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Ocean Risk and Resilience Action Alliance

KEMENTERIAN KELAUTAN DAN PERIKANAN

UNDP

Case Study

Building Coastal Resilience in Indonesia

United Nations Development Programme (UNDP)

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About Ocean Risk and Resilience Action Alliance (ORRAA)

The Ocean Risk and Resilience Action Alliance (ORRAA) is the only multi-sector collaboration connecting the finance and insurance sectors, governments, multilateral organisations, civil society, and local partners to pioneer finance and insurance products that incentivise investment into coastal and ocean resilience, and through Nature-based Solutions. The mission, by 2030, is to activate at least $500 million of investment to build the resilience of 250 million climate vulnerable coastal people in the Global South.
ORRAA is delivering system-wide change by growing an investable product pipeline and generating the transformative investment instruments, vehicles and policies that contribute to a regenerative and sustainable blue economy.
These solutions enable coastal communities and the Ocean to adapt and thrive, creating greater economic, social and cultural resilience.
https://www.oceanriskalliance.org

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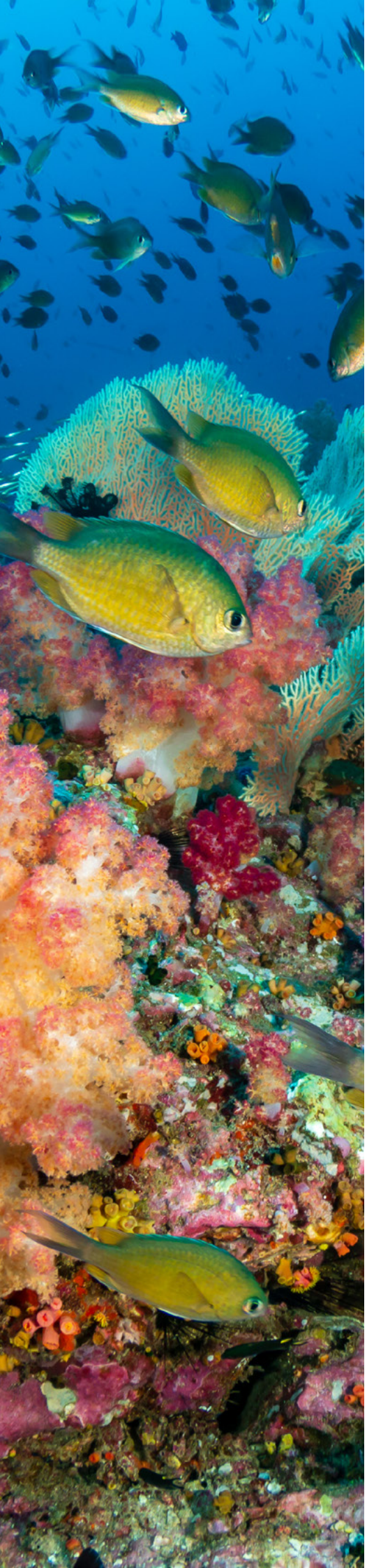


Case study at a glance

Focus of solution

Parametric coral reef insurance designed to provide rapid financing for reef restoration and recovery following extreme sea surface temperature events that pose risk of coral bleaching

Global partners

United Nations Development Programme (UNDP), with funding from the UK Government and supported by the Ocean Risk and Resilience Action Alliance (ORRAA)

Institutional partners

Ministry of Marine Affairs and Fisheries (MMAF), Indonesia Environment Fund (IEF), Financial Services Authority (OJK)

Insurance industry partners

General Insurance Association of Indonesia (AAUI), Swiss Re

Intended beneficiaries

- Government of Indonesia (MMAF and Marine Protected Area authorities)
- Reef-dependent communities and local businesses in Gili Matra, which attract more than 500,000 visitors annually and generate approximately IDR 9.5 trillion[1] (US$530 million) in economic value each year

Coverage

Proposed parametric insurance coverage limit of up to $100,000 for reef response, restoration, and recovery activities

1 Widianto, A. et al. (2026). Rapid economic valuation and sustainability analysis for managing ecotourism in Gili Matra Marine Conservation Area, West Nusa Tenggara Province. Available at: https://www.researchgate.net/publication/400678779

Premium financing

Potential financing through a mix of public resources, environmental financing mechanisms, tourism-related revenues, philanthropic contributions, through the ‘Blue Window’ Trust under IEF Financing. Arrangements remain subject to further development and stakeholder agreement

Status

Feasibility assessed and proposed insurance solution developed and socialized with local stakeholders. Policy and institutional foundations established, with future work focused on implementation readiness, governance arrangements, and sustainable financing

Policy/regulatory links

Aligned with Indonesia’s Blue Economy agenda and 2025–2029 Medium-term National Development Plan (RPJMN) as an innovative financing instrument. UNDP supported policy dialogues that informed the development of Ministerial Regulation No. 27/2024, which established the basis for the ‘Blue Window’ program as a sustainable marine financing mechanism and a potential platform for future premium financing, fund administration, and insurance payout management for coral reef management and insurance.

Defining the Indonesia project focus: **Mapping the landscape, engaging key stakeholders and exploring the role of insurance**

Indonesia's coral reefs are among the most important in the world, supporting marine biodiversity, coastal protection, tourism, fisheries, and the livelihoods of millions of people. In Gili Matra, healthy reef ecosystems underpin local economic activity and community well-being, generating an estimated IDR 9.5 trillion (approximately $530 million) in economic value each year.

Protecting these natural assets is a key component of the Government of Indonesia's Blue Economy agenda, which seeks to balance economic growth with the sustainable management of marine and coastal resources. Through the Blue Economy strategy, the Ministry of Marine Affairs and Fisheries (MMAF) is advancing initiatives that strengthen ocean health, support coastal communities, and promote long-term resilience of marine ecosystems and the economic activities that depend on them.

At the same time, Indonesia's coastal ecosystems are increasingly exposed to climate-related and human-caused risks. Rising sea surface temperatures have contributed to more frequent and severe coral bleaching events, threatening reef health and the tourism, fisheries, and coastal protection benefits that reefs provide. In areas such as Gili Matra, where communities and businesses are closely linked to the health of marine ecosystems, these impacts can translate into significant economic and social consequences.

As marine heatwaves and potential bleaching events become more frequent, governments and local stakeholders face growing costs associated with reef monitoring, restoration, recovery, and community support. However, financing for these activities is often limited and may not be readily available when needed following a climate-related shock.

Working with MMAF, the Indonesia Environment Fund (IEF/BPDLH), the Financial Services Authority (OJK), the General Insurance Association of Indonesia (AAUI) and local government stakeholders, UNDP helped bring together expertise from across the public and private sectors to examine how innovative risk financing solutions could support Indonesia's Blue Economy objectives and improve the availability of timely funding for post-event response and recovery following climate-related shocks.

Recognizing the need for more predictable financing mechanisms to support coastal resilience, UNDP started working with the Government of Indonesia and ORRAA, with funding from the UK's Blue Planet Fund, to explore how insurance could complement existing marine conservation, disaster risk management, and sustainable financing efforts. The objective was not to insure the reef itself, but to provide rapid access to funding for post-event response and recovery actions that help protect reef-dependent ecosystems, livelihoods, and local economies.

BOX 1

Snapshot of Indonesia blue economy and coastal resilience context

Indonesia's ocean and coastal ecosystems are central to the country's economy, food security, and livelihoods. As climate change increases pressure on marine ecosystems and coastal communities, strengthening resilience and identifying sustainable financing solutions have become key priorities within Indonesia's Blue Economy agenda.

Ocean economy value

$80 billion annually (IDR 1,290 trillion) and **7.6%** of GDP (2021)[2]

Fisheries employment

7 million jobs[3]

National coral reef economic values

$6.6 billion

total annual economic benefits[4] =

$3.1 billion from tourism +
$2.9 billion from fisheries +
$639 million from coastal flood protection

Insurance penetration

2.72%[5] (2024)

Coastal population dependence

70% of Indonesians rely on coastal and marine resources[6]

Share of global coral reefs

16%[7]

Climate related coastal risks

Marine heatwaves, sea-level rise, coastal flooding, storms, and ecosystem degradation

Number of insurance and reinsurance providers[8]

58 life insurance companies

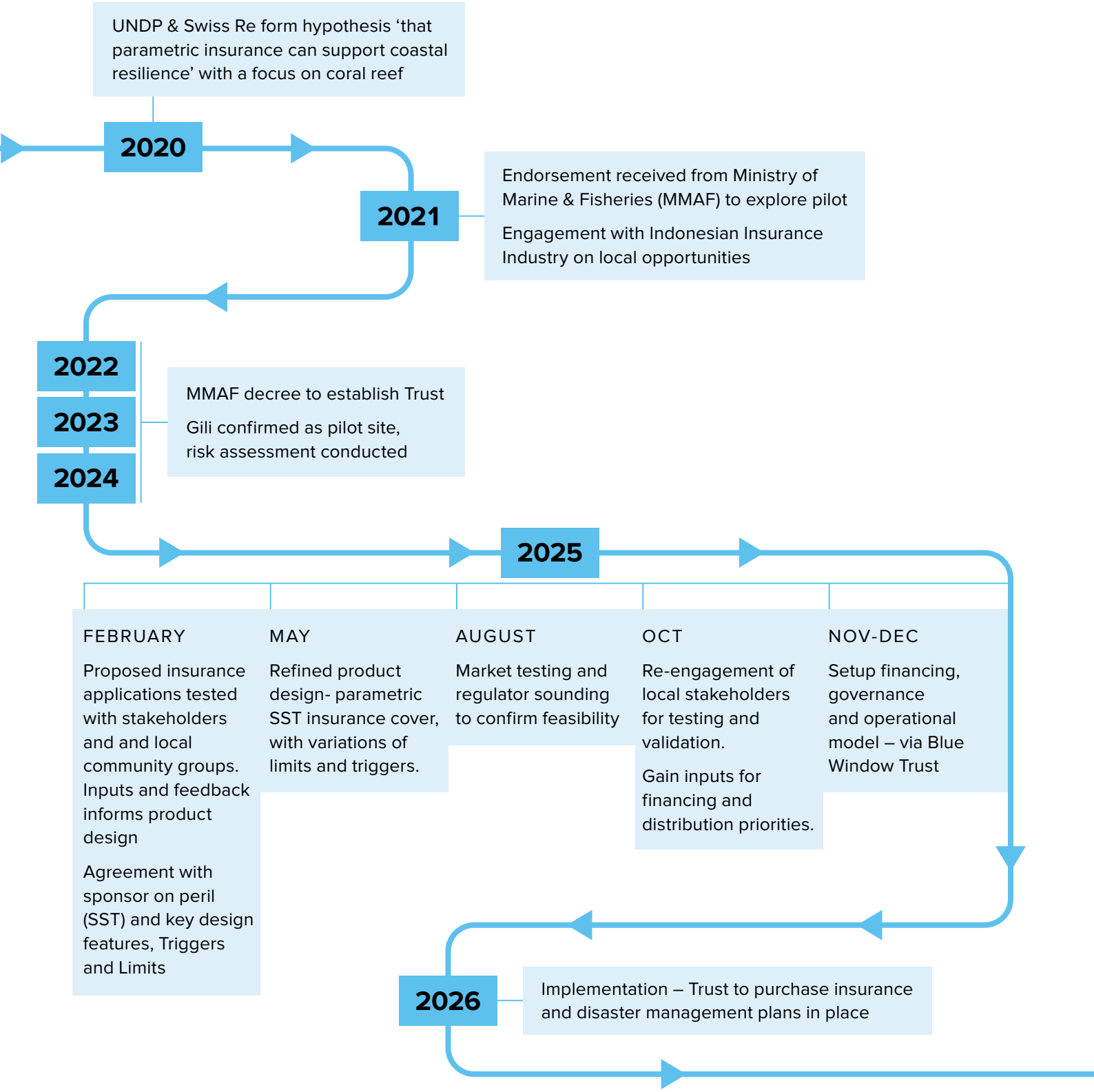
78 non-life insurance companies

8 reinsurers

2 ASEAN Blue Wealth, "Indonesia National Snapshot" (2026). Available at https://aseanbluewealth.com/national-snapshots/indonesia.
3 Ibid.
4 Ibid
5 Indonesia Financial Service Authority (OJK), " Indonesia Financial Market Report, Q4 2025", " (Jakarta, 2025). Available at https://ojk.go.id/id/data-dan-statistik/laporan-triwulanan/Documents/Laporan%20Kinerja%20Triwulan%20IV-2025.pdf.
6 World Bank, "Indonesia Sustainable Oceans Program" (Washington, D.C.). Available at https://www.worldbank.org/en/programs/indonesia-sustainable-oceans-program.
7 Ministry of Marine Affairs and Fisheries, Republic of Indonesia, "Indonesia Coral Reef Bond" (Jakarta, 2025). Available at https://kkp.go.id/coralreefbond.html.
8 Ibid.

The development of the coral reef insurance project built on several years of engagement between UNDP and the Ministry of Marine Affairs and Fisheries (MMAF) to analyze the role of insurance and risk financing in strengthening coastal resilience and supporting sustainable marine resource management in Indonesia.

Fig. 1 Timeline of key milestones in the development of coral reef insurance in Indonesia (2020–2026)



Project focus:
Improving resilience of coral reefs and dependent communities in Gili Matra marine protected area

The project was designed around three interconnected areas of work: strengthening the policy and enabling environment, developing and validating the design of a parametric insurance solution, and building stakeholder awareness and capacity. As technical partner, Swiss Re provided the expertise on climate risk analysis and insurance solution design. Together, these efforts aimed to establish the foundations for integrating insurance into broader coastal resilience and sustainable marine financing strategies in Indonesia.

MMAF identified the Gili Matra Marine Protected Area in North Lombok as a suitable pilot location. The area's ecological significance, strong dependence on reef-based tourism and livelihoods, and growing exposure to climate-related risks made it an appropriate site to test the application of coral reef insurance.

Through a combination of policy support, insurance solution development, and stakeholder engagement, the initiative explored how insurance could complement existing coastal management and financing mechanisms while strengthening resilience to climate-related risks.

Building the foundations for coral reef risk financing

A key focus of the project was strengthening the policy, institutional, and financing foundations needed to implement coral reef insurance within Indonesia's broader coastal resilience and Blue Economy agenda. As discussions progressed, stakeholders increasingly understood insurance not as a standalone conservation tool, but as a complementary financing mechanism that could support post-event response and recovery while contributing to wider sustainable marine risk management and financing objectives. This perspective was consistent with broader policy developments in Indonesia, including the recognition of coral reef insurance in the country's 2025–2029 Medium-Term National Development Plan (RPJMN) as an innovative financial instrument supporting sustainable finance and coastal resilience.

One of the project's most significant achievements was supporting the broader policy dialogue around sustainable marine financing that culminated in the issuance of Ministerial Regulation No. 27/2024 on the Implementation of Funding for Sustainable Programs in the Marine and Fisheries Sector. The regulation recognizes the need for alternative financing mechanisms to complement public budgets and establishes the policy basis for the Marine Biodiversity Trust Fund, known as the Blue Window. This represented a major milestone toward establishing the legal and institutional foundations for coral reef insurance implementation in Indonesia.

The Blue Window framework also helped advance discussions on one of the most important challenges facing nature-based insurance solutions: sustainable financing. Through consultations with MMAF, IEF/BPDLH, OJK, AAUI, and other stakeholders, the project identified how the mechanism could potentially support future premium financing arrangements through a combination of public, philanthropic, tourism-related, and other financing sources. These discussions reinforced that the long-term viability of coral reef insurance depends not only on product design, but also on clear governance arrangements and sustainable financing mechanisms to cover the premium.

The project also helped clarify the institutional arrangements that would be needed for future implementation. Stakeholders considered issues such as policyholder arrangements, premium payment mechanisms, trigger monitoring, claims administration,

payout governance, and coordination among participating institutions. While these arrangements will require further development as implementation progresses, the discussions helped establish a clearer pathway for how coral reef insurance could potentially operate within Indonesia's regulatory and institutional context.

Designing the parametric insurance solution

Building on the policy and financing discussions, the project assessed the feasibility of a coral reef insurance solution for Gili Matra. Technical analysis undertaken with Swiss Re examined a range of natural and environmental risks affecting the Marine Protected Area (MPA), including windstorms, flooding, earthquake, tsunami, and heat stress associated with elevated sea surface temperatures. Following discussion and validation with the MMAF, the assessment identified extreme sea surface temperature (SST) events as one of the most significant and immediate climate-related threats to coral reef ecosystems within the MPA due to their strong association with coral bleaching9. Unlike many of the other perils assessed, which were less likely to directly affect reef health or occurred less frequently within the project area, elevated SST events have caused recurrent bleaching episodes across Indonesia's coral reef systems and are expected to increase in frequency and severity under climate change. The analysis further concluded that this risk was well suited to a parametric insurance approach, given the availability of reliable historical data and the ability to establish objective, transparent, and independently verifiable triggers.

The proposed insurance structure was designed to finance post-event reef response, restoration, and recovery activities rather than insure the coral reef ecosystem itself. Drawing on international experience and stakeholder consultations, the project developed and validated the design of a parametric insurance product tailored to Indonesia's coastal resilience context.

As part of the product design process, MMAF, the Gili Matra MPA, local government representatives, community stakeholders, and other reef management actors were engaged to identify priority response and restoration activities, estimate associated costs, and clarify institutional roles. Discussions on standard operating procedures also explored how payouts would be governed, coordinated, and deployed through existing reef management structures. While detailed operational arrangements will be finalized during implementation, the project helped establish the foundation for identifying the institutions and stakeholders that would be responsible for translating insurance payouts into on-the-ground restoration and recovery actions.

9 NOAA Coral Reef Watch, "Current Global Bleaching: Status Update & Data Submission," (Washington, D.C., updated June 2, 2026). Available at https://coralreefwatch.noaa.gov/satellite/research/coral_bleaching_report.php

Key Features of the Proposed Coral Reef Insurance Solution

Trigger mechanism

Parametric insurance linked to extreme sea surface temperature (SST) Alert Level events.

Trigger based on Degree Heating Weeks (DHW), a globally recognized measure of accumulated heat stress that can be used as a predictor of coral bleaching.

Utilizes independent data from the National Oceanic and Atmospheric Administration (NOAA) Coral Reef Watch, providing objective and transparent monitoring of sea surface temperature.

Coverage and payout structure

Payouts are triggered when average DHW levels across the defined reef area exceed 4 DHW – as per the NOAA Alert Notifications system.

A tiered payout structure was proposed:
NOAA Alert Level 1 (4–7.9 DHW): 50% payout.
NOAA Alert Level 2 (8+ DHW): 100% payout.

Based on the proposed innovative and unprecedented insurance design, with very high frequency of payout expected, the indicative premium range is conservatively positioned at the higher end US$30,000 – 40,000 based on a maximum payout of US$100,00010. The indicative payout level is derived from estimates of the Ministry of Marine Affairs and Fisheries (MMAF)'s coral reef emergency response and restoration costs. While the premium-to-limit ratio appears relatively high, its assessment should be considered in the context of the potentially significant ecological and economic consequences of coral bleaching events, as well as the costs of delayed intervention. The decision to proceed with insurance should therefore balance the value of securing rapid, predictable funding for response measures against alternative uses of limited conservation and adaptation resources.

Intended use of payouts

Execution of the disaster response plan – Financing rapid response, restoration, and recovery activities following severe bleaching events.

Supporting implementation of ongoing reef management and restoration measures identified by MMAF and local MPAs.

Beneficiaries

The direct beneficiary is the MMAF and MPA teams who receive the payout for execution of the disaster response activities

Further beneficiaries, in turn, are the reef-dependent communities, tourism operators, fisheries stakeholders, and local economies that rely on healthy coral reef ecosystems.

The community experiences the benefits of more stable income and less disruption, due to faster financing for reef restoration and recovery activities. This aggregated approach can deliver a broader and more inclusive impact, rather than direct compensation payments to individuals.

→

10 Conservative estimate based on high frequency trigger selection. Market pricing may result in more competitive offerings. Final pricing will be at the discretion of the insurer. It should also be noted that at this rate, the cost of insurance may not be the optimal use of limited funds.

Sustainability and financing

MMAF was identified as the proposed policyholder.

Discussions explored the potential role of the Blue Window under IEF/BPDLH as a future mechanism to support premium financing, including pooling resources from multiple funding sources to finance insurance coverage, receiving and administering payouts, and channeling disbursements toward agreed reef response and recovery activities following a triggering event.

Stakeholders recognized that sustainable financing arrangements, potentially combining public, philanthropic, tourism-related, and other sources of funding, would be essential for long-term implementation. Discussions highlighted tourism-related financing as a promising long-term funding source given the sector's dependence on healthy reef ecosystems. Potential mechanisms discussed included visitor fees, tourism levies, voluntary contributions, and corporate sustainability commitments. While tourism stakeholders generally expressed interest in supporting reef resilience initiatives, stakeholders noted that initial premium support from public and philanthropic sources may be needed to demonstrate the effectiveness and value of the insurance mechanism, establish appropriate governance and fund management arrangements, and build confidence in how funds and payouts would be managed before broader private sector participation could be secured.

Regulatory and market readiness

The proposed product was reviewed with MMAF, OJK, AAUI, and insurance industry stakeholders.

Consultations confirmed the technical feasibility of the concept while identifying the need for further clarity on implementation arrangements, premium financing, policyholder responsibilities, and underwriting arrangements before a product could be formally launched.

The project helped advance regulatory dialogue and market understanding of parametric insurance, insurance for nature-based solutions, and disaster risk financing in Indonesia.

The design process helped demonstrate how insurance could complement broader coastal resilience and sustainable marine financing efforts by providing a predictable source of funding for post-event response and recovery.

Building capacity and stakeholder readiness

Recognizing that coral reef insurance was a new concept in Indonesia, the project placed significant emphasis on building awareness, strengthening technical understanding, and fostering collaboration among the stakeholders that would ultimately be responsible for implementing, regulating, financing, and benefiting from a future insurance mechanism.

The project developed and delivered a series of training and stakeholder engagement activities involving government agencies, regulator, insurers, Marine Protected Area authorities, academia, NGOs, tourism stakeholders, community representatives, women's groups, and other coastal resource management actors.

- National-level capacity building activities focused on policy, governance, regulatory, and insurance market considerations. Through engagement with MMAF, OJK, AAUI, IEF/BPDLH, insurers, and development partners, 250 participants learned about topics such as nature and biodiversity risks, parametric insurance, governance arrangements, sustainable financing, and the role of insurance within broader coastal resilience and marine financing strategies. These discussions helped strengthen institutional understanding of the opportunities and practical requirements associated with implementing nature-related insurance solutions in Indonesia.

- Local level activities focused on the realities facing reef-dependent communities and coastal economies. MPA managers, local governments, tourism operators, community representatives, and coastal stakeholders participated in discussions on climate risks, reef degradation, restoration needs, and the potential role of insurance in supporting post-event response and recovery. Interactive learning approaches helped participants better understand financial risk management concepts and how insurance could complement existing conservation and resilience efforts.

These engagements helped build trust and ownership around coral reef insurance as a complementary risk financing tool, while clarifying its role in supporting faster access to funding for reef restoration and recovery rather than replacing conservation efforts. They were particularly relevant for reef-dependent groups — including tourism operators, dive and snorkeling businesses, boat operators, fishers, small enterprises, informal workers, and coastal households — by strengthening understanding of climate risks and helping lay the groundwork for future financing mechanisms that could reduce disruptions to livelihoods and local economic activity following severe environmental events.

To support continued learning beyond the project period, UNDP and its partners developed two knowledge products that capture the project's experience and lessons.

- The Improving Resilience of Coral Reef-Dependent Communities in Gili Matra, Indonesia: Lessons Learned Report documents the process of stakeholder engagement, risk assessment, product development, and institutional arrangements.

- The Insurance for Coastal Resilience: Guidance and Toolkit from the Indonesia Coral Reef Insurance Project provides practical guidance, tools, and decision-making frameworks for policymakers, practitioners, insurers, and development partners exploring similar approaches.

Together, these resources help translate the project's findings into actionable knowledge that can support future implementation and replication in Indonesia and other coastal contexts.

By building awareness, strengthening institutional readiness, and documenting practical lessons, the project helped establish the knowledge and stakeholder foundations needed to support future coastal risk financing initiatives in Indonesia.

Lessons learned

Key lessons learned from the project include:

1. **Insurance is best positioned as complementary to national marine and coastal resilience agendas.** Insurance gained greater stakeholder support when presented as part of Indonesia's broader Blue Economy and coastal resilience agenda rather than as a standalone intervention. Positioning insurance as a complementary tool for risk management and financing post-event response and recovery helped align the concept with existing government priorities and financing frameworks.

2. **Strong government ownership and engagement are critical for implementation.** The leadership of MMAF was instrumental in convening stakeholders, advancing policy discussions, and maintaining momentum throughout the project. Strong government ownership helped strengthen the credibility of the initiative and create pathways for future implementation.

3. **Early engagement with regulators, insurers, and technical partners improves implementation readiness.** Engagement with OJK, AAUI, insurers, and technical partners helped build a shared understanding of the opportunities and challenges associated with nature-related insurance solutions. These discussions highlighted the importance of addressing regulatory, institutional, and market considerations alongside product development.

4. **Clearly defining the insurable interest and intended use of payouts is essential.** The project demonstrated the importance of distinguishing between insuring an ecosystem and financing the costs of its recovery. Clarifying that payouts would support response, restoration, and recovery activities — rather than compensating for the ecological value of the reef itself— helped align the proposed solution with existing insurance approaches that focus on financing quantifiable recovery costs following a triggering event. This distinction also helped manage stakeholder expectations regarding the purpose and role of the insurance mechanism.

5 **Product design requires balancing technical rigor, affordability, and stakeholder expectations.** Developing a viable insurance solution required balancing scientific robustness with affordability and practical implementation considerations. Iterative consultation and technical validation helped refine the product design while managing stakeholder expectations regarding premium costs, coverage and payouts.

6 **Insurer interest alone is insufficient to move a nature-based insurance solution to implementation.** While insurers and industry representatives generally recognized the technical feasibility and potential value of the proposed coral reef insurance product, they emphasized the need for further clarification on premium financing, governance arrangements, risk ownership, and regulatory framework before underwriting commitments could be considered. As a result, institutional and financing arrangements emerged as equally important determinants of implementation readiness as the insurance product itself.

7 **Sustainable premium financing remains fundamental to long-term viability.** Long-term implementation will depend on securing reliable premium financing and establishing clear governance arrangements for managing funds and payouts. Exploring blended financing approaches early in the design process can help strengthen the sustainability of nature-based insurance solutions.

8 **Grant funding plays a critical catalytic role in developing innovative risk financing solutions.** Establishing new insurance mechanisms for natural assets requires substantial investment in stakeholder engagement, policy dialogue, regulatory discussions, technical analysis, and institutional coordination before implementation can occur. These preparatory activities are often resource- and time-intensive, with outcomes that may not be immediately investable or commercially viable. Grant funding can therefore help absorb early-stage development costs, reduce barriers to innovation, and create the enabling conditions needed to attract longer-term public and private financing.

Path to scale

The project established important foundations for future coral reef insurance initiatives in Indonesia. While implementation will require continued collaboration and investment, the experience in Gili Matra demonstrated that the key building blocks for coastal risk financing can be developed through a combination of policy innovation, technical design, and stakeholder engagement.

From policy foundations to implementation readiness

The issuance of Ministerial Regulation No. 27/2024 and the establishment of the Blue Window framework provide an important foundation for advancing sustainable financing for coastal and marine resilience. Building on these developments, future efforts can focus on operationalizing institutional arrangements, including clarifying the role of the 'Blue Window' Trust as a potential mechanism for premium financing, fund administration, and disbursement of insurance payouts.

The project also identified the need to further strengthen governance arrangements for future implementation. This includes defining policyholder and beneficiary arrangements, establishing clear protocols for payout utilization and claims management, and ensuring alignment between insurance mechanisms and existing marine conservation and coastal management systems. Continued engagement among MMAF, IEF/BPDLH, OJK, AAUI, and other stakeholders will be important to translate the enabling framework into practical implementation arrangements.

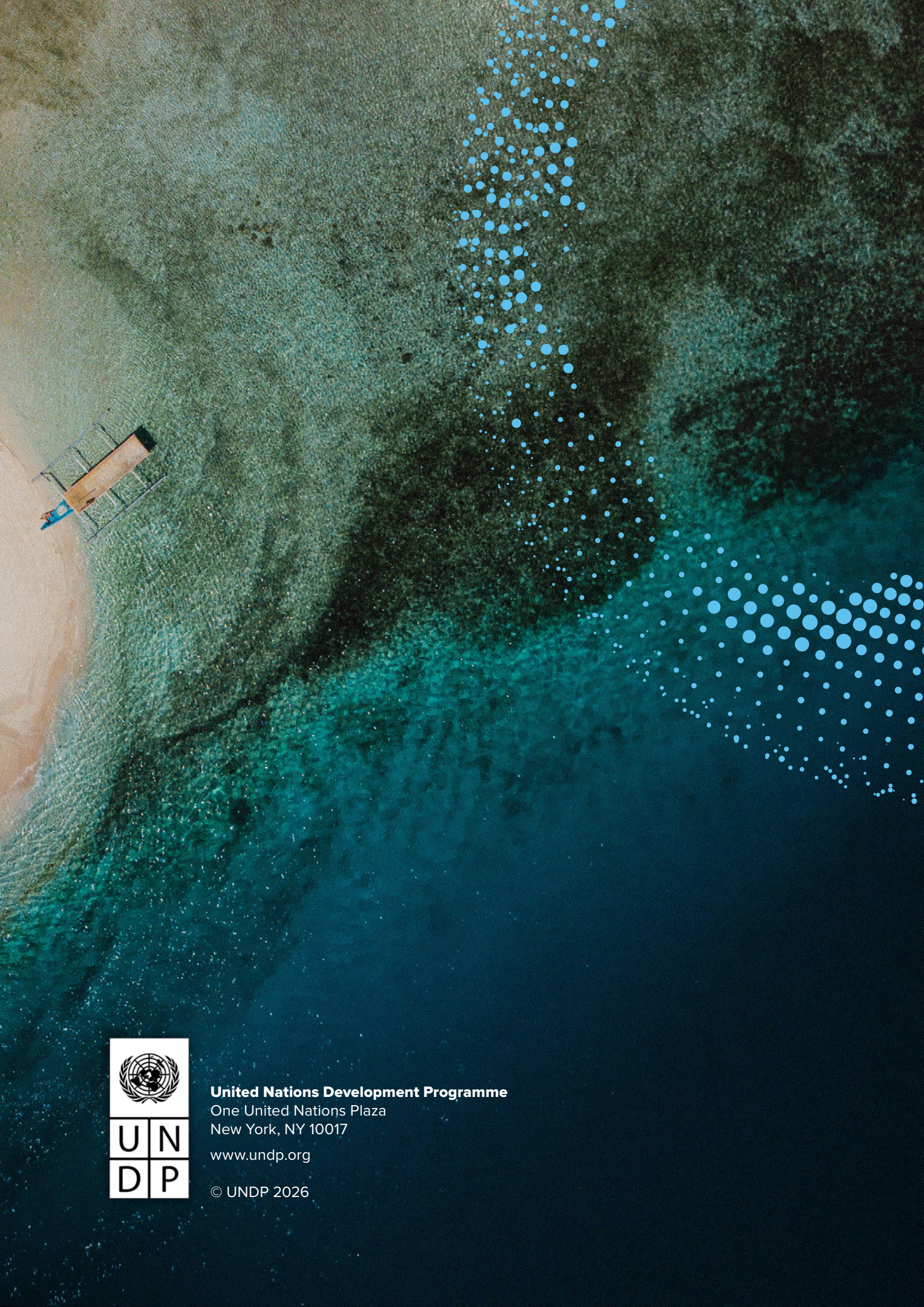
Advancing a proposed coral reef insurance solution

The project developed and refined the design of a proposed parametric insurance solution tailored to Indonesia's coastal risk context. Future work can focus on refining implementation arrangements, confirming regulatory pathways, and supporting the transition from a proposed draft concept to an operational insurance product.

Continued engagement with OJK, AAUI, insurers, and other market stakeholders will be important to further assess regulatory requirements, underwriting arrangements, and market appetite for coral reef insurance. This ongoing engagement can also help validate the technical parameters of the product and translate the product design into a practical and scalable solution that aligns with Indonesia's insurance market, regulatory framework, and coastal resilience objectives.

Supporting replication through knowledge and capacity building

Continued capacity building will be important to support implementation readiness among government agencies, regulators, insurers, and coastal resource managers. The project's Lessons Learned Report and Insurance for Coastal Resilience Toolkit provide practical resources that can support future implementation in Indonesia while also offering a framework that can be adapted by other marine protected areas, coastal ecosystems, and jurisdictions exploring the role of insurance within broader resilience and sustainable financing strategies. Through continued knowledge exchange and peer learning, the Gili Matra experience can help inform the development of similar nature-based insurance initiatives in other contexts.



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