Capacity, Supply Chain, and Livelihoods (Component 3 to Component 2)

Component 3 provides the essential social and economic foundation necessary for the long-term viability and equitable operation of the physical infrastructure.

- **Human Capital:** Component 3 delivers the human capital by training certified staff and co-management committees (Output 3.2, 3.1), including local community and indigenous representatives. These trained teams are responsible for the routine operation and maintenance of the high-value Component 2 assets, such as the modular water storage systems (Output 2.1) and the watershed restoration areas (Output 2.2).
- **Sustainable Supply Chain:** Component 3 creates a sustainable local supply chain through the Women-Led Community Nurseries (Output 3.1). These nurseries propagate the native plants necessary for the Forest Enrichment (Output 2.2) and Urban NbS

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Upgrades (Output 2.3). This mechanism guarantees local ownership, creates livelihoods, and reduces the project's dependency on external resources for long-term maintenance and replication.

B. Economic, Social and Environmental benefits

The Programme will generate significant and interlinked benefits across economic, social, and environmental dimensions, demonstrating a holistic approach to climate change adaptation that targets Malaysia's most climate-vulnerable landscapes and populations.

Primary Adaptation Outcomes: Economically, the Programme ensures stability by significantly reducing flood damage and infrastructure maintenance costs through nature-based flood control. Environmentally, it secures vital water resources and stabilizes water tables to mitigate drought and fire risks.

Co-benefits: Beyond these primary objectives, the Programme generates significant social and environmental value. Socially, it integrates Gender Equality and Social Inclusion (GESI) by ensuring leadership roles for women and youth in water management. Environmentally, it achieves critical ecosystem restoration (peatlands, forests) and provides carbon sequestration, while creating the institutional blueprint for national NbS scaling.

Economic Benefits:

- **Reduction in Flood Damage Costs (C2):** The Programme aims to achieve a 20-25% reduction in flood damage costs by ecologically upgrading retention ponds and deploying NbS assets across the three municipalities, leveraging high-impact, low-cost adaptation.
- **Avoided Fire Loss and Infrastructure Protection (output 2.1)**: Stabilizing the peat water table via innovative water storage systems prevents major economic losses associated with catastrophic peat fires (e.g., agricultural damage, infrastructure costs, tourism impact) and avoids the cost of suppressing massive wildfires.
- **Enhanced Water Security and Livelihood Resilience (C2):** Improved watershed management stabilizes water flows, mitigating drought and sedimentation, thereby safeguarding rice yields for smallholder farmer households and protecting their primary income source.
- **Co-benefit: Livelihood Creation and Diversification (C2, C3):** Generates new green employment; local community members will be trained and compensated for long-term roles in NbS maintenance and monitoring, including dedicated women-led nursery operations (O. 3.1). Crucially, the program trains farmers/households in climate-smart livelihoods and disaster finance concepts, enhancing off-farm income.
- **Maladaptation Avoidance (C1):** The Integrated Climate–Forest Intelligence System (ICFIS) ensures adaptation spending is evidence-based and optimally sited, avoiding financial waste on ineffective projects.

Social Benefits:

- **Improved Water Security and Consistency (C2):** Directly benefits people with consistent domestic water supply and provides a reliable source for Indigenous Households in the peatland areas, directly reducing the domestic water-collection burden disproportionately placed on women and girls.
- **Enhanced Community Resilience and Data Ownership (C2, C3):** The program trains farmers with adaptive livelihood skills and establishes local Eco-Warden Teams to strengthen citizen science and data collection. This feeds directly into local Early Warning Systems (EWS) and the adaptive management of physical assets.
- **Improved Public Health and Safety (C2):** Mitigation of peat fire hazards reduces smoke-related health risks for local residents and reduced urban heat stress (1.5-3.0° C local

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cooling) and improved air/water quality enhance public health.

- **Co-benefit: Gender Equality and Social Inclusion (GESI) (C3):** The Programme mandates high women's participation (minimum 50% in training), establishes women-led nurseries (O. 3.1), and prioritizes vulnerable groups (youth, low-income farmers, Indigenous Peoples) in training and benefits. The total programme budget allocates 15% to gender equality and social inclusion.

Environmental Benefits:

- **Peatland Hydrology Restoration and Fire Risk Reduction (C2):** The Rewetting System (output 2.1) reduces fire ignition risk by 60-80% across 500 hectares of peatland, acting as a hydrological buffer.
- **Co-benefit: Carbon stock protection:** Protecting significant carbon stock (output 2.1) delivers a high-value global climate mitigation benefit.
- **Forest Enrichment and Water Quality (C2):** Rehabilitation of 800 hectares of degraded forest will strengthen the watershed's natural functions. This is expected to reduce the sedimentation rate in the Muda Dam and key river sections by 10% significantly enhancing long-term water quality and prolonging the reservoir lifespan.
- **Ecosystem-based Adaptation (EbA) and Biodiversity (C2, C3):** NbS interventions across urban and rural sites act as natural buffers against climate impacts. The use of native species, bioacoustic monitoring (O. 3.2), and green corridors enhances local biodiversity and ecosystem functionality.
- **National Knowledge Infrastructure (C1):** The National Forest-Climate Vulnerability Atlas provides a foundation for science-based conservation and climate planning across Malaysia, guiding future EbA investments toward the most vulnerable ecosystems.

Avoiding and Mitigating Negative impacts

In compliance with the Adaptation Fund's Environmental and Social Policy (ESP) and Gender Policy (GP), and applying the UNDP Social and Environmental Standards (SES) and the UNDP Gender Policy, the programme integrates mitigation measures directly into the design. Classified as Moderate Risk (Category B), the programme commits to zero physical displacement and ensures that all physical works are focused on existing, disturbed areas using only native species to avoid harm to natural habitats.

The programme proactively manages high-priority social risks, including risks to Indigenous Peoples, high public safety risks (e.g., drowning in rehabilitated ponds), and commits to the Prevention of Sexual Exploitation and Abuse (PSEA) and Gender-Based Violence (GBV) mitigation measures.

The framework for compliance, including the application of the UNDP Social and Environmental Standards (SES) and approach towards the further assessment and management of all risks identified during preliminary screening, is outlined in Section E and Section K (see also Annex 1 Abridged SES Procedure form).

C. Cost-effectiveness

The Programme maximizes cost-effectiveness through strategic investment in scalable Nature-based Solutions (NbS) that provide quantifiable economic returns and establish a scientific framework for replication. The three interconnected component structure achieves high cost-efficiency by leveraging the cross-cutting Integrated Climate–Forest Intelligence System (ICFIS) in Component 1 to ensure all adaptation measures are evidence-based, risk-informed, and ready for national mainstreaming, eliminating redundant design and validation costs for future scaling.

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The programme's investment in Nature-based Solutions (NbS) is significantly more cost-effective and financially sustainable than comparable 'grey' infrastructure alternatives over the programme's lifetime, primarily by avoiding high capital costs, lowering long-term maintenance needs, and generating high-value ecosystem co-benefits (carbon sequestration).The full Programme proposal will conduct a detailed Cost-Benefit Analysis to formally quantify the Net Present Value and return on investment of the NbS portfolio versus traditional alternatives.

Table: NBS approach vs. Grey infrastructure alternative

Intervention	NbS Approach (Programme)	Grey Infrastructure alternative	Cost-Effectiveness Rationale
Water Supply/ Security	Modular Water Storage and Infiltration Systems deployment (O 2.1) and Forest Rehabilitation (O. 2.2) for water retention, surface-moisture stabilisation, and water supply consistency.	New concrete Dam/Reservoir: Estimated upfront cost in Malaysia often exceeds $100 million with high maintenance.	Primary Adaptation Outcome: NbS provides water security and drought resilience at a fraction of the cost, is decentralized, and requires lower maintenance. Co-benefits: the NbS approach generates significant co-benefits (carbon sequestration, enhanced biodiversity) which are typically not valued in grey infrastructure.
Flood/Erosion Control	Retention Pond and NbS upgrades (O. 2.3) and Forest Enrichment (O. 2.2): Improved flood attenuation capacity through natural retention and reduced sedimentation.	Concrete Flood Walls/Dredging: High recurring capital costs for construction and maintenance, with no ecosystem co-benefits.	Primary Adaptation Outcome: NbS provides direct flood control by addressing root causes (erosion/sedimentation) and provides natural attenuation, demonstrating superior long-term return on investment and reducing the need for costly grey infrastructure maintenance (dredging). Co-benefits: Provides additional co-benefits through ecosystem services (habitat restoration, air quality) not possible with concrete infrastructure.

Additional Cost-Effectiveness Factors

- **Adaptive Efficiency (C1):** The ICFIS (O. 1.1) ensures adaptation spending is evidence-based and optimally sited, avoiding financial waste on ineffective projects, thereby ensuring that every dollar invested in C2 assets is targeted by high-resolution data.
- **Sustainability via Livelihoods (C3):** The investment in Women-Led Community Nurseries and training of local community members (O. 3.1) creates a sustainable, low-cost supply chain for native plants and a compensated, local workforce for asset maintenance. This mechanism ensures the long-term viability of the physical assets (C2) without relying on expensive external contractors.
- **Policy Scaling (C1):** By developing and embedding the Integrated Policy-to-Practice Scaling Framework (IPPSF) (O. 1.3) within three municipal bodies, the Programme creates a template for multi-city replication. This means future cities can adopt proven NbS models and policy protocols without incurring the full design and validation costs of a pilot, maximizing the initial grant investment's impact.
- **Leveraging Existing Infrastructure (C2):** The urban NbS approach (O. 2.3) focuses on leveraging and ecologically upgrading existing urban drainage assets (like retention ponds), which is 50-100 times cheaper than constructing new, large-scale grey infrastructure.

Return on Investment (ROI)

The financial viability of the Programme is guaranteed by a strong Return on Investment (ROI).

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The following tables demonstrate the cost-effectiveness of the NbS portfolio, showing that the Total Financing requirement for the programme is recovered in less than five months, preventing an estimated USD 10-12 in future losses for every USD 1 spent.

The tables below summarize the financial justification for the Programme. The overall Total Programme Cost (TPC) is used to calculate the Programme's payback period, while direct component costs are used to calculate the individual ROI of each technical intervention

Table: Overall Programme Return on Investment (ROI)[7]

Element	Unit	ROI
Total Programme Costs (TPC)	USD	USD 10,000,000 (RM 42.2M)
Total Annual Savings (TAS)	USD	USD 26,661,000 M (RM 92.2M)
Payback Period	Months	<5 months

Table: Detailed Return on Investment calculation pr. component

Component	Cost-Effectiveness Justification	Initial Investment (USD)	Annual Benefit (USD)	ROI Timeline
Component 1: Adaptive Governance and Scaling	**Avoided Maladaptation & Innovation:** The Integrated Climate–Forest Intelligence System (ICFIS) and the Vulnerability Atlas protect the entire programme investment by ensuring all physical assets (C2) are optimally sited and managed based on climate intelligence, preventing future financial waste and loss from maladaptation. The framework consolidates fragmented data, replacing expensive guesswork.	**$1,750,000**	**$3,571,000**	**< 6 months**
Component 2: Physical Assets for Enhanced Resilience	**Integrated Avoided Loss (Fire, Flood, Erosion):** This integrated investment secures the Ulu Muda watershed (protecting VPR for 4.15M people), avoids catastrophic peat fire losses (saving carbon and infrastructure), and provides measurable flood/heat reduction across 3 cities (upgrading 200 assets is 50–100X cheaper than new construction).	**$5,000,000**	**$23,614,000** ($7.5M fire + $11.9M watershed + $4.214M urban savings)	**< 3 months**
Component 3: Capacity, Livelihoods, and Sustainability	**Institutional Cost Leverage & Livelihoods:** Investment establishes a low-cost, permanent monitoring network (Eco-Wardens/Citizen Science), replacing expensive manual inspections. Additionally, Women-Led Nurseries create sustained revenue and resilient local supply chains, safeguarding the long-term maintenance costs of all C2 assets.	**$1,591,014**	**$476,000**	**< 40 months**
Overall Programme Totals	**Adaptation-focused ROI: The Programme's design principle dictates that every USD 1 spent prevents approximately USD 10–12 in future losses.**	**$8,341,014 (Total Component Cost)**	**$27,661,000 (Annual Mid-Point)**	**< 4 months**

D. National policy framework

The Programme is highly consistent with Malaysia's national development strategies and climate policy frameworks. The programme's activities are explicitly designed to align with and provide

[7] Exchange Rate: All calculations use the established exchange rate of 1 USD = 4.22 RM

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tangible, piloted inputs to key government priorities regarding climate resilience, flood mitigation, water security, and institutional capacity building.

Consistency with National Strategy: Climate and Development

National Climate Change Policy 2.0 (NCCP 2.0): The programme contributes to two main strategic thrusts:

- Strategic Thrust 3 (Adaptation and Resilience): The programme promotes risk-based planning and integrated approaches. It achieves the strategy of maximizing co-benefits by deploying Nature-Based Solutions (NbS) across all components 1, 2, and 3, providing essential ecosystem services for resilience.
- Strategic Thrust 1 (Climate Governance and Capacity):The programme supports the goal of strengthening institutional capacity and data systems. Component 1 (Output 1.1) establishes the Integrated Climate–Forest Intelligence System (ICFIS), linking fragmented data streams (IoT, satellite, citizen science) to guide intervention and informed policy action.

Thirteenth Malaysia Plan (13MP, 2026–2030): The programme directly supports the 13MP's focus on Strengthening Flood Mitigation and Adaptation. The scaling strategy ensures adaptation measures are integrated into state and national planning.

Malaysia's 2025 Nationally Determined Contributions (NDC 3.0): The programme directly supports the implementation of adaptation strategies outlined in Malaysia's updated NDC, which focuses on six priority areas for the period 2026–2035:

- The Programme improves water supply consistency, strengthens flood capacity in the national rice bowl (C2/O. 2.2), and deploys NbS for urban resilience (C2/O. 2.3).
- Ecosystem and Health Protection: It addresses health risks by reducing smoke from peat fires and enhancing ecosystem resilience through forest rehabilitation.

National Adaptation Plan (MyNAP 2026–2035): Malaysia is currently developing its first NAP expected to be finalized in 2026. The Programme addresses multiple national priority areas:

- Managing Water Resources and Security
- Ensuring Agriculture Sustainability and Food Security
- Increasing Resilience for Infrastructure and Cities
- Protecting and Conserving Forests and Biodiversity Sustainably

Water Sector Transformation 2040 (WST 2040): The programme enhances the resilience of the water sector against climate change, contributing to managing water-related risks such as flood, drought, and storm surge, which is a core agenda of WST 2040.

Alignment with sub-national and institutional frameworks

The Programme ensures ownership and long-term sustainability by aligning with the specific plans and mandates of key state and regional authorities.

State and municipal alignment

- **Selangor**: The programme's interventions, specifically the Modular Water Storage pilot (C2/O. 2.1) in Raja Musa and the urban NbS deployment (C2/O. 2.3) in the Petaling Jaya municipality (MBPJ), align with state priorities. The institutionalization of the Integrated Policy-to-Practice Scaling Framework (IPPSF) (C1/O. 1.3) within MBPJ supports the municipality's climate action and flood management plans by formalizing a gender-responsive, data-driven approach to deploying green infrastructure for urban resilience.

- **Kedah:** Component 1 is strategically designed to address critical institutional gaps for Nature-based Solutions (NbS) adoption within Kedah. It develops and internalizes the systematic

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Integrated Policy-to-Practice Scaling Framework (O. 1.3) within the Majlis Perbandaran Kubang Pasu (MPKP) and relevant Kedah state agencies. This aligns the Programme's physical assets (O. 2.3 urban NbS upgrades) with the state's own development priorities on flood mitigation, water security, and institutional capacity building..

- **Kuala Lumpur (Federal Territory)**: The Programme's small-scale physical pilots (C2/O. 2.3) and community monitoring activities (C3/O. 3.2) support the city's resilience and sustainability goals, such as those outlined in the Kuala Lumpur Structure Plan 2040. The institutionalization efforts under Component 1 (O. 1.3)—focused on adaptive protocols and toolkit validation—are directly relevant to the strategic planning of Kuala Lumpur City Hall (DBKL), contributing to the city's ambition of becoming a climate-resilient metropolis.

Sectoral Alignment

- **MADA Authority**: Within the agricultural landscape, the Programme's interventions in Ulu Muda (Component 2/O. 2.2) are designed to complement and enhance the existing work of the Muda Agricultural Development Authority (MADA). The programme shifts the focus towards adaptive, climate-resilient agricultural and water management solutions, ensuring synergy and avoiding duplication with this key sectoral agency responsible for national rice production.

E. Environmental and Social Standards

Applicable Standards & Requirements

UNDP is an accredited Implementing Entity of the Adaptation Fund, and as such commits to developing and implementing the proposed programme in compliance with the Adaptation Fund's Environmental and Social Policy (ESP). UNDP will do so through its own Environmental and Social Management System (ESMS) and application of UNDP's Social and Environmental Standards (SES), explicitly recognized as meeting the requirements of the Adaptation Fund ESP[8]. All programmes shall also meet relevant national legal requirements and technical standards.

Environmental & Social Risk Screening and Categorisation

Consistent with the Adaptation Fund ESP requirement, UNDP's SES also promotes screening at concept stage through the SES Procedure (SESP). As such, a SESP screening has been conducted during concept note development and is presented in Annex 1. The SESP form will be reviewed and updated during the full programme preparation phase (and during implementation when appropriate or required e.g. due to changes in activities, locations or operational context). Based on this preliminary screening, while the project is expected to have mainly positive social and environmental impacts and integrate social and environmental standards in its design, a number of risks were identified. As per UNDP's SES policy and the Adaptation Fund's ESP, the principles and standards outlined in the table below are triggered. Potential adverse social and environmental risks and impacts are few in number, limited in scale, largely reversible and can be identified with a reasonable degree of certainty and readily addressed through application of recognized good international practice, mitigation measures and stakeholder engagement during project implementation. **The overall project risk category is Moderate as per UNDP's SES policy** and **Category B** as per the Adaptation Fund's ESP. The planned relevant social and environmental assessments and management measures are described in the sections below.

The table below presents the relevant UNDP SES principles and project/programme-level standards triggered by the proposed concept, as identified during the SESP screening. For reference, the table also shows the equivalent AF ESP principles that are considered relevant.

[8] See Articles 3 and 6 of the ESP.

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Table: Environmental and Social Principles and Standards Triggered

UNDP SES Principles (P)/Standards (S)	AF ESP Principles
P1: Human Rights/Leave No One Behind	P2: Access & Equity P3: Marginalised & Vulnerable Groups P4: Human Rights
P2: Gender Equality & Women's Empowerment	P5: Gender Equality & Women's Empowerment
P3: Sustainability & Resilience	P11: Climate Change
P4: Accountability	P2: Access & Equity P4: Human Rights
S1: Biodiversity Conservation & Sustainable Natural Resource Management	P9: Protection of Natural Habitats P10: Conservation of Biological Diversity
S2: Climate Change & Disaster Risks	P11: Climate Change
S3: Community Health & Safety	P13: Public Health
S5: Displacement & Resettlement	P8: Involuntary Resettlement
S6: Indigenous Peoples	P7: Indigenous Peoples
S7: Labour & Working Conditions	P6: Core Labour Rights

Environmental & Social Assessment and Risk Management

As a moderate risk programme, an Environmental and Social Assessment (ESA) will be undertaken during the programme preparation phase to further assess and consider key issues/risks, confirm this categorization, and develop an Environmental and Social Management Plan or Framework (ESMP/ESMF)[9]. The ESMF/ESMP will set out requirements for further assessment as well as approaches, steps and measures for the avoidance, management and mitigation of the range of environmental and social risks. This may include accompanying targeted management plans or standard codes of practice for particular activities.

In line with the Adaptation Fund's ESP Principle 1, the ESMF/ESMP shall reference and comply with the Malaysian legal framework providing relevant protections for the environment and communities. The programme will be implemented in partnership with the Government of Malaysia and shall wherever possible utilise the existing country safeguards systems and institutional arrangements. Important relevant legislation will include laws, regulations and standards pertaining to Environmental Impact Assessment (EIA), land tenure (Land Code) and forestry, labour and occupational health and safety (OHS). Additional safeguards measures will only be applied where necessary to ensure further compliance with the SES and best international practices and standards.

Given that the programme includes specific outputs/activities that will affect indigenous peoples, the preparation phase will initiate a process of Free, Prior and Informed Consent (FPIC)[10] for the proposed activities and develop an Indigenous Peoples Plan (IPP).

In addition, and as standard practice in the development of UNDP programmes in line with the SES principles, programme preparation shall be done in an inclusive and participatory manner with a Stakeholder Engagement Plan (SEP) prepared with strategies to ensure effective and meaningful engagement throughout the programme cycle, including the design of a Grievance Redress Mechanism (GRM). Further, the preparation phase shall also include the conduct of a gender assessment and preparation of a Gender Action Plan (GAP).

[9] Per the UNDP SES, projects for which an ESMF may be necessary include, but are not limited to, those that: a) support multiple small-scale subprojects; b) implement to-be-specified activities; c) include components that could not be assessed prior to submission (e.g. due to budgetary or time constraints); d) respond to crisis and emergency situations.

[10] Broad community support for the interventions and consent to proceed will be secured during the preparation phase. Formal and full FPIC will be secured prior to the implementation of activities

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F. Other relevant projects/programmes

The proposed Programme is designed to achieve maximum impact by avoiding duplication and creating strong synergies with existing government, multilateral, and bilateral investments in Malaysia. The programme fills critical gaps by providing tangible, scalable Nature-Based Solutions (NbS) models where current initiatives primarily focus on policy frameworks, grey infrastructure, or small-scale research. The Programme acts as a vital "missing middle," connecting national policy, research, and large-scale infrastructure with practical, community-engaged, and NbS.

Table: other relevant projects in Malaysia

Organisation / Project Name	Description	Budget and timeframe	Potential Duplication/Synergy
Forest Research Institute Malaysia (FRIM) R&D and Pilot Projects	Research and Development and technical pilots for forestry (e.g., preliminary AquaVault floating nursery trials, Technology Readiness Level 7-8).	Government core funding and grants Ongoing	Direct Synergy and foundation. FRIM's R&D is the direct foundation for Component 2 assets, which scales pilots into full, integrated demonstrations and provides the data (component 1) needed for validation. .
Muda Agricultural Development Authority (MADA) Irrigation and Climate Adaptation Works	Manages downstream irrigation and flood control for the "rice bowl," focusing on water storage and farm-level solutions.	State/Local Budget Ongoing	Direct Synergy and upscaling. The proposed programme enhances MADA's work by addressing the upstream source (O. 2.2 Ulu Muda rehabilitation) and introducing community-based adaptation and capacity building (component 3) for mainstreaming.
Global Environment Centre (GEC) Peatland Restoration Projects	Implements localized peatland restoration using passive techniques (canal-blocking/rewetting) in reserves like Raja Musa and Kuala Langat North Forest Reserve (KLNFR).	Donor-funded Ongoing	Direct Synergy and enhancement. EC's passive rewetting is highly complemented by the programme's active, modular water storage technology (C2/O. 2.1), which provides targeted, reliable water storage in fire-risk hotspots.
Department of Irrigation and Drainage (DID) Urban Stormwater Management	Mandates and implements national guidelines for stormwater management, including the use of retention ponds and other grey infrastructure.	National Budget Ongoing	Direct Synergy & Enhancement. The programme ecologically upgrades existing DID/Municipal Council assets (C2/O. 2.3), transforming them into multi-functional NbS assets and providing the adaptive governance (C1) and community-monitoring model (C3) for effective long-term maintenance.
United Nations Development Programme (UNDP) Climate Promise & Climate Finance Innovation Lab (CFIL)	Focuses on policy, Nationally Determined Contribution (NDC) enhancement, and developing finance models for climate-resilient agriculture.	Approximately USD 1.25M (combined) 2025–2026+	Strong Synergy. These projects work at the policy and financing level. The programme provides the tangible, validated NbS models (C2) and the data/evidence from the ICFIS (C1) needed to scale climate finance and policy work.
United Nations Development Programme (UNDP)/Ministry of Agriculture (MoA): Climate-	Enhances the resilience of the hill paddy industry in Sabah through improved practices and capacity building.	USD 750,000 2025–2028	Complementary. Focuses on a different agricultural system in a different state. No duplication with the MADA/Kedah focus (Component 2).

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resilient Hill Paddy in Sabah			
Japan International Cooperation Agency (JICA): Technical Cooperation for Flood Management	Supports large-scale grey infrastructure (dams, levees) and advanced flood forecasting systems.	Large-scale budget; Multi-year phases	Complementary. JICA focuses on "grey" infrastructure. The programme's focus on "green" Nature-Based Solutions (component 2) and community-based monitoring (component 3) fills a critical, cost-effective gap.
World Bank: Analytical Work and Investment Lending	Provides macro-economic analysis and facilitates large-scale infrastructure loans for climate resilience.	Very large-scale (loans); Ongoing	Synergistic. The programme serves as a pilot model for NbS that could be scaled up using larger World Bank investment lending, providing proven, community-validated approaches.
Green Climate Fund (GCF): FP181 - Climate Resilient Landscapes in Kelantan	Aims to enhance climate-resilient landscapes through integrated watershed management and sustainable agriculture in the state of Kelantan.	Approximately USD 30 Million; Proposed	Operates in a different state with a similar integrated approach. The programme's urban NbS innovation (C2/O. 2.3) and its specific peatland fire prevention technology (C2/O. 2.1) are distinct and mutually beneficial for learning.

G. Learning and knowledge management

The Programme integrates a systematic Knowledge Management (KM) strategy across its design, ensuring that experiences and lessons learned are captured, analysed, and disseminated to enrich local, national, and global adaptation knowledge. This function is systematically embedded directly within the Adaptive Governance (C1) and Capacity & Livelihoods (C3) components, ensuring Knowledge Management is a central, continuous activity rather than a standalone output.

Embedded Knowledge Management Mechanisms

Component 1 is the primary knowledge capture and analytical mechanism. It establishes the centralized Integrated Climate–Forest Intelligence System (ICFIS) (Output 1.1). This system systematically aggregates raw data, monitoring results, and performance metrics from all physical intervention sites (C2: Physical Assets). The key KM outputs from this platform include:

- Validated NbS Models: Technical reports detailing the performance, cost-effectiveness, and replicability of the C2 assets (e.g., Modular Water Storage Systems, Urban NbS Upgrades).
- Policy Products: Formalized tools such as the Integrated Policy-to-Practice Scaling Framework (IPPSF) (Output 1.3) and targeted policy briefs to guide national mainstreaming.

Component 3 serves as the local knowledge generation, learning, and dissemination mechanism.

- Knowledge Generation and Feedback: It captures grassroots knowledge, technical data from the Eco-Warden Teams (Output 3.2), and local perceptions of programme success, providing a crucial adaptive management feedback loop to C1.
- Dissemination and Learning: It establishes the National Climate Knowledge Portal (Output 3.3), a public-facing platform dedicated to disseminating key national-level KM products from C1 (e.g., the National Climate Vulnerability Atlas) and practical tools for community use.

Dissemination and Learning

The KM strategy will focus on targeted dissemination of knowledge and lessons learned to accelerate understanding of effective adaptation interventions:

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- **Dissemination Products:** Knowledge products will include the National Climate Knowledge Portal (for the public and practitioners), targeted policy briefs (for national stakeholders), and technical guidelines (for replication).
- **Knowledge Sharing Tools:** The Programme will utilise a mix of tools, including the digital platform, targeted social media streams, and newsletters reflecting on progress and lessons. Complementary products like photos, videos, and presentations will be developed to communicate local impacts, particularly demonstrating Gender Equality and Social Inclusion (GESI) results.
- **Adaptive Learning:** Experiences gained from the programme will be rigorously analysed periodically (e.g., through annual reports and mid-term evaluations) to inform national decision-making and accelerate the mainstreaming of successful NbS models across Malaysia, ensuring continuous improvement.

At the fully developed proposal stage, the Programme will finalize an outreach strategy and identify specific tools to ensure lessons are effectively shared with both the technical community and the broader public, aligning with the Adaptation Fund's principles for knowledge management.

H. List of Stakeholders

Stakeholder consultations held during concept stage

Initial consultations and informal discussions were conducted with key government agencies and institutional partners during the programme concept design phase to confirm site suitability, address potential conflicts, and incorporate input from key beneficiaries.

Stakeholder Consulted	Focus	Outcome
Forest Research Institute of Malaysia (FRIM)	Executing Entity, Scientific oversight, and validation methodology	FRIM confirmed its role as the Executing Entity responsible for overall programme coordination and technical delivery (C1-C3) and validated the Programme methodology.
Ministry of Natural Resources and Environmental Sustainability (NRES)	Institutional Arrangements and Policy Scaling	Confirmed that the Project Board will be chaired by the Secretary-General of NRES, ensuring high-level policy support and coherence for national scaling.
Selangor State Forestry Department (SSFD)	Indigenous peoples Inclusion and Site Custodianship of Kuala Langat Utara Forest Reserve (KLUFR).	SSFD identified specific community-proximate areas where the modular water storage system should prioritize water purification to provide a reliable, clean water supply for the Orang Asli Temuan communities.
Muda Agricultural Development Authority (MADA)	Non-duplication and Upstream alignment	MADA confirmed their plan to store excess water during extreme rainfall events. The programme was consequently designed to align with MADA by focusing upstream on ecosystem restoration and forest rehabilitation (C2).
Kubang Pasu Municipal Council (Majlis Perbandaran Kubang Pasu, MPKP)	Local government engagement	MPKP confirmed custodianship of the 200 retention ponds targeted for cost-effective ecological upgrading in Component 2 (O. 2.3), guaranteeing local government commitment.
Kuala Lumpur City Hall (Dewan Bandaraya Kuala Lumpur, DBKL) and C40Cities	Local government leadership, alignment with existing DBKL-C40 Cities climate resilience frameworks, and community-based adaptation initiatives.	DBKL and C40 Cities provided the already developed comprehensive Community Resilience Implementation Plan (CRIP), which outlines site-specific risks and adaptation priorities, thereby ensuring full alignment and readiness for the Kampung Pasir Baru pilot site. The CRIP identifies community vulnerabilities, details co-created solutions, and includes committed technical inputs from DBKL departments, supporting feasibility, local buy-in, and readiness for NbS-enhanced intervention, ensuring full alignment with DBKL's

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		climate adaptation agenda and C40 methodologies.
Selangor Climate Adaptation Centre (SCAC)	State-level climate adaptation governance, climate-vulnerability site prioritisation, evidence-based planning, and alignment with Selangor's adaptation strategies	SCAC endorsed Kampung Cempaka as an adaptation site, confirming its suitability due to flood risk, community vulnerability, and ecological potential, ensuring alignment with state priorities.
Selangor State Economic Planning Unit - Local Authority Section (UPEN Selangor - PBT)	State-level coordination with local authorities (PBTs) and alignment with Selangor's urban resilience priorities and NbS integration opportunities.	Selangor State Economic Planning Unit - Local Authority Section agreed that Kampung Cempaka is an appropriate pilot site due to flood risk and ecological potential (e.g., Painted Stork sightings), and confirmed support for expanding the NbS model to other areas.

Future consultations and process (Project Preparation Phase)

The requested USD150,000 Project Formulation Grant (PFG) will be utilized to finance a comprehensive, gender-responsive stakeholder consultation process required for the fully developed proposal. This iterative process will ensure full compliance with the Adaptation Fund's Environmental and Social Policy and Gender Policy and involve all direct and indirect stakeholders.

Key commitments:

- **Gender Analysis and CSO engagement**: A robust Gender Analysis will be conducted, informed by consultations with women's and environmental rights Civil Society Organizations (CSOs).
- **Indigenous Peoples (IP) integration:** Consultation will be prioritised with Temuan Orang Asli representative groups to formally document Free, Prior, and Informed Consent (FPIC) as required, and to ensure the specific interests and rights of Indigenous Peoples are integrated into the final institutional arrangements and benefit-sharing mechanisms.
- **Capacity Building and safeguards:** Pre-approval consultation workshops will be held to manage stakeholders and establish specific community safeguard measures (e.g., Drowning Risk mitigation).
- **Documentation and transparency:** The full consultation documentation will detail the techniques used (tailored per target group, including vulnerable populations), key findings, and how suggestions and concerns were integrated into the final programme design.

List of Stakeholders to be consulted

Category	Specific Entity/Group	Role and Involvement
Project Implementing and Executing Entities	United Nations Development Programme (UNDP)	Implementing Entity (IE); provides oversight and ensures compliance with AF policies.
	Forest Research Institute Malaysia (FRIM)	Executing Entity (EE); leads project design, technical implementation, and R&D
Federal and State Government Agencies	Ministry of Natural Resources and Environmental Sustainability (NRES)	Project Executive/Chair of Project Board, providing policy and strategic direction.
	Department of Forestry Peninsular Malaysia - JPSM	Policy guidance and data for forest restoration and management
	Ministry of Economy	General oversight role
	Ministry of Finance	Provide strategic direction on climate financing for adaptation

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	Ministry of Agriculture and Food Security	Provide policy and technical advice on food system/security
	Ministry of Plantations and Commodities	Provide policy and technical advice
	Ministry of Natural Resources and Urban Development (MUDeNR)	Provide policy and technical advice on natural resources and urban interventions
	Ministry of Energy Transition and Water Transformation (PETRA)	Provide policy guidance on water management and adaptation action
	Selangor State Forestry Department (SSFD)	Site custodian for peatland reserves, long-term maintenance, and regulatory coordination.
	Muda Agricultural Development Authority (MADA)	Authority for agricultural irrigation; ensure alignment with food security priorities.
	National Water Research Institute Malaysia (NAHRIM)	Water management coordination and hydrological data integration research
	Department of Irrigation and Drainage (DID)	Water management coordination
	Selangor State Economic Planning Unit (UPEN Selangor)	State-level coordination with local authorities
	Majlis Perbandaran Kubang Pasu, Municipal Council (MPKP)	Local governments, responsible for validating pilot nature-based solutions (NbS) for flood control and urban cooling in their jurisdictions and formally adopting the programme's adaptive governance methods (Urban Resilience Toolkit) to scale up programme impact (C4).
	Petaling Jaya City Council (MBPJ)	
	Kuala Lumpur City Hall (DBKL)	
Vulnerable & Marginalized Communities	Indigenous Peoples (Orang Asli Temuan)	Direct beneficiaries of water security and fire risk reduction; partners in co-management.
	Farmers and Smallholders (Kubang Pasu/MADA area)	Direct beneficiaries of flood mitigation and water security; targeted for economic analysis and capacity building in NbS
	Women and Youth	Targeted groups for empowerment; women-led nurseries and 50% participation target in citizen science training
	Urban and Peri-Urban Residents (Kubang Pasu, Kuala Langat Utara, Klang valley)	Direct beneficiaries of reduced flood risk, urban cooling, and improved water access.
Civil Society, NGOs, and Research	Global Environment Centre (GEC)	Provides expertise in peatland conservation, community outreach, and supports Component 1 synergy.
	Academia and Technical Experts	Provides expertise for vulnerability assessments and data integration
	Women's and Environmental Rights CSOs	Will be consulted during the PFG phase to strengthen gender analysis and risk mitigation plans.

I. Justification and adaptation reasoning

The proposed Programme is a critical, full-cost adaptation investment required to counter the severe and systemic impacts of climate change that are challenging the economic, social, and environmental stability of vulnerable communities in Malaysia. The justification for this funding is rooted in moving beyond a costly, reactive "Business-as-Usual" (BAU) approach to implementing a proactive, integrated, and adaptive governance framework. The Programme is strategically designed to deploy Nature-based Infrastructure across targeted watersheds and urban areas, ensuring both high impact at the local level and an evidence-based model for national scaling.

Baseline Scenario: The cost of inaction (without Programme interventions)

The existing conventional development and maintenance practices, which constitute the baseline scenario, are fundamentally inadequate to address the escalating threat of climate hazards—

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including more intense flooding, prolonged droughts, and catastrophic peat fires. The national and development programs baseline is defined by adherence to conventional sector-specific budgets which cover routine maintenance, existing infrastructure upgrades, and reactive disaster response, but which do not integrate a dedicated climate change adaptation mandate or the necessary financial instruments for systemic, preventative Nature-based Infrastructure designed for flood and water management.

Without this Programme, the BAU scenario dictates a cycle of increasing vulnerability and compounding costs, where the long-term cost of inaction far exceeds the initial investment in adaptation:

- **Unsustainable Public spending and Short-Term fixes**: Existing Municipal Council and Public Works budgets are programmed for recurrent, reactive infrastructure repair (e.g., clearing debris, fixing damaged roads) post-flood events. These budgets lack the provision for proactive, functional Nature-Based Infrastructure such as the modular water storage and infiltration systems (O 2.1). Consequently, dependence on expensive, carbon-intensive emergency fire suppression methods will continue, combating the chronic risk of catastrophic peat fires, leading to significant recurring economic losses, human health impacts, and the continued release of stored carbon.
- **Persistent Livelihood Exposure and Inadequate Water Security**: Existing agricultural support and water utility programs focus primarily on conventional irrigation schemes and maintenance of existing, static retention infrastructure. These budgets do not allocate funds for upstream ecosystem-based adaptation designed to provide water security. Without the upstream forest rehabilitation (O. 2.2.) in critical water catchments and the ecologically upgraded retention infrastructure (O. 2.3), agricultural systems will remain directly exposed to climate shocks. This results in chronic, unpredictable crop losses, deepening the instability of smallholder farming livelihoods, increasing water treatment costs, and reducing the storage capacity of critical reservoirs due to climate-driven sedimentation.
- **Critical Governance and Policy Financing deficits:** Local and municipal governments, while aware of climate risk, lack the financial resources to invest in pioneering climate intelligence infrastructure. The baseline budget is sufficient for routine operational data but cannot finance the development and deployment of the Integrated Climate–Forest Intelligence System (ICFIS) (O. 1.1) necessary to break down complex climate data into usable, forward-looking planning forms. Without C1, planning efforts remain fragmented, wasteful, and fail to secure the evidence-based policy and financial foundations necessary for long-term, large-scale adaptation.
- **Exacerbated Social Inequality in Decision-Making:** Existing national development policies often advocate for Gender Equality and Social Inclusion (GESI) but lack the dedicated, ring-fenced financial and programmatic mechanism to ensure its implementation in climate action. The BAU path neglects to prioritize the specific vulnerabilities of excluded groups, particularly women, who remain excluded from technical roles and climate decision-making, thereby weakening overall community resilience.

Full Cost of Adaptation and additionality of the AF investment

The Programme's three components represent necessary adaptation measures that collectively provide clear additionality by funding a systemic and integrated response which falls outside the scope, budget, or technical mandate of all current national and development financing envelopes. The requested AF funding covers the full cost of adaptation by financing interventions that represent a paradigm shift from conventional development to climate-proof, anticipatory governance.

Component	AF Additionality	Financing Gap

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C2: Physical Assets (O. 2.1)	Hydrological restoration: Innovative, non-conventional NbS technology (Modular Water Storage Systems) specifically for proactive drought mitigation, water table stabilization, and flood buffering.	This is not a conventional Public Works budget item. It is a new, specialized, non-revenue generating adaptation service for climate mitigation and fire prevention and flood control which existing ministerial budgets do not cover.
C2: Physical Assets (O. 2.2 & O. 2.3)	Full-Watershed Ecosystem-Based Adaptation (EbA): Financing the link between upstream forest rehabilitation (O. 2.2) and downstream ecologically upgraded retention ponds (O. 2.3) to provide integrated flood attenuation.	The cross-sectoral coordination and financing challenge prevents this investment (Forestry, Water, Urban Development) from being financed by a single sector's limited budget. AF funds the critical nexus for systemic resilience, ensuring water stability and flood protection — services beyond standard forestry or municipal maintenance.
C1 & C3: Governance & Capacity	Adaptive Governance & Climate Intelligence Infrastructure: Investment in the Integrated Climate–Forest Intelligence System (ICFIS) (C1) and the Citizen Science Programme (C3) to provide community-level data for local Early Warning Systems (EWS) and to manage flood and drought risks dynamically.	This is a pioneering national investment in climate intelligence and dynamic management that national budgets do not currently allocate funds for. Conventional budgets finance static monitoring, not the full-cost development of a predictive, integrated planning platform for water management.
C1: Adaptive Governance (O. 1.3)	Institutionalizing NbS: Development of the validated NbS models and monitoring protocols into the Integrated Policy-to-Practice Scaling Framework (IPPSF).	AF funding is used to create the first-of-its-kind, evidence-based blueprint for institutionalizing and enforcing Nature-based flood management at a national scale. This crucial policy-to-finance shift is a transaction cost of adaptation that is not covered by routine government operations or ODA projects.

The requested funding is therefore essential not just to implement a series of projects, but to build an interconnected, institutionalized system that builds sustainable, long-term climate resilience and empowers communities to engage in meaningful, climate-informed development planning. The AF grant is the necessary catalyst to bridge the financial gap between conventional, reactive development (the Baseline) and proactive, systemic adaptation (the Full Cost of Adaptation).

J. Sustainability

The long-term sustainability of the Programme's adaptation benefits is fully integrated into the programme design across all three components, addressing institutional, financial, economic, social, and environmental dimensions. The overall goal is to ensure the adaptation benefits are sustained after programme completion, enabling replication and scaling up with other funds.

Institutional and Knowledge Sustainability

Institutional sustainability is achieved by ensuring programme outputs become permanent national assets, primarily through **Component 1** (Adaptive Governance).

- **Permanent Monitoring System:** Component 1 (O. 1.1) ensures institutional sustainability by embedding the monitoring systems within the Forest Research Institute Malaysia (FRIM)'s permanent research infrastructure and core budget. This creates a long-term Integrated Climate–Forest Intelligence System (ICFIS) that provides the scientific insights and real-time data needed for sustained adaptive management.
- **Policy and Scaling Blueprint:** Component 1 (O. 1.3) pioneers the systematic Integrated Policy-to-Practice Scaling Framework in Kedah, Kuala Lumpur, and Selangor. This framework provides a proven blueprint for the whole country, ensuring successful technical models can be replicated nationally to potentially transform thousands of retention ponds nationwide. This action strengthens the ability of local institutions (Municipal Councils) to apply climate-risk data to guide future planning.

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Financial and Economic Sustainability

The Programme is designed to deliver high economic returns and establish viable financing mechanisms for long-term maintenance, moving beyond grant dependency.

- **High Return on Investment (ROI):** The use of Nature-based Solutions (NbS) is demonstrably cost-effective compared to grey infrastructure. The programme is designed to deliver a positive ROI through avoided losses, such as reduced flood damage (up to 20-25% and mitigated agricultural losses.
- **Revenue Generation (Carbon Credit Potential):** Financial sustainability for peatland intervention (C2/O. 2.1) is supported by the carbon credit potential derived from peat fire prevention. The Modular Water Storage system reduces the fire ignition risk by a substantial 60-80%, enabling long-term financial viability through ecosystem service valuation.
- **Cost-Efficient Maintenance:** The NbS approach provides high-cost efficiency, with pond upgrades (C2/O. 2.3) being 50-100 times cheaper than new grey construction, ensuring long-term local government adoption and reduced lifecycle maintenance costs.
- **Financing Strategy:** Component 1 (O. 1.3) includes partnerships (e.g., with the Climate Finance Innovation Lab) to establish a Kedah-level and National NbS financing strategy, exploring tools like green bonds and Payments for Ecosystem Services (PES), to secure long-term investment for NbS scaling.

Social and Technical Sustainability

Sustainability relies on local ownership, capacity building, and robust infrastructure, all integrated within Component 3 (Capacity & Livelihoods).

- **Community Co-Management and Social Ownership:** The Programme builds social infrastructure by establishing Locally Led Adaptation (LLA) Co-Management Bodies and Eco-Warden teams (C3/O. 3.2). Local communities, including Orang Asli Temuan and farmers, are trained and certified to perform operation and maintenance, empowering them as long-term stewards of the adaptation assets.
- **Gender and Youth Empowerment:** The programme specifically targets 50% women and youth participation in technical training (C3/O. 3.1) and establishes women-led nurseries, institutionalizing the roles of vulnerable groups in technical adaptation management.
- **Technical Longevity:** Physical installations (C2) are built with robust design principles and quality, acid-resistant materials (e.g., HDPE) for a 20 year operational life. Component 1 (O. 1.1) ensures Technical Sustainability through the use of open-source software, local technical capacity development, and documented protocols for independent system maintenance.

Environmental Sustainability

Environmental sustainability is achieved through direct restoration and ecological enhancement using NbS, guaranteeing the integrity of natural capital against climate stress.

- **Ecosystem Resilience: C**omponent 2 focuses on restoring ecological functions by implementing forest rehabilitation (EbA) in Ulu Muda (O. 2.2) and active peat rewetting (O. 2.1). This action safeguards critical ecosystem services, such as watershed function and massive carbon storage.
- **Biodiversity Enhancement:** The ecological upgrade of retention ponds and planting of mini-forests (C2/O. 2.3) creates stepping-stone habitats and enhances biodiversity, ensuring the longevity of natural buffers against climate-driven hydrological extremes.

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K. Overview of environmental and social impacts and risks

The programme's environmental and social risks are summarized below, based on the Moderate Risk (Category B) classification detailed in Section E. Risk management and mitigation are governed by the Environmental and Social Management Framework (ESMF) developed during the preparation phase.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law		**Risk: medium; Likelihood: medium; Potential impact: medium** Physical works (C2) require national/technical standards adherence (e.g., building codes, water quality regulations). EIA is not required since the activities do not fall under Malaysia's prescribed activities list, and the works involve only small-scale, non-invasive installation. Further assessment will be done during PFG stage to confirm what is required for compliance to UNDP SES, AF ESP and laws/regulation of Malaysia Mitigation: FRIM will secure all necessary national/state regulatory approvals during the implementation phase, prior to construction, in addition to developing the UNDP SES-compliant Environmental and Social Assessment (ESA) and Environmental and Social Management Plan (ESMP) during the programme preparation phase.
Access and Equity		**Risk: medium; Likelihood: medium; Potential impact: medium** Risk of maladaptation or unintentionally causing harm to non-beneficiaries. Mitigation: Conduct a detailed Social Assessment to map benefits and risks. Establish clear criteria for equitable distribution and ensure the Grievance Redress Mechanism (GRM) is accessible to all stakeholders.
Marginalized and Vulnerable Groups		**Risk: medium; Likelihood: medium; Potential impact: medium** The programme targets vulnerable groups, including low-income farmers, women, youth, and Indigenous Peoples. Risk of increasing vulnerability of beneficiaries or non-beneficiaries, or marginalizing minority groups. Mitigation: Conduct a detailed Social Assessment. Ensure clear criteria for equitable distribution and that the needs of vulnerable groups are specifically addressed.
Human Rights		**Risk: high; Likelihood: high; Potential impact: high** Risk to human rights concerning Indigenous Peoples' land tenure, safety, and adherence to core labour standards. Mitigation: Formal adherence to Free, Prior, and Informed Consent (FPIC) protocols. Implement a strict Occupational Health and Safety (OHS) Plan. Establish a transparent and functional Grievance Redress Mechanism (GRM).
Gender Equality and Women's Empowerment		**Risk: medium; Likelihood: medium; Potential impact: medium** Risk of exclusion of women from key technical/monitoring roles and of non-compliance with the 15% budget allocation for gender. Mitigation: Comprehensive Gender Analysis to be conducted during programme design with formulation of a Gender Action Plan (GAP) with strict participation targets and budget tracking to ensure gender equality and women's empowerment. The Gender Action Plan will be implemented as part of the programme and include a programme-specific gender baseline using DOSM, sub-national data, and indicators to track intra-household impacts (e.g., time saved in water collection, women's participation in decision-making). Further, the GAP will integrate mandatory procedures and mitigation measures for the Prevention of Sexual Exploitation and Abuse (PSEA) and Gender-Based Violence (GBV), in strict adherence to the UNDP Gender Policy and PSEA requirements.
Core Labour Rights		**Risk: medium; Likelihood: high; Potential impact: medium** Risk to worker safety during civil works and fair employment practices for community-led work Mitigation: Implement a strict Occupational Health and Safety (OHS) Plan for all construction sites. Ensure all contracts adhere to national labour laws and fair wage standards. Ensure fair employment practices for community-led activities.

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Indigenous Peoples		**Risk: medium; Likelihood: medium; Potential impact: medium** The intervention (Modular Water Storage, C2/O. 2.1) is in areas used by Temuan Orang Asli communities. Risk to rights and interests. Mitigation: Initial consultations have taken place at the concept stage. Further assessment is required, leading to the development of an Indigenous Peoples Plan (IPP), to ensure rights and interests are addressed, including integration of representative groups into institutional arrangements and formal adherence to consent protocols (Free, Prior, and Informed Consent).The mitigation strategy will also ensure their inclusion in capacity building (C3) and governance (C1).
Involuntary Resettlement		**Risk: medium; Likelihood: low; Potential impact: medium** No land acquisition or restricted access will occur due to programme activities. No physical or economic displacement is anticipated as interventions are on government/community land or existing infrastructure. Continuous monitoring of site selection throughout design to ensure zero resettlement or economic displacement occurs. Mitigation: Exclusion of activities leading to physical displacement and/or land acquisition. Participatory consultation, engagement with local communities and FPIC to avoid and manage/mitigate any access restriction and/or economic displacement risks. Continuous monitoring of site selection throughout design to ensure zero resettlement or economic displacement occurs.
Protection of Natural Habitats		**Risk: medium; Likelihood: medium; Potential impact: medium** Risk of Ecosystem disruption from water retention deployment, forest rehabilitation or using non-native species for interventions in sensitive ecosystems (peatlands, degraded forests, C2). Mitigation: Focus NbS on existing, disturbed areas using only certified native plant species. Monitor to verify positive impact.
Conservation of Biological Diversity		**Risk: medium; Likelihood: medium; Potential impact: medium** The programme aims to enhance biodiversity, but there is a risk of NbS inadvertently causing conflicts or harming protected species in ecosystem restoration areas and urban ponds (C2). Mitigation: Use only certified native species. Implement continuous citizen science monitoring to track indicator species and verify positive biodiversity enhancement.
Climate Change		**Risk: low; Likelihood: low; Potential impact: medium** As an adaptation programme, the primary objective is to reduce climate risk. Risk of maladaptation (unintentionally increasing vulnerability to other climate impacts). Mitigation: Ensure programme design avoids maladaptation and that outcomes align with climate vulnerability scenarios. Use the C1 Decision Support Platform to inform adaptive management during implementation.
Pollution Prevention and Resource Efficiency	X	
Public Health		**Risk: medium; Likelihood: medium; Potential impact: medium** Risk of drowning in constructed or rehabilitated retention ponds (C2). Health benefits include reducing smoke-related risks from peat fires. Mitigation: Mandatory safety protocols for all retention pond sites, including site fencing, safety signage, and community education protocols, , developed as part of the SEP/ESMP and prioritized during the preparation phase.
Physical and Cultural Heritage		**Risk: low; Likelihood: low; Potential impact: medium** Risk of inadvertently harming cultural heritage sites during ground works in Ulu Muda or Temuan Orang Asli lands (C2). Mitigation: Assessment required during programme design to ensure no physical or cultural heritage sites are harmed during ground works (map and establish exclusion zones). Implement a 'Chance Finds' Procedure training for all personnel.
Lands and Soil Conservation	X	

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PART III: IMPLEMENTATION ARRANGEMENTS

A. Programme alignment with the Results Framework of the Adaptation Fund

Programme Objective(s)	Programme Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Objective 1: To strengthen the climate resilience and adaptive capacity of vulnerable communities and national/sub-national institutions in Malaysia through the integration of evidence-based policy frameworks, the deployment of scalable Nature-Based Solutions for enhanced water security, and targeted capacity building and gender-responsive livelihood empowerment.	Hectares of vulnerable ecosystems (e.g., peatlands, catchments, urban green spaces) brought under improved NbS management, disaggregated by type of intervention. Number of national and sub-national institutions that have formally adopted and applied integrated climate risk tools and/or adaptive policy frameworks developed by the Programme, demonstrating strengthened capacity for evidence-based decision-making.	Outcome 5: Increased ecosystem resilience in response to climate change and variability induced stress Outcome 8: Support the development and diffusion of innovative adaptation practices, tools and technologies	5. Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress 8. Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level.	8,341,014
Programme Outcome(s)	**Programme Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 1: Adaptive Governance and Scaling (Component 1)	1.1: Number of integrated climate risk tools and knowledge products developed and formally utilized/institutionalized in systematic NbS policy frameworks adopted by targeted national and sub-national agencies.	Output 2.1: Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated	2.1.2 No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale) 8.1: No. of innovative adaptation practices, tools, and technologies accelerated, scaled-up, and/or replicated.	2,000,000

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Outcome 2: Physical Resilience and Water Security (Component 2)	2.1: Hectares of degraded peatland/forest under improved management to restore natural water storage and stabilize water levels. 2.2: Number of urban NbS infrastructure assets (e.g., retention ponds, vegetated berms, drainage corridors) strengthened or constructed to withstand climate variability and change. 2.3: Percentage reduction in flood damage costs and stabilization of downstream water supply through enhanced natural buffering in adjacent areas.	Output 4: Physical infrastructure improved to withstand climate change and variability-induced stress. Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability.	4.1.2: No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale). 5.1: No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale).	5,000,000
Outcome 3: Outcome 3: Capacity, Livelihoods, and Sustainability (Component 3)	3.1: Number of local institutions and/or communities that have formally adopted a decision-making mechanism over adaptation solutions (aligned with Locally Led Adaptation principles). 3.2: Number of national and sub-national staff, and community members trained on climate intelligence tools and risk management, disaggregated by sex and institution/sector. 3.3: Number of Women-Led Community Nurseries established and generating revenue.	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability. Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	6.1.1: No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies. 3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	1,591,014

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Governance arrangements
The project will be implemented under the National Implementation Modality (NIM), with the implementation and support structure clearly defining the roles of the Implementing Entity (IE), the Executing Entity (EE), and the designated Responsible Parties. This arrangement ensures a Whole-of-Government approach and strict compliance with UNDP and the Adaptation Fund's policies.

Implementing Entity (IE): United Nations Development Programme (UNDP)
UNDP's role comprises two distinct and separate functions:

- **Programme Assurance and Oversight (IE Function):** UNDP provides overall project oversight, financial accountability, and quality assurance, ensuring full compliance with UNDP and the Adaptation Fund's fiduciary standards, Environmental and Social Policy (ESP), and Gender Policy (GP).
- **Programme Support Services (Country Office Service):** Based upon formal request by the Executing Entity (FRIM) under the established NIM Support Services framework, the UNDP Malaysia Country Office will offer specific, cost-reimbursable support to augment FRIM's execution capacity. This support may include, but is not limited to, procurement, recruitment, and technical implementation assistance. The costs are covered under the Project/Programme Execution Cost.

Executing Entity (EE): The Forest Research Institute Malaysia (FRIM)
FRIM leads the Programme Management Unit (PMU) and is the principal technical implementer. FRIM is responsible for coordinating all Responsible Parties and delivering programme results.

A strict and auditable firewall will be maintained between UNDP's mandatory oversight function and its optional Country Office support services. This is critical to ensure the IE's objective monitoring and supervision role is not compromised. FRIM retains full ultimate responsibility for the execution of the Programme.

Programme Board:
The Programme Board (PB) acts as the primary Whole-of-Government coordination platform, ensuring strategic policy alignment:

- **Chair:** The Secretary-General of the Ministry of Natural Resources and Environmental Sustainability (NRES), ensuring high-level policy support and coherence for national scaling.
- **Co-chair:** UNDP Resident Representative
- **Key Federal Partners:** The Department of Irrigation and Drainage (DID/JPS) and the National Water Research Institute (NAHRIM), both under the Ministry of Energy Transition and Water Transformation (PETRA), are essential attendees. DID/JPS is the primary recipient of NbS specifications for national flood guidelines, while NAHRIM acts as the scientific partner validating the NbS hydrological effectiveness (C5).
- **Beneficiary Representatives**: An Orang Asli Temuan Indigenous Peoples' Representative (C2), a Smallholder Farmer Representative (C2), a Local Community/Eco-Warden Representative (C2), and a Gender/Vulnerable Women Representative (Crosscutting).

Responsible parties
FRIM will lead and coordinate implementation with the following Responsible Parties: Selangor State Forestry Department (SSFD), Forestry Department Peninsular Malaysia (JPSM), Muda Agricultural Development Authority (MADA), Kubang Pasu Municipal Council (MPKP), Kuala Lumpur City Hall (DBKL), Petaling Jaya City Council (MBPJ), Selangor Climate Adaptation Centre (SCAC), UPEN Selangor Local Authority Section (PBT), Dept. of Irrigation and Drainage (DID/JPS), National Water Research Institute (NAHRIM), Forestry Department Peninsular Malaysia (JPSM*).*

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Annexes

A. UNDP Offline SESP Tool (Abridged version for Adaptation Fund)

Project Information

Information	
Title	Strengthening Resilience and Adaptive Capacity by Piloting Nature Based Solutions for Water Management in Malaysia
Number	Quantum project ID, 10377
Location	Malaysia
Project stage	Concept
Date	December 2025

Social and Environmental Risk Rating of the Project

Overall Social and Environmental risk categorization		
S&E Risk rating		Comments
Low Risk	☐	
Moderate Risk	X	
Substantial Risk	☐	
High Risk	☐	

Social and Environmental Risk Management Instruments

Assessment or management measures required to address the identified S&E risks and impacts		
Further assessment or management measures	Check if applicable	Comments: indicate scope of measures (e.g. outputs/activities to be addressed) as well as timing (e.g. completed, planned in design, or planned in implementation prior to initiation of certain activities)
ESMF (Environmental and Social Management Framework)	✓	ESMF may be prepared during Programme Formulation Grant (PFG) stage if/where the nature, location and scale of activities is insufficiently detailed for ESMP preparation (see below).
Targeted assessment(s)	✓	To be confirmed during PFG stage but ESMF/ESMP may specify further targeted assessments to be carried out during implementation if/where needed e.g. Cultural Heritage, OHS risks.
ESIA (Environmental and Social Impact Assessment)	X	To be confirmed during PFG stage but activities unlikely to require ESIA.
SESA (Strategic Environmental and Social Assessment)	X	N/A. Not required for programme of this nature (no upstream policy, programme, plan development)
ESMP (Environmental and Social Management Plan)	✓	ESMP may be prepared during PFG stage if/where nature, location and scale of activities are sufficiently detailed and where there is adequate time for consultation.

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Targeted management plans	✓	Indigenous Peoples Plan(s) (IPPs) to be developed during PFG stage where project activities affect IPs Gender Action Plan (GAP) to be developed during PFG stage To be confirmed during PFG stage but ESMF/ESMP may specify further targeted management plans e.g. OHS Management Plan, Cultural Heritage Management Plan etc.
Other instruments (please specify)	✓	Stakeholder Engagement Plan (SEP) including Grievance Redress Mechanism (GRM) to be developed during PFG stage

Additional Measures to Integrate the Programming Principles to Strengthen Social and Environmental Sustainability

Measures to further mainstream the UNDP Programing Principles into the project
Mainstreaming the human rights-based approach
Participatory project formulation process engaging a wide range of stakeholders, emphasizing consultation and co-design with indigenous peoples, local communities, women and youth, as well as relevant government agencies, academia and civil society. The project design itself will be socially-inclusive and seek to strengthen accessibility of project benefits and services to marginalised and vulnerable groups. Specific assessments and measures shall be included to ensure that for components/activities affecting indigenous peoples, Free, Prior and Informed Consent (FPIC) is initiated during the project formulation phase and secured prior to the implementation of activities. The project includes activities aiming to enhance the capacity of government agencies to realise human rights under international law and to implement human rights-related standards in national law (particularly vis-à-vis indigenous peoples and other marginalised groups that are especially vulnerable to climate change).
Improving gender equality and women's empowerment
Comprehensive Gender Analysis to be conducted during programme design with formulation of a Gender Action Plan (GAP) with strict participation targets and budget tracking to ensure gender equality and women's empowerment. The GAP will be implemented as part of the programme and include a programme-specific gender baseline using DOSM, sub-national data, and indicators to track intra-household impacts (e.g., time saved in water collection, women's participation in decision-making). Further, the GAP will integrate mandatory procedures and mitigation measures for the Prevention of Sexual Exploitation and Abuse (PSEA) and Gender-Based Violence (GBV), in strict adherence to the UNDP Gender Policy and PSEA requirements
Mainstreaming sustainability and resilience
The project's interventions as a whole aim to reduce vulnerabilities and strengthens resilience of communities to anticipated impacts of climate change and associated disaster risks in line with Malaysia's stated national climate adaptation commitments and policies. The detailed design of project components and activities will consider relevant climate projections and hazard modeling, considers environment-development linkages and promotes Nature-based Solutions (NbS) as a key strategic adaptation response.
Strengthening accountability to stakeholders
Stakeholder mapping and analysis will be conducted during project formulation and a Stakeholder Engagement Plan (SEP) prepared providing strategic approaches towards supporting the meaningful participation and inclusion of all stakeholders, in particular marginalized individuals and groups in project implementation and monitoring. The SEP shall also include means for local communities and affected populations to raise concerns and/or grievances including a Grievance Redress Mechanism (GRM) for local communities when activities may adversely impact them. Project stakeholders shall also have access to UNDP's Accountability Mechanism.

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UNDP SES Principles & Standards	S&E Risk Events	Causes	Impacts	Risk Signifi-cance (Impact/ Likelihood)	Treatment Measures
Human Rights Principle	Risk associated with the limited capacities of duty bearers to meet human rights obligations (P1.2)	General/all outputs	Affected stakeholders may be excluded from decision-making or benefits or rights to access basic services/resources may be affected	I: 3 L: 2	Capacity needs assessment to be conducted during project preparation Capacity-building activities included in project design, including on relevant human rights and Social & Environmental safeguards.
Gender Equality & Women's Empowerment Principle	Risk of discrimination against women (P2.10)	General/all outputs	Ongoing or worsening of gender inequalities and injustices	I: 3 L: 3	Gender assessment to be conducted during project preparation and Gender Action Plan (GAP) prepared Mainstreaming gender equality and women's empowerment in project activities and indicators
Accountability Principle	Risks of potential exclusion of affected stakeholders (P3.13) Risks of stakeholder grievances (P3.14)	General/all outputs	Exclusion of affected stakeholders could affect project results and sustainability, enhance inequity or even have adverse impacts on livelihoods, leading to potential grievances	I: 3 L: 3	Stakeholder mapping and analysis to be conducted during project preparation and Stakeholder Engagement Plan (SEP) prepared SEP to outline participatory and socially-inclusive approaches to ensure comprehensive stakeholder engagement during implementation SEP to include design of a Grievance Redress Mechanism (GRM) for the programme with stakeholders also able to access UNDP's Accountability Mechanism
Sustainability and Resilience Principle	Generic sustainability and resilience risks associated with activities with unknown design parameters (P4.16)	General/all components	Unknown but general nature and scale of activities indicates only low/moderate impacts	I: 3 L: 3	Activities to be developed in greater detail during project preparation. Sustainability risks considered in relation to project-level Standards (as below)
1. Biodiversity Cons. & Sust. Nat. Resource Mgmt.	Risks to habitats and/or ecosystems and their services (S1.1) Risks to critical habitats (S1.2) Forestry/plantation-related risks to biodiversity (S1.8)	Peatland restoration , Upland forest restoration and Urban NbS activities	Biodiversity loss, ecosystem degradation and loss of ecosystem service values	I: 3 L: 2	Environmental & Social Assessment (ESA) during project preparation to identify critical habitats and consult experts on detailed design of restoration activities. ESMP/ESMF to include standard requirements for restoration activities re; use of native species, buffers, stand design, fire breaks etc.
2. Climate Change and Disaster Risks	Hazard/disaster-related risks (S2.1) Risks due to sensitivity to climate change or disasters (S2.2) Maladaptation risks (S2.3)	Malaysia and sites are exposed to climate related risks and hazards. Peatland restoration, Upland forest restoration and Urban NbS activities and outcomes may be susceptible to climate/hazards	Project activities aim to have a positive impact on enhancing climate resilience but adverse impacts if they fail are not expected to be significantly additional to the baseline.	I: 2 L: 4	Detailed technical designs to consider climate projections e.g. in selection of hardy or climate resilient tree species
3. Community Health, Safety and Security	Construction-related risks (S3.1) Emissions, noise, traffic, hazards and effluent risks (S3.2) Risks of water/vector-borne diseases (S3.4)3.1)	Retention pond construction activities	Potential drowning risks associated with ponds	I: 4 L: 2	Safety measures for ponds to be included in detailed designs and ESMF/ESMP Stakeholder engagement and awareness-raising with local communities and relevant government agencies on safety risks associated with ponds

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4. Cultural Heritage				I: L:	ESA during project preparation to confirm the absence of this risk
5. Displacement and Resettlement	Economic displacement risks (S5.2)	Peatland restoration (C1), Upland forest restoration (C2) activities could lead to restricted access to lands/resources or transport routes customarily used by local communities and have adverse economic or livelihood impacts	Economic losses or livelihood impacts (inconvenience, loss of access to lands/resources used for subsistence purposes)	I: 3 L: 2	Participatory consultations and surveys with communities during project preparation to understand localized land tenure issues, natural resource dependency and impacts/risks of proposed activities to livelihoods Siting of restoration activities to avoid areas where there could be risks of economic displacement.
6. Indigenous Peoples	Risks associated with activities taking place where indigenous peoples are present (S6.1) Risks associated with activities taking place on lands, territories claimed by indigenous peoples (S6.2) Risk that activities will take place without meaningful, effective informed participation of indigenous peoples (S6.4) Risk of economic displacement of indigenous peoples (S6.6)	Peatland restoration (C1), Upland forest restoration (C2) activities are implemented at sites with known IP populations. Project activities are expected to affect these communities.	Activities that affect IP customary access and land tenure rights can be sensitive and lead to negative outcomes for the project and impacts on the IP communities	I: 3 L: 3	ESA to identify affected IP groups and assess the likely impact of proposed activities on their livelihoods Participatory consultations and surveys with IP communities during project preparation to understand localized land tenure issues, natural resource dependency and impacts/risks of proposed activities to traditional livelihoods Confirmation of broad support for proposed activities by IP communities during project preparation Indigenous Peoples Plan(s) to be prepared to ensure adequate Free, Prior and Informed Consent (FPIC), inclusion of IPs and/or their representatives in programme decision-making, avoid/manage any possible adverse impacts on IP communities, ensure appropriate livelihood benefits, equitable benefit-distribution
7. Labour and Working Conditions	Occupational health and safety (OHS) risks (S7.6)	There are low/moderate OHS risks associated with peatland restoration (C1), upland forest restoration (C2), and urban NbS (C4) activities as well as at tree nurseries (C3.1)	Likely relatively minor injuries or impacts on health of workers or hired labour for project activities.	I: 3 L: 3	ESA to assess potential labour/OHS impacts/risks of proposed activities. ESMP/ESMF to outline standard protocols (e.g. Environmental and Social Codes of Practice) based on existing laws/guidelines for specific activities such as tree-planting, small scale construction, tree nurseries etc.
8. Pollution Prevention and Resource Efficiency				I: L:	ESA during project preparation to confirm the absence of this risk

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PART IV. ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government[2]

Provide the name and position of the government official and indicate the date of endorsement. If this is a regional project/programme, list the endorsing officials of all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:

DATUK NOR YAHATI AWANG Deputy Secretary General (Environmental Sustainability) Ministry of Natural Resources and Environmental Sustainability Malaysia	Date*: 5 January 2026*

B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the Programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (Nationally Determined Contribution 3.0, National Climate Change Policy 2.0 and the Thirteenth Malaysia Plan) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy and the Gender Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Name & Signature Implementing Entity Coordinator DocuSigned by: Nancy Bennet 4EEADA5A5FE9433... *Nancy Bennet* *Executive Coordinator,* *Vertical Fund Programme Support, Oversight and Compliance Hub* *Bureau for Policy and Programme Support* *United Nations Development Programme*	
Date: 5 *January 2026*	Tel. and email: nancy.bennet@undp.org
Project Contact Person: Aishath Azza, Regional Technical Specialist	
Tel. and Email: aishath.azza@undp.org	

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KEMENTERIAN SUMBER ASLI DAN KELESTARIAN ALAM
(Ministry of Natural Resources and Environmental Sustainability)
Parcel F, Blok F11, Kompleks F
Lebuh Perdana Timur, Presint 1
Pusat Pentadbiran Kerajaan Persekutuan
62000 PUTRAJAYA
MALAYSIA

Tel : +603-8000 8000
Portal Rasmi : www.nres.gov.my

CONFIDENTIAL

Ref: NRES.700-4/4/5 ( ) (S)
Date: 5 January 2026

The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Dear Sir,

ENDORSEMENT FOR STRENGTHENING RESILIENCE AND ADAPTIVE CAPACITY BY PILOTING NATURE BASED SOLUTIONS FOR WATER MANAGEMENT IN MALAYSIA

In my capacity as designated authority for the Adaptation Fund in Malaysia, I confirm that the above proposed regional project/ programme aligns with Malaysia's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Malaysia.

2. Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project/programme will be implemented by United Nations Development Programme (UNDP) Malaysia, Singapore and Brunei Darussalam with the Forest Research Institute Malaysia (FRIM) as the national executing entity.

3. This endorsement is subject to the following conditions:

(i) All project-related data are the property of the Government of Malaysia;

(ii) Data security must comply with the Government's data classification requirements, including mandatory verification and approval processes prior to any use;

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(iii) The proposed project sites will be identified and mutually agreed upon during the consultation process; and

(iv) for the avoidance of doubt, this endorsement does not create any obligation on the part of the Government of Malaysia with respect to legal or financial actions.

Sincerely,

(DATUK NOR YAHATI BINTI AWANG)
Designated Authority of Adaptation Fund
Deputy Secretary General (Environmental Sustainability)
Ministry of Natural Resources and Environmental Sustainability
Malaysia

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SCHEDULE 2

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ADAPTATION FUND

Revised PFG Submission Form[1] (additions in red)

Project Formulation Grant (PFG)

Submission Date:

Adaptation Fund Project ID:
Country: Malaysia
Title of Project/Programme: Strengthening Resilience and Adaptive Capacity by Piloting Nature Based Solutions for Water Management in Malaysia
Type of IE (NIE/RIE/MIE): MIE
Implementing Entity: United Nations Development Programme (UNDP)
Executing Entity/ies: United Nations Development Programme (UNDP)

A. Project Preparation Timeframe

Start date of PFG	May 2026
Completion date of PFG	Dec 2026

B. Proposed Project Preparation Activities ($)

List of Proposed Project Preparation Activities	Output of the PFG Activities	US$ Amount	Budget note[2]
1. International Consultants.	**Project Proposal** **Project SESP plan** **Gender Assessment** **Review of construction and engineering activities**	91,500	Consultancy contracts for: ● Lead technical drafter of Full Proposal include facilitation of onsite workshop(s). ● Expert to support Social and Environmental Screening Procedure (SESP) development ● Expert to develop gender assessment ● Experts to review and provide advice on

[1] As presented in AFB/PPRC.33/40 Annex 1.
[2] The proposal should include a detailed budget with budget notes indicating the break- down of costs at the activity level. It should also include a budget on the Implementing Entity management fee use.

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			construction and engineering components.
2. Travel to sites for workshops and other field visits	**Travel**	13,725	Travel to sites for workshops and other field visits
3. Printing and other material to support consultation workshops.	**Workshop materials**	2,745	Printing and other material to support consultation workshops.
4. Miscellaneous costs (sundry expenses)		1,830	Miscellaneous costs (sundry expenses)
5. Consultation and workshops with stakeholders at project sites to enable and ensure participatory approach to project development.	**Workshops**	27450	Consultation workshops at project sites
Implementing Entity's Management Fee (Maximum of 8.5%)		12,750	
Total Project Formulation Grant		150,000	

1. Expert consultants:
    a. Consultant to assist in technical drafting of Full Proposal include onsite workshop

An international expert will support the technical development of the full project proposal and related documents, including a visit to Malaysia to conduct site assessments and participate in project workshops with local communities and relevant stakeholders.

This expertise is required to ensure the project is designed to have the greatest impact and is aligned with the objectives of the Adaptation Fund.

b. Expert to support SESP development

International expert to perform activities to assess risks and undertake (SESP) screening process.

An international expert is proposed to bring world class expertise and oversight of SESP development. Interventions on this project are potentially high risk, so extensive planning and mitigation strategies are required.

c. Expert to develop gender assessment

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This project has significant gendered impact. This assessment will ensure we have assessed the key gender issues and ensure project programming has a significant gender impact.

d. Experts to review and provide advice on construction and engineering components.

Project components involve civil works and engineering interventions. Expertise will be procured to provide technical review of the project proposal and recommendations for project implementation.

2. Travel to sites for workshops and other field visits

Project sites are in Kedah and Selangor. A travel budget is allocated for FRIM, UNDP and relevant experts to travel to project sites for consultation and site assessments.

3. Printing and other material to support consultation workshops.

Small printing budget for materials to support workshops.

4. Miscellaneous costs for currency exchange and sundry expenses

Small miscellaneous to account for currency exchange and other small expenses.

5. Consultation and workshops with stakeholders at project sight to enable and ensure participatory approach to project development.

For consultation and workshops to ensure a participatory approach to project planning and local buy in for implementation. Budget will support venue hire and event management services.

C. Implementing Entity

This request has been prepared in accordance with the Adaptation Fund Board's procedures and meets the Adaptation Fund's criteria for project identification and formulation

Implementing Entity Coordinator, IE Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Nancy Bennet	DocuSigned by: Nancy Bennet 4EEADA5A5FE9438...	03-Jul-2026	Aishath Azza		Aishath.azza@undp.org

Certificate Of Completion

Envelope Id: 6F11C866-9EFE-8FC3-8046-E32473D21247
Status: Completed
Subject: Complete with Docusign: PFG Agreement_UNDP_Malaysia (002).pdf
Source Envelope:
Document Pages: 69
Signatures: 2
Certificate Pages: 6
Initials: 0
AutoNav: Enabled
EnvelopeId Stamping: Enabled
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1818 H Street NW
Washington, DC 20433
esignaturelegia@worldbank.org
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Location: DocuSign
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Ali Mohamed Ali.mohamed@climateenvoy.go.ke Mr. Security Level: Email, Account Authentication (Optional)	Ali Mohamed Signature Adoption: Pre-selected Style Using IP Address: 41.79.9.178	Sent: 7/7/2026 4:17:37 PM Viewed: 7/8/2026 5:02:49 AM Signed: 7/8/2026 5:03:06 AM

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ID: 5ff61e4b-d4c3-4440-b48b-7e1826dd3200
Company Name: The World Bank

Nancy Bennet nancy.bennet@undp.org Security Level: Email, Account Authentication (Optional), Login with SSO	Nancy Bennet Signature Adoption: Pre-selected Style Using IP Address: 192.124.42.11	Sent: 7/8/2026 5:03:10 AM Viewed: 7/8/2026 8:36:08 AM Signed: 7/8/2026 8:36:17 AM

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ID: 61a9a6ad-6251-44f6-b07a-48398cedf175
Company Name: The World Bank

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Bhakthi Abeysooriya babeysooriya@worldbank.org World Bank Group Security Level: Email, Account Authentication (Optional) **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 7/7/2026 4:17:33 PM
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Richard Mance rmance@worldbank.org The World Bank Security Level: Email, Account Authentication (Optional) **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 7/7/2026 4:17:32 PM Resent: 7/7/2026 4:17:35 PM Viewed: 7/8/2026 11:05:23 AM
Sophie Hans-Moevi shansmoevi@adaptation-fund.org Security Level: Email, Account Authentication (Optional) **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 7/7/2026 4:17:34 PM Viewed: 7/8/2026 11:29:39 AM
Young Hee Lee ylee12@adaptation-fund.org Security Level: Email, Account Authentication (Optional) **Electronic Record and Signature Disclosure:** Accepted: 3/19/2026 2:44:51 PM ID: f4b3d31a-7911-4fc8-a272-151f6da6be25 Company Name: The World Bank	COPIED	Sent: 7/7/2026 4:17:34 PM
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Robin Merlier robin.merlier@undp.org Security Level: Email, Account Authentication (Optional) **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 7/8/2026 5:03:09 AM
Official Documents odesk@worldbank.org The World Bank Security Level: Email, Account Authentication (Optional), Login with SSO **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 7/8/2026 8:36:20 AM Viewed: 7/8/2026 9:37:55 AM

Witness Events	Signature	Timestamp

Notary Events	Signature	Timestamp

Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	7/7/2026 4:17:35 PM
Certified Delivered	Security Checked	7/8/2026 8:36:08 AM
Signing Complete	Security Checked	7/8/2026 8:36:17 AM
Completed	Security Checked	7/8/2026 8:36:20 AM

Payment Events	Status	Timestamps

Electronic Record and Signature Disclosure

Electronic Disclosure Statement And Consent for E-Signature with a Relevant World Bank Group Organization [1]

1.0 Acknowledgement of Independent Vendor:

A relevant "World Bank Group Organization" means any of the following international organizations established by treaty among its member countries: International Bank for Reconstruction and Development ("IBRD"), International Development Association ("IDA"), International Finance Corporation ("IFC"), Multilateral Investment Guarantee Agency ("MIGA"), and International Centre for Settlement of Investment Disputes ("ICSID").

By checking the 'I agree' box below in this Electronic Disclosure Statement and Consent for E-Signature ("Disclosure Statement and Consent"), you agree and understand that: (1) the e-signature service (the "Service") is not owned or operated by any of the relevant World Bank Group Organizations in any way. Instead, the Service is owned, operated and maintained by an independent vendor; and (2) no relevant World Bank Group Organization is responsible or liable for the services provided by the independent vendor.

2.0 Agreement to Terms of Service and Privacy Policy:

When using the Service, you agree and understand that the Service's Terms of Service, including the Service Privacy Policy, will govern your use of e-signature.

3.0 Limitation of Liability:

You agree and understand that your use of the Service with a relevant World Bank Group Organization is at your own risk.

You agree and understand that the relevant World Bank Group Organization expressly disclaims all warranties of any kind related to the site, the services and the materials, whether express or implied, including, but not limited to: (1) the implied warranties of merchantability; (2) fitness for a particular purpose; and (3) non-infringement. You agree to be solely responsible for any damage to your computer system or loss of data that results from use of the Service.

In no event will the relevant World Bank Group Organization or its licensors, business partners, contractors, collaborators, partners, agents, employees or the like be liable for any indirect, consequential, incidental, collateral, exemplary, punitive, reliance or special damages (including, without limitation, business interruption or loss of goodwill, data, revenue or profits), even if advised or made aware of the possibility of any such losses or damages and regardless of

whether the claim is based on contract, tort (including negligence, strict liability and willful and/or intentional conduct), warranty, indemnity or other theory of liability.

4.0 **Remedies and No Warranty:**

The relevant World Bank Group Organization makes no warranty that: (1) the Service will meet your requirements; (2) the Service will be uninterrupted, timely, secure or error-free; (3) any results or outcomes from the use of the service will be accurate or reliable; (4) the quality of the Service will meet your expectations; or (5) the Service, or its servers, or communications sent from the any of the relevant World Bank Group Organizations, will be free of viruses or other harmful elements.

You agree and understand that your sole course of action and exclusive remedy for any losses or damages incurred or suffered by you as a result of your use of the Service shall be to terminate your Service account and cease using the Service. Under no circumstances will you have any claim against any of the relevant World Bank Group Organizations for any losses or damages whatsoever arising out of or related to your use of the Service.

5.0 **Preservation of Immunities.**

Nothing in this Disclosure Statement and Consent shall constitute, be construed, or considered to be, a limitation upon or a waiver, renunciation or modification of any immunities, privileges or exemptions of any of the World Bank Group Organizations accorded under its respective Articles of Agreement, international Convention or any applicable law. Such immunities, privileges or exemptions are specifically reserved.

6.0 **Additional Terms**:

By checking the 'I agree' box below, you agree and confirm that:

- You understand that this Disclosure Statement and Consent governs only e-signature transactions or arrangements with a relevant World Bank Group Organization which may be subject to additional Service terms;
- You can access and read this Disclosure Statement and Consent; and
- You can print on paper the Disclosure Statement and Consent or save or send the same to a place where you can print it for future reference and access.
- With respect to IBRD and IDA, you (a) will always keep your e-mail address updated with the Service and follow instructions provided by the relevant World Bank Group Organization to keep your e-mail address updated with the Service as needed; and (b) understand that the minimum system requirements for using the Service may change

over time. The current system requirements are found here: https://support.docusign.com/guides/signer-guide-signing-system-requirements

[1] This Electronic Disclosure Statement and Consent for E-Signature with a relevant World Bank Group Organization is to be used on a specific **transactional basis** and does not in any way or form purport to create an ongoing contractual relationship between the user of the Service, the independent vendor and any of the relevant World Bank Group Organizations.