STIMSON

REPORT

Climate and Natural Resources

Environmental Security Program &
Southeast Asia Program

Assessing IUU Fishing in Southeast Asia

IUU Fishing Risk Profile for the Sulu-Sulawesi Seascape

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ABOUT STIMSON

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ABBREVIATIONS AND ACRONYMS

AIS	Automatic Information Systems
AN-IUU	ASEAN Network-IUU
ASEAN	Association of Southeast Asian Nations
BFAR	Bureau of Fisheries and Aquatic Resources (Philippines)
CORVI	Climate and Ocean Resilience Vulnerability Index
CTI-CFF	Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security
DOF	Department of Fisheries (Malaysia)
EAFM	Ecosystem Approach to Fisheries Management
EC	European Commission
EEZ	Exclusive Economic Zone
ETP	Endangered, threatened, and protected species
FMA	Fisheries Management Area
GT	gross tonnage
IEZ	Inshore Exclusion Zone
IUU	Illegal, Unreported, and Unregulated (fishing)
KI	Key Informants
LGU	Local Governance Units (Philippines)
MCC	Marine Command Center
MCS	Monitoring, Control, and Surveillance
MMAF	Ministry of Marine Affairs and Fisheries (Indonesia)
MMEA	Malaysia Maritime Enforcement Agency
MoU	Memorandum of Understanding
MPA	Marine Protected Area
NGO	Non-Government Organization
nm	Nautical Mile
NPOA	National Plan of Action
PFDA	Philippines Fisheries Development Authority
Php	Philippine Peso
PiPo	Port In-Port Out
PNK	Malaysian National Fishermen Association
PRC	People's Republic of China
PSMA	Agreement on Port State Measures
RETT	SuFiA TS Regional Experts Technical Team
RFMO	Regional Fisheries Management Organization
RM	Malaysian Ringgit
Rp	Indonesian Rupiah
RPOA	Regional Plan of Action
SCS	South China Seascape
SEJ	Structured Expert Judgement
SFI	Seaweed Farm Inputs
SOP	Standard Operating Procedure
SSME	Sulu-Sulawesi Marine Ecoregion
SSS	Sulu-Sulawesi Seascape
SuFiA-TS	USAID Sustainable Fish Asia Technical Support
UPI	Fish Processing Unit
U.S.	United States of America
USD	US Dollar
VMS	Vessel Monitoring Systems

INTRODUCTION

The purpose of this report is to identify pathways to sustainable fisheries and conserve biodiversity in the Indo-pacific by offering a robust review of the drivers of IUU fishing in the Sulu-Sulawesi Seascape (SSS). This risk assessment profiles the vulnerability to Indonesia, Malaysia, and Philippines—countries which border the SSS—to illegal, unreported, and unregulated (IUU fishing). This report offers an assessment of fishing activities in SSS waters to inform regional collaboration and policy discussions.

The risk assessment process which derives the results detailed in this report adapts the Stimson Center's Climate and Ocean Risk Vulnerability Initiative (CORVI) survey methods to assess the specific economic, environmental, and governance risk factors that drive IUU fishing in the SSS and surrounding region. The process began with 50 semi-structured interviews with expert key informants (KIs) and extensive desk research to determine risk categories (economic, environmental, and governance) and develop five indicators per category. Then an online risk survey was sent to KIs and other identified government, academic researchers, fisheries industry members, NGO staff, and independent experts.

In the online survey, respondents select a country of focus and answer five questions about risk and vulnerabilities for each of the fifteen indicators in the selected country. Questions assess current and future perceptions of issues related to the indicator. Respondents are also asked to compare risk across countries and across different seascapes. To learn more about who took the survey and how respondent's scores are weighted and calculated into mean scores per indicator and category, please see the methods section at the end of this report.

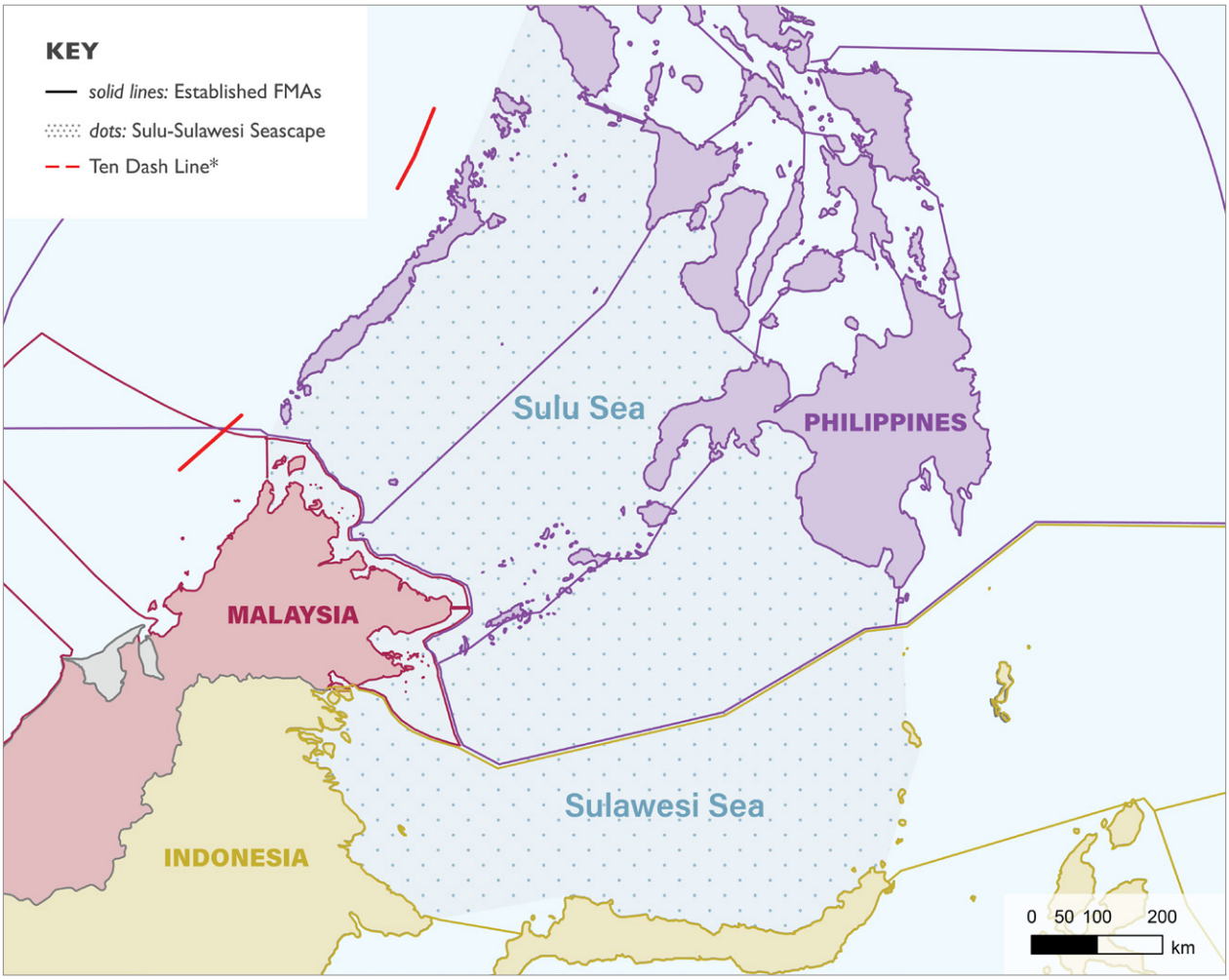
A high risk score for an indicator denotes a higher level of perceived risk associated with that indicator (see Figure 1). This report lays out findings from the analysis of surveys, interviews, and desk research. While it is not within the scope of this report to produce policy and planning recommendations, it is logical to assume that the issues and needs with the highest risk scores are those which require the most policy and programmatic attention.

Figure 1: Risk Score Continuum

This report begins with a results summary and comparative analysis of the risk assessment results. This section offers an overview of rankings for governance, environmental, and economic risk indicators. This section also details key risks and trends applicable to the SSS, as well as observations on potential drivers of IUU fishing between the six analyzed countries. The section entitled "Challenges and Opportunities for Regional Action" explores how regional organizations such as the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) and the Regional Plan of Action to promote responsible fishing practices including combatting IUU Fishing (RPOA-IUU) can act to address IUU fishing in the SSS. Profiles for each country take a deeper dive into the drivers of risk for particular indicators across the three categories and detail unique threats and best practices found in the SCS countries. The report conclusion summarizes the findings and describes opportunities for future collaboration in the SSS on this topic.

IUU fishing encompasses a range of fisheries offenses. *Illegal* fishing refers to fishing activities by a national or foreign vessels in the waters of a country, or by flag state vessels that are party to a regional fisheries management organization (RFMO), in contravention of conservation and management measures. *Unreported* fishing refers to fishing activities that have either not been reported or have been misreported to authorities. Unreported fishing is not only fraudulent, but it also undermines fisheries management by skewing the accuracy of fish stock assessments on which fisheries conservation and management regulations are based. *Unregulated* fishing refers to fishing activities in areas without any fisheries management or conservation measures, including the high seas and areas not management by a RFMO.

Figure 2: Sulu-Sulawesi Seascape Map



The SSS covers over 900,000 square kilometers of ocean within the territorial seas of Philippines, Malaysia, and Indonesia. It is a rich fishing ground for tunas and small pelagic species. The SSS lies within the Coral Triangle, a global center of marine biodiversity. The SSS has an average total catch of 1.06 million metric tons with an estimated value of US$1.18 billion.[1] Approximately 40 million people are

*The ten dash line represents PRC's SCS claim and is not internationally accepted by the international community and are evidence of PRC disinformation within the maritime domain, inclusive of fishing claims.

dependent on the seascape's fishery resources for their food security and livelihoods.[2] The national governments of countries in the SSS are committed to marine conservation and regulation but face implementation challenges that hamper sustainable fisheries management and efforts to eliminate IUU fishing. Vessels from Indonesia, Malaysia and the Philippines encroach on the waters of their neighbors and fish outside of registered zones in their domestic waters. Foreign-flagged vessels from the PRC, Taiwan, and Vietnam also encroach on territorial waters in the SSS. Transnational criminal enterprises are known to operate in the region and cause additional challenges to enforcement. Fish stocks in the SSS are declining from overfishing and rising sea temperatures. Intensifying weather patterns also introduce safety risks to artisanal fishers, threatening their food and economic security.

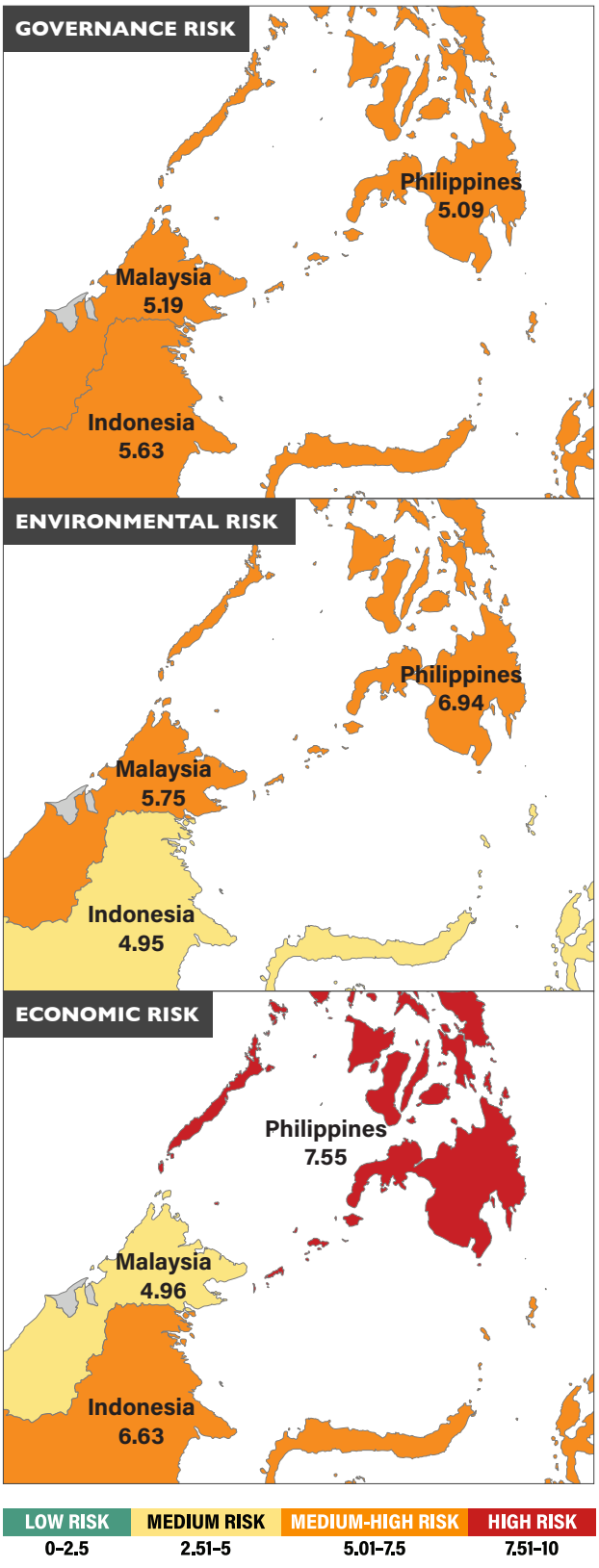
Figure 3: Sulu-Sulawesi Seascape Comparative Fact Table

	Per Capita Fish Consumption, kg	Annual Fish Catch, MMT	Annual Loss to IUU Fishing, billion USD	Country Allows Foreign-Flagged Vessels in TTY waters	Registered Employment Maritime Fisheries	Percentage small-scale or artisanal
Indonesia	35.26 (2021)	6.8 (2021)	$.074 (2022)	No	719,000 (2024)	97% (2020)
Malaysia	34.08 (2021)	1.79 (2021)	$1.4 (2019)	No	116,000 (2022)	60% (2022)
Philippines	34.28 (2021)	4.3 (2021)	$1.3 (2021)	Yes	1,354,000 (2020)	80% (2022)

Overall, porous national boundaries in SSS waters limit monitoring, control, and surveillance (MCS) efforts. Limited MCS capacity proliferates the encroachment of transnational criminal networks and foreign-flagged vessels engaging in IUU fishing within the seascape. MCS capacity for domestic fleet is relatively more robust but is hampered by low enforcement capacity and bureaucratic confusion.

In addition to relatively robust enforcement efforts by the national governments in SSS waters, regional states have developed mechanisms for collaboration on key issues related to fisheries management and marine conservation. The CTI-CFF, a multilateral partnership between six countries including those along the SSS, recently ratified the second CTI-CFF Regional Plan of Action (RPOA-2.0) which places an emphasis on strengthening national conservation and management of marine ecosystems through sustainable financing and regional partnerships.[3] CTI-CFF in collaboration with Regional Plan of Action to Promote Responsible Fishing Practices including Combating IUU Fishing (RPOA-IUU), a minister-level initiative among 11 regional states, met in May of 2024 to discuss collaboration on data validation efforts and the IUU Fishing Index Assessment for regional states through the USAID Sustainable Coral Triangle Program.[4] Countries along the SSS also maintain bilateral collaboration through Memorandums of Understanding (MoUs) to align efforts on fisheries crimes, and also include joint patrols and sharing monitoring and surveillance tech to combat IUU fishing and destructive fishing practices. Notably, in early-July of 2024, in partnership with the U.S. and leading environmental non-government organizations, Indonesia signed an unprecedented $35 million debt-for-nature swap to protect Indonesia's coral reefs.[5] Further domestic-level management and conservation initiatives in the SSS will be discussed in the country profiles.

Figure 4: Sulu-Sulawesi Seascape Risk Profile



Source: SuFiA TS Adapted CORVI Risk Survey for IUU Fishing.

RESULTS SUMMARY AND COMPARATIVE ANALYSIS

When averaging the indicator scores of each country across each category (governance, environmental, and economic), survey results suggest the SSS is at medium-high risk level for each of the three risk categories (see Figure 4). Average scores for the governance indicators rank medium-high and have the least variance across Indonesia (5.63), Malaysia (5.19), and the Philippines (5.09). Overall, experts from the region indicated environmental and ecological risk as medium-high to medium, with the highest risk in the Philippines (6.94) and Malaysia (5.75), while Indonesia was rated as medium risk (4.95). The greatest variance between scores were observed in the economic risks category with the high average risk in the Philippines (7.55), medium-high risk in Indonesia (6.63), while Malaysia was rated as medium risk (4.96). Comparative analysis of these scores is summarized below.

GOVERNANCE RISKS

The average score of risk indicators related to governance (see Figure 5) suggests medium-high risk in Indonesia (5.63), Malaysia (5.19), and the Philippines (5.09). Compared to the SCS[6] governance in the SSS is lower risk for Indonesia and the Philippines, where government initiatives to counter IUU fishing and promote sustainable fisheries management are well-received. KIs rated government initiatives as medium-low risk in all three countries, and this indicator was the lowest in the Philippines (4.26). Lower risk scores indicate a greater presence and effectiveness of government programming to combat IUU fishing. For instance, in 2012 the Philippines Bureau of Fisheries and Aquatic resources (BFAR) recognized threats posed by overfishing to sardinella spawning and implemented a four-month closed season in the East Sulu Sea, Basilan Strait, and Sibuguey Bay to allow stocks to spawn and regenerate.[7] KIs in Indonesia (4.86) and the Philippines (4.96) rated the capacity of their fisheries enforcement as medium risk citing joint patrols, MoUs, and other collaboration with foreign partners improved MCS and enforcement capabilities. Lower risk scores indicate a greater

capacity for counter-IUU fishing enforcement on the water, at ports, and in the seafood supply chain. KIs in Malaysia reported capacity of fisheries enforcement as medium-high risk *(6.21)*, the highest in the seascape, citing institutional corruption, low prosecution rates, and limited at-seas enforcement.

Figure 5: Governance Risks

Low Risk 1 - 2.5 **Medium Risk** 2.51 - 5 **Medium-High Risk** 5.01 - 7.5 **High Risk** 7.51 - 10

Indicators	Indonesia	Malaysia	Philippines
Governance	**5.63**	**5.19**	**5.09**
% of Territorial Waters Protected	3.79	4.60	3.94
Capacity of Fisheries Enforcement	4.86	6.21	4.96
% of Artisanal/Small-scale Vessels Licensed or Registered	6.73	5.15	3.98
Contested Maritime Boundaries	8.73	5.49	8.52
Government Initiatives to Counter IUU Fishing and Promote Sustainable Fisheries Management	4.73	4.52	4.26

Table: Stimson Center. Created with Datawrapper.

Indicator	Context
% of territorial waters documented as protected	This indicator measures the amount of a country's territorial waters designated with some level of government protection, such as marine protected areas, fisheries management areas, or others. It does not measure the capacity of government institutions or others to enforce these protections. Protected territorial waters indicate that the government is making commitments to support the health and sustainable management of marine ecosystems and resources.
Capacity of fisheries enforcement	This indicator assesses the capability of government institutions to enforce anti-IUU fishing laws and regulations in their territorial waters against national and foreign vessels. Individuals engaging in IUU fishing may seek out areas with poor enforcement, heightening the risk that IUU fishing occurs in these waters.
% of artisanal/small-scale vessels licensed or registered	This indicator measures the ability and will of a government to regulate their artisanal and small-scale fisheries, previously identified by experts as the largest perpetrators of IUU fishing in the region. As discussed earlier, IUU fishing violations perpetrated by artisanal fisherfolk are largely unregulated or unreported, rather than illegal.
Contested maritime boundaries	This indicator assesses the stability of the maritime security environment, level of tension with other regional states, and extent of a state's law enforcement mechanisms. Contested maritime boundaries were identified by interviewees as hubs of IUU fishing, such as those between Cambodia and Vietnam, and those between China and the Philippines.
Government initiatives to counter IUU fishing and promote sustainable fisheries management	This indicator assesses the level of government effort and action to address IUU fishing and/or improve sustainable fisheries management. This indicator includes plans, policies, programs led or funded by the government as well as investments to the fishing industry.

Porous national boundaries in the SSS limit MCS efforts and have allowed transnational criminal enterprises to fund and engage in IUU fishing and other illicit activities throughout the region. The persistent encroachment of foreign-flagged vessels and transnational criminal networks into the maritime domain of respective SSS countries are key drivers of the risk perception in the *contested maritime boundary* indicator for Indonesia (8.73) and the Philippines (8.52). The gap between the elevated risk scores for this indicator compared to medium risk scores for domestic-focused issues highlights the difficulties of deterring and regulating the encroachment of foreign-flagged vessels in the SSS. *Contested maritime boundaries* is reported as medium-high risk in Malaysia (5.49), where KIs note that the government has made enforcement against Vietnamese- and Thai-flagged vessels a priority.

ENVIRONMENTAL RISK

Figure 6: Environment: Nearshore and Offshore Fish Stocks

Low Risk 1 - 2.5 | Medium Risk 2.51 - 5 | Medium-High Risk 5.01 - 7.5 | High Risk 7.51 - 10

Indicators	Indonesia	Malaysia	Philippines
Environmental	**4.95**	**5.75**	**6.94**
Nearshore Fish Stocks	4.70	6.41	7.00
Offshore Fish Stocks	4.53	6.19	6.73
Marine Habitat Health	4.89	5.89	7.07
Climate Change Impacts on Marine Habitat Health and Fish Stocks	5.95	4.60	7.80
Climate Change Resilience	4.69	5.69	6.00

Table: Stimson Center. Created with Datawrapper.

Indicator	Context
Nearshore fish stock status	This indicator assesses the health of nearshore fish stocks which are primarily targeted by artisanal and small-scale fisherfolk for household consumption or sale at the local market. It also assesses the effectiveness of the management of inshore fish stocks. Nearshore is defined in this indicator as from the shoreline to 10 nautical miles.
Offshore fish stock status	This indicator assesses the health of offshore fish stocks which are primarily targeted by commercial fisherfolk. It also assesses the effectiveness of the management of offshore fish stocks. Offshore is defined in this indicator as 10 nautical miles to 200 nautical miles.
Marine Habitat health	This indicator assesses the health of marine ecosystem-based services, such as those provided by mangroves, coral reefs, and seagrass beds. This indicator includes a question with an open-ended response for survey respondents to indicate the marine ecosystems they deem most important in their country.
Climate change impacts on habitat health and fish stocks	This indicator measures the vulnerability of each country's marine habitats and fish stocks to climate change, as well as the projected impacts of climate change on IUU fishing.
Climate change resilience	This indicator measures the level of effort and action the government has taken to implement coastal resiliency planning measures.

Environmental risk (Figure 6) is perceived as medium-high in the Philippines (6.94) and Malaysia (5.75) and medium (4.95) in Indonesia with notable concerns over the health of fish stocks among KIs in all countries. The Philippines' nearshore fish stocks (7.00) and offshore fish stocks (6.73) risk scores are highest within the region, while Malaysia and Indonesia note relatively less risk to stock health, at medium-high risk and medium risk, respectively. Seventy percent of fishing grounds have been overfished in the Philippines forcing fishers to travel farther and exert more fishing effort in search of ever-declining stocks.[8] KIs note that sardinella closed seasons primarily benefited fish spawning for waterways accessible by commercial vessels, with waterways accessible by small-scale and artisanal fishers being relatively more depleted. Malaysia has a medium-high risk for both *nearshore fish stocks (6.41)* and *offshore fish stocks (6.19)*. KIs in Sabah identified IUU fishing Vietnamese-flagged vessels as the greatest threat to the sustainability of their fish stocks. Industrial fishers interviewed reported a 40-50 percent decrease in catch since 2020, coinciding with a rise in Vietnamese-flagged vessels encroaching on Sabah's territorial waters and targeting endangered, threatened, and protected (ETP) species using offshore large motherships and smaller nearshore vessels. Risk to Indonesia's *nearshore fish stocks (4.70)* and *offshore fish stocks (4.53)* are rated as medium risk, while *marine habitat health (4.89)* was rated as a medium risk, the lowest in the seascape. Interviews with KIs in Indonesia reflect similar views, as there was a noted belief that Indonesia's waters are still relatively abundant which has potentially attracted vessels from neighboring countries to illegally fish in Indonesian waters.

Relatively higher risk scores for the Malaysia and the Philippines in environmental risk indicators extend to *marine habitat health*, reported as medium-high risk *(5.89)* and high risk *(7.07)* in Malaysia and the

Philippines, respectively. KIs in both countries report damage to seabed ecosystems from trawling and illegal fishing practices. In the Philippines, KIs report additional pressure on marine habitats due to coastal land development. In all three countries, KIs reported that foreign and domestic vessels encroach on inshore exclusion zones (IEZ) reserved for small-scale fishers.

ECONOMIC RISKS

Figure 7: Economic: Percent of Population Employed by Fisheries and Coastal Poverty Rate

Low Risk 1 - 2.5 | Medium Risk 2.51 - 5 | Medium-High Risk 5.01 - 7.5 | High Risk 7.51 - 10

Indicators	Indonesia	Malaysia	Philippines
Economic	**6.63**	**4.96**	**7.55**
% of Population Employed in Fisheries	7.07	4.25	6.80
Household Economic Dependence on Fishing in Coastal Communities	6.70	5.15	8.60
% of National Fisheries that are Artisanal	7.70	5.40	7.80
Coastal Poverty Rate	6.73	5.30	7.80
Fisheries Infrastructure	4.80	4.55	4.60

Table: Stimson Center. Created with Datawrapper.

Indicator	Context
% of population employed by fisheries	This indicator measures the workforce of the fishing industry, throughout the seafood supply chain, relative to total population in each country, inclusive of artisanal, small-scale, and industrial fisherfolk. Foreign fisherfolk living in each country are included in this indicator.
Household economic dependence on fishing in coastal communities	This indicator measures the economic dependence on fishing in coastal communities. Shocks to the community through regulation, the economy, or environment can have varying degrees of impact on driving coastal communities to engage in IUU fishing activities. If a large percentage of household income is derived from fishing, individuals will be more likely to engage in IUU fishing activities.
% of national fisheries that are artisanal	This indicator measures the relative size of artisanal fisherfolk to the national fisheries workforce. Several interviewees stressed that artisanal fisherfolk are the greatest perpetrators of IUU fishing in their respective countries. IUU fishing perpetrated by artisanal fisherfolk is generally unregulated and unreported, rather than illegal. Artisanal fisherfolk are also the most vulnerable to stock collapses, which may further drive them to engage in IUU fishing.
Coastal poverty rate	This indicator measures the proportion of the coastal population without the economic means to acquire basic goods and services. Coastal poverty drives fisherfolk to engage in IUU fishing to feed their families and communities, while IUU fishing in turn exacerbates coastal poverty. Coastal poverty rates were also identified by government interviewees as a roadblock to policy reform to combat IUU fishing, as they were reluctant to reduce a food and revenue source for people in poverty if they could not provide an alternative.
Fisheries infrastructure	This indicator measures the risks of IUU fishing from the level of investment into fisheries infrastructure, such as implementation of the Port State Measures Agreement (PSMA).3 This indicator also measures the level of community-based fisheries infrastructure, such as community-based fisheries surveillance and co-management.

The average score of indicators related to economic risk (Figure 7) varies in the SSS with the Philippines ranking high-risk (7.55), Indonesia at medium-high risk (6.63), and Malaysia at medium risk (4.96). In the Philippines, the economic category ranks as the highest categorical risk factor (7.55) when compared to environmental and governance risk. In the Philippines, *household economic dependence on fishing in coastal areas (8.60)*, the *coastal poverty rate (7.80)*, and the *percentage of national fisheries that are artisanal (7.80)* were all rated as high-risk. Among the three countries, the Philippines has the highest portion of its population engaged in fishing activities. Economic risk is the highest categorical risk factor in Indonesia (6.63) as well, but it is only rated as medium-high. The *percentage of national fisheries that are artisanal (7.70)* and the *percentage of the population employed by fisheries (7.07)* are identified as the two greatest risk factors in Indonesia. Economic risk factors are perceived as medium risk in Malaysia (4.96), the

lowest score among the three states and the least reliant on fisheries for economic productivity and local livelihoods. While risk *from the percent of population employed by fisheries* is relatively low *(4.25)*, the *percent of national fisheries that are artisanal (5.40)* and *coastal poverty rates (5.30)* are medium-high risks. With 82 percent of fisherfolk living in poverty in Malaysia, addressing the medium-high risk associated with household economic dependence on fishing (5.15) and fisheries infrastructure (4.55) are integral to reducing IUU fishing by small- scale fishers.[9] Notably, Malaysia is the only state in the SSS that is not party to the Agreement on Port State Measures (PSMA), the only binding international agreement which seeks to prevent, deter, and eliminate IUU fishing by preventing vessels engaged in IUU fishing from using ports and landing their catches.

REGIONAL AND BILATERAL EFFORTS

In addition to efforts by the three national governments to regulate domestic waters, IUU fishing risks in the SSS can be addressed and mitigated through relevant regional actions. This section briefly addresses regional organizations and cooperative MoUs working to address IUU fishing and promote sustainable fisheries management.

Sustainable fisheries and marine habitats in the SSS are overseen regionally by CTI-CFF.[10] CTI-CFF is a multilateral partnership between six countries (Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, and Timor-Leste) to address critical marine issues such as food security, climate change, and biodiversity to protect the Coral Triangle's marine resources and strengthen coastal resilience. CTI-CFF has five priority areas: strengthen the management of seascapes; promote an ecosystem approach to fisheries management; establish and improve effective management of marine protected areas (MPA); improve coastal community resilience to climate change; and protect threatened species.[11]

CTI-CFF adopts a marine ecoregion approach to marine habitat conservation and fisheries management. In 2004 a Sulu-Sulawesi ecoregion conservation plan was established by Indonesia, Malaysia, and the Philippines to address threats to ecological diversity across the seascape through the Coral Triangle Initiative.[12] The Sulu-Sulawesi Marine Ecoregion (SSME) committee, comprising representatives from the three countries, works to establish policy plans for transboundary marine protection issues in the SSS.[13] For example, in 2009 the SSME committee approved a trinational Marine Turtle Protected Area Network design. This design is implemented through MoUs between Malaysia, Indonesia, and the Philippines to jointly manage the Turtle Islands Wildlife Sanctuary, the first established transboundary marine park for turtle conservation.[14]

In 2018, a CTI-CFF Senior Officials Meeting endorsed the Sub-Regional Plan for Managing Transboundary Fisheries in the SSS.[15] The plan provides a framework for adopting and implementing an Ecosystem Approach to Fisheries Management (EAFM) through relevant governmental agencies, non-governmental partners, and multilateral organizations in the seascape. In November of 2022 the National Coordinating Committees of the CTI-CFF member states deliberated and endorsed the second CTI-CFF RPOA-2.0 (2021-2030).[16] RPOA-2.0 prioritizes EAFM by strengthening conservation and management of marine ecosystems and establishing sustainable financing strategies and regional partnerships. Three objectives, seven targets, 17 regional activities, and 33 expected outcomes are highlighted in RPOA-2.0. According to the plan's objectives, by 2030 priority threatened species and fisheries are improved through effective management. Second, by 2030 risk resilience and food security are improved for coastal communities living in the Coral Triangle. Finally, objectives and targets are met through CTI-CFF governance, leadership, and partnership. The EAFM Working Group developed by the six CTI-CFF member countries plans, develops, and manages fisheries to meet goals outlined in the RPOA and EAFM Sub-Regional Plan.[17]

Regional efforts to counter IUU fishing are supported by the RPOA-IUU. RPOA-IUU is a ministerial level initiative among 11 regional states (members include: Australia, Brunei Darussalam, Cambodia, Indonesia,

Malaysia, Papua New Guinea, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam). RPOA-IUU serves as a convening body for voluntary cooperation of sustainable fisheries management and information sharing on IUU fishing vessel movements and sightings in the South China Sea, SSS, and Arafura-Timor Seas. In May of 2024, the RPOA-IUU and the CTI-CFF held a meeting to explore collaboration under the USAID Sustainable Coral Triangle Program.[18] Collaborative activities include the IUU Fishing Index Assessment, the Assessment of RPOA/NPOA IUU Fishing Implementation, and efforts to strengthen data validation.

However, data and information on the health of fish stocks, fleet size, fishing capacity, and harvest locations are sensitive, and national governments are unwilling to share them with others in the region. In 2022, ASEAN established ASEAN Network-IUU (AN-IUU), a platform for fisheries enforcement agencies to upload reported incidents of IUU fishing.[19] Representatives from ASEAN countries and the EU met in July of 2024 to discuss implementing best practices in information sharing, and strategies for enhancing enforcement procedures. Creating formal regional data sharing mechanisms for reported incidents of IUU fishing, and data on the health of fish stocks and marine ecosystems, fleet size, and harvest locations between relevant regional partner organizations such as RPOA-IUU and CTI-CFF can help to share information to reduce IUU fishing levels in a collaborative but sensitive manner.

Intergovernmental cooperation is supported through CTI-CFF, RPOA-IUU, and ASEAN, but there is also robust bilateral cooperation between the governments of Indonesia, Malaysia, and the Philippines. Malaysia maintains MoUs with Indonesia and the Philippines to align efforts on smuggling, fisheries crime, transshipment, and trafficking in persons. Malaysia and Indonesia's collaborative efforts include joint patrols against poaching vessels and sharing monitoring and surveillance technologies.[20] The Philippines and Malaysia's initiatives include planning a joint commission to discuss collaboration on transnational crime.[21] Enforcement agencies from the three states also conduct trilateral patrols to counter piracy, kidnapping at sea, and terrorist activity in the Eastern Sabah Security Zone. Beyond joint patrols, the three countries share intelligence and have established Maritime Command Centers (MCCs) at Tarakan (Indonesia), Tawau (Malaysia), and Bongao (the Philippines) to share intelligence about crime and terrorism in the SSS.[22] Indonesia and the Philippines do not have a formal MoU, but Indonesian law enforcement authorities cooperate closely with the Philippine consulate in Manado, Indonesia when Philippine fishers are caught IUU fishing.[23] Indonesian KIs working in MCS supported the idea of expanding law enforcement partnership with countries outside of the region, including Australia and the U.S. to counter IUU fishing and improve MCS capacity.

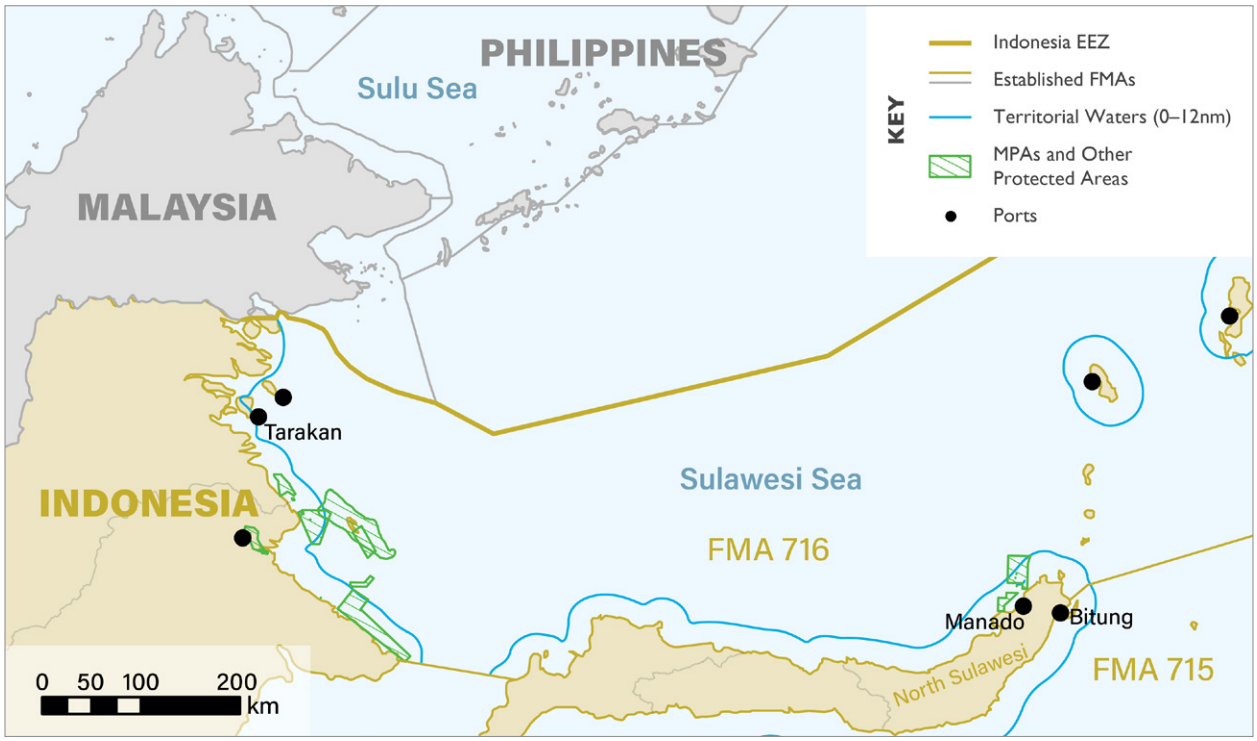
INDONESIA

OVERVIEW

Summary scores for Indonesia rank medium-high risk in the economic (6.63) and governance (5.63) categories and medium risk (4.95) for environmental risk indicators.

Indonesia loses $74 million (IDR 1.149 trillion) annually to IUU fishing in the Sulu-Sulawesi Seascape (SSS) and the South China Sea (SCS). Between 2015 and 2021, estimated losses from IUU fishing fell from $6.8 billion to $74 million, experts contribute this decrease to offshoring IUU fishing into international waters and the use of more evasive IUU fishing tactics.[24] The fishing industry in Indonesia is expansive and is critical to the stability of the national economy. As of 2020, the number of fishers in

Figure 8: Map of Indonesia's Sulu-Sulawesi Seascape



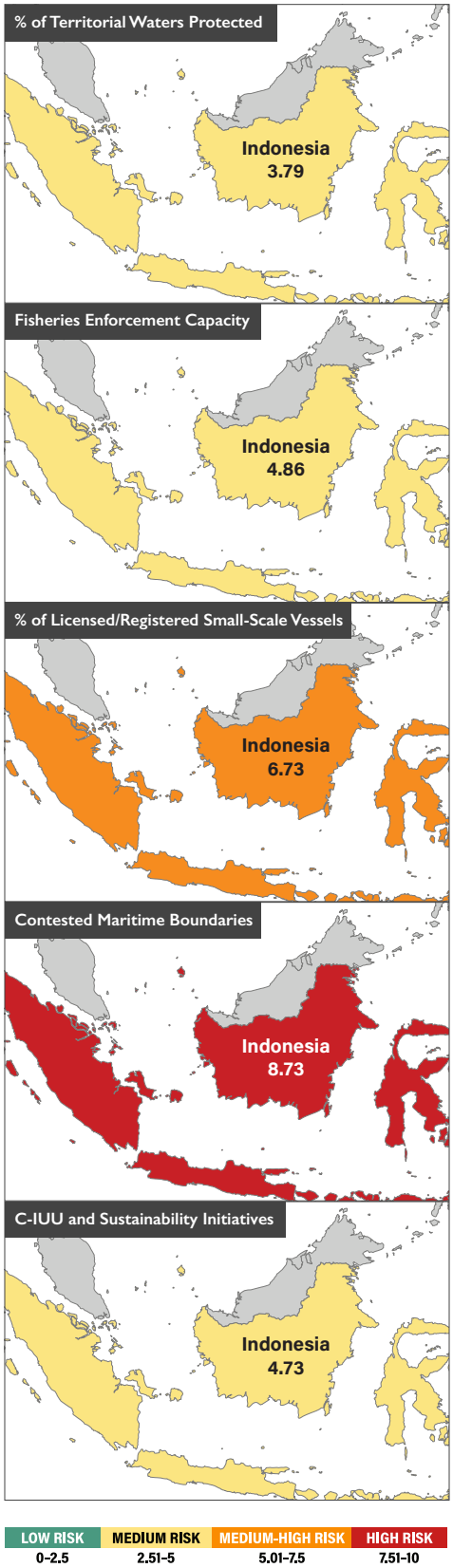
the national database was 1.5 million, or 1.2 percent of the population.[25] Of this, approximately 719,000 have Marine and Fisheries Business Actors Cards, official identification cards for marine capture fishers in Indonesia. 97 percent are small-scale fishers, which use boats under 10 gross tons (GT). Indonesia's marine capture fishery is the world's second most productive, producing 1.22 million metric tons of fisheries products in 2022.[26] Primary fish stocks targeted in the SSS are large pelagic fish, tuna, and billfish. Between 2013 and 2022, the average yearly catch for tuna in the Indonesia's SSS was 5.48 metric tons, far outpacing the 3.81 metrics of yearly catch for the U.S. in 2022.[27]

The fishing industry in Indonesia is regulated at the national level by the Ministry of Marine Affairs and Fisheries (MMAF), while provincial authorities regulate territorial waters[i]. Indonesia is the only country in Southeast Asia to establish a cabinet-level ministry with a sole focus on marine affairs and fisheries. This shows a high level of commitment to supporting marine conservation and protection. MMAF sets national marine and fisheries management policies and regulates Indonesian seascapes through both fisheries management areas (FMAs) and marine protected areas (MPAs). Indonesia has 11 FMAs and 411 MPAs — which frequently overlap but have different boundaries and regulations.[28]Approximately 20 percent of the SSS is located within Indonesia's maritime boundaries[29] and is primarily located within FMA 716.[ii30] In addition, there are 22 MPAs established within the boundaries of FMA 716 (7 are within the SSS), encompassing 1.4 percent of the total coverage of Indonesian MPAs. While provincial authorities are responsible for managing territorial waters, artisanal fishers in Indonesia are not required to report their catch, obtain licenses, or land at designated sites.

Fisheries enforcement in Indonesia's SSS is hampered by territorial incursions, low capacity, and low political will. KIs report that foreign vessel operators believe that Indonesia's waters have relatively higher

i Territorial waters are between 0 and 12 nautical miles.
ii FMA 716 is approximately 526,800 square kilometers.

Figure 9: Indonesia Governance Scores by Indicator



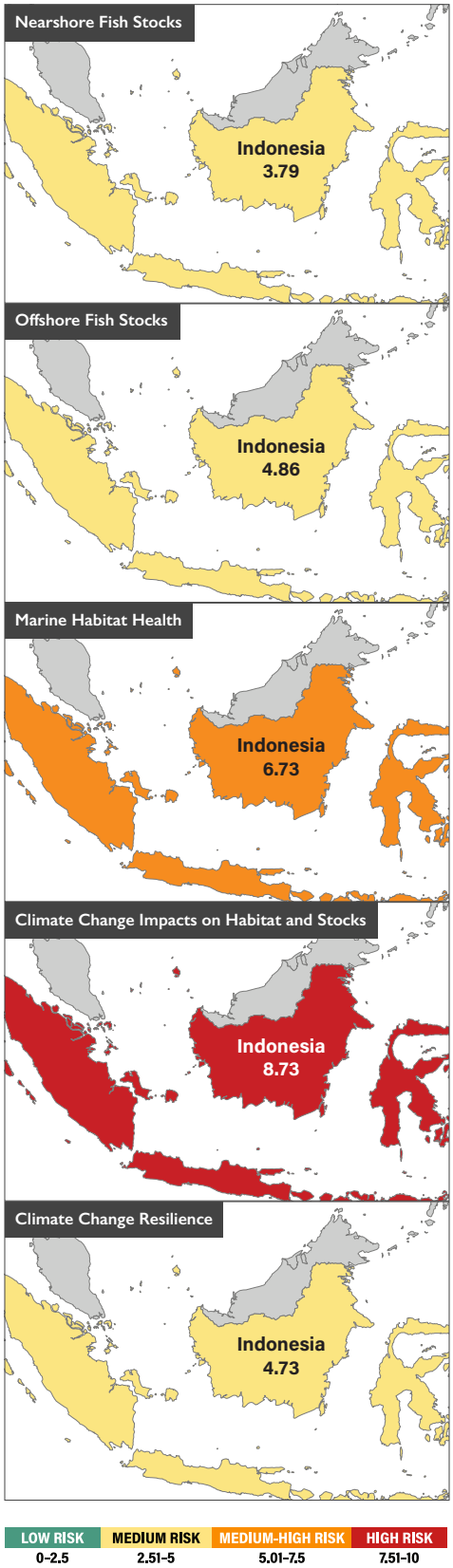
stocks of fish, leading to encroachment into the SSS by small-scale and industrial vessels from the Philippines. Additionally, transnational criminal networks operating in the Sulu Sea limit IUU fishing enforcement capacity by diverting government resources to address illegal fishing, wildlife trafficking, weapons trafficking, and human trafficking instead of fisheries management.[31] Expanded patrol areas due to incursions and rising fuel prices have limited at-seas enforcement, according to KIs. While the government has taken steps to improve management by announcing expansions of Indonesia's MPA network and increased funding to FMAs, KIs report that implementing mechanisms to regulate IUU fishing is politically contentious.[32] There is a large voting base of small-scale and artisanal fishers that are disproportionately impacted by fisheries enforcement activities. Poor fisheries management has depleted fish stocks in Indonesia, with 53 percent of FMAs fully exploited, including large pelagic stocks in FMA 716.[33]

GOVERNANCE RISK

Across five indicators, governance risk scores are categorized as medium-high risk *(5.63)* when averaged together. According to KIs, rising fuel costs for patrol boats and territorial incursions increasing the total area patrolled have limited at-seas enforcement capacity. This is reflected in the highest indicator risk of *contested maritime boundaries (8.73)*. Incursions across maritime boundaries by foreign vessels targeting large pelagics and by transnational criminal networks are a challenge in Indonesia. Recent analysis from TRAFFIC logged 452 instances of confiscated smuggled wildlife in the Sulu Sea from 2003 to 2021, amounting to 125,000 million metric tons of wildlife.[34] 88 of the reported confiscations occurred in Indonesia. Regulatory and operational weaknesses are exploited by foreign fishers with the perception that Indonesia does not have the funding and capacity to patrol its own waters.

The risks related to *licensed or registered artisanal/small scale vessels (6.73)* and the *capacity of fisheries enforcement (4.86)* lay a groundwork for understanding regulatory and operational weaknesses. Approximately 90 percent of Indonesia's estimated 562,500 fishing vessels are small-scale (less than 10GT).[35] While domestic small-scale fishers require provincial licenses to fish close to shore, provincial governments do not have the capacity or funding to enforce regulations. Additionally, KIs report that unclear rules often lead to unintentional IUU fishing. For example, there is no clear mandate for enforcement oversight; both the Indonesian Maritime Security Agency and the Indonesian coast guard have the authority to act as enforcement

Figure 10: Indonesia Environmental Scores by Indicator



agents in Indonesian waters.[36] Artisanal vessels in provincial waters are not required to have licenses nor AIS and are not required to report their catch; this further complicates enforcement efforts. As a result, 60-80 percent of North Sulawesi provincial government support is spent on input-based support such as vessel purchases and modernization, with significantly less spent on fisheries management.[37] Funding shortfalls are also reflected with management funding for MPAs in the state budget, regional budget, and from foreign NGOs covering only one-third of estimated management costs of Rp 225 billion (USD 15.5mn).[38]

The governance risk score is tempered by medium-low categorical risk scores for the *percent of territorial waters documented as protected (3.79)* and *government initiatives to counter IUU fishing (4.73).* In 2023, the MMAF announced its intention to expand MPA coverage to 325,000 square kilometers, or 10 percent of its Exclusive Economic Zone (EEZ), by 2030.[39] In addition to expanding MPA coverage, MMAF aims to invest in its MCS capacity through four strategic development objectives: improving capacity and competence of human resources in the fisheries sector, increasing the contribution of the fisheries sector to the national economy, improving conservation, and improving good corporate governance within the MMAF.[40]

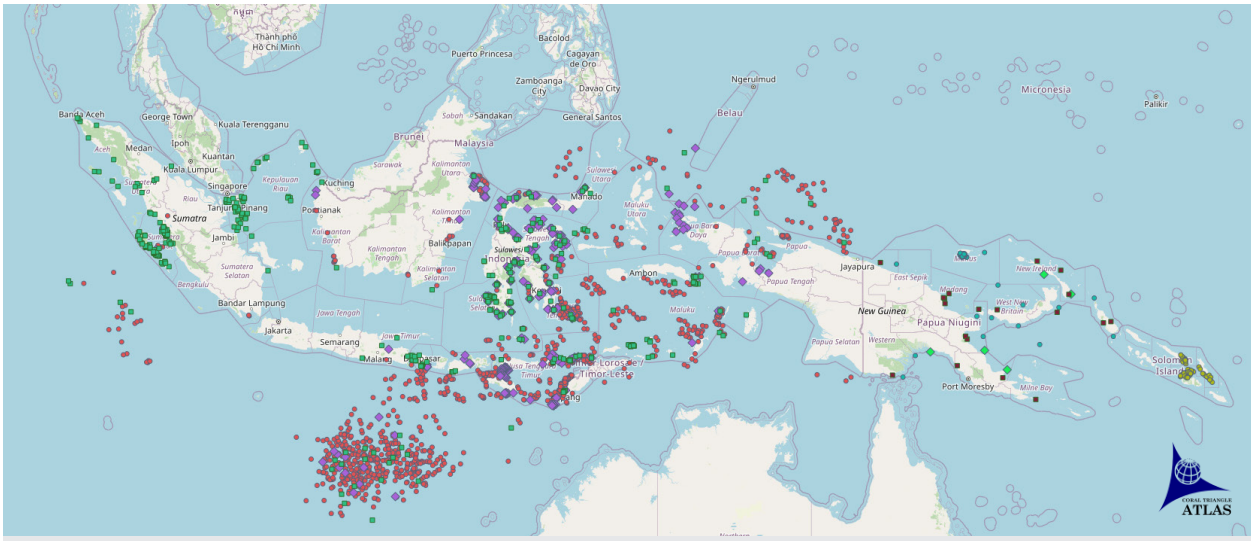
ENVIRONMENTAL RISK

Environmental risk reported as the lowest of the three risk indicators for Indonesia, rated as medium *(4.95)* on average across five indicators. *Climate change impacts on marine habitat health and fish stocks (5.95)* is the highest risk in this category. Climate change severely impacts artisanal fishers and coastal communities. KIs report that changes in timing to the traditional typhoon season makes it difficult for fishers to predict when it is safe to fish. Additionally, warming sea temperatures are changing fish spawning seasons. Recent analysis of the threat of climate change to marine health in Indonesia supports KIs' perceptions, quantifying a 20-30 percent reduction in maximum catch potential under a high emissions scenario and a 12-20 percent reduction in a low emissions scenario by 2050.[41] *Climate change resilience (4.69)* is medium risk, reflecting Indonesia's recent efforts to establish more climate resilient coastal communities, FMAs, and MPAs. The MMAF is currently developing strategies to improve planning and monitoring of MPAs, emphasizing the importance of fish spawning grounds for absorbing carbon, and the need to improve the economic benefits of conservation by engaging with coastal communities. Compared to regional peers, Indonesia's adaptive capacity

to climate change is mid-tier and has seen improvements in recent years.[42] Improvements in adaptation reflect the outcomes of programs such as the Coral Reef Rehabilitation and Management Program (COREMAP) and investments in mangrove restoration, which will help protect coastal ecosystems from the threat of climate change and destructive fishing practices.

Indicators for nearshore fish stocks (4.70), offshore fish stocks (4.53), and *marine habitat health (4.89)* were also calculated at medium risk. KIs perceive that Indonesian stocks are relatively healthier compared to other regional states. Industrial fishers from Taiwan and the Philippines encroach on Indonesia's maritime boundaries near north Sulawesi and target pelagic species and skipjack. The Oceanic Port Authority of Bitung reported that skipjack landings in 2022 increased 19 percent from 2021. However, according to a 2022 stock assessment, large pelagic stock in Indonesia's SSS is fully exploited.[43] Across Indonesia, 53 percent of FMAs are fully exploited. An increase in landings and decline in stocks reflects higher fishing effort and overexploitation of current stocks. IUU fishing causes damage to overall marine habitat health due to low enforcement capacity of regulatory requirements and poor management of fisheries resources in MPAs. KIs noted that IUU fishing in Indonesia's MPAs damages corals reefs and sea grass, threatening critical protected ecosystems. Ecosystems are also under pressure from coastal land development and land-based sources of pollution. KIs report that in North Sulawesi, tailings and chemical waste from a nearby gold mine caused fish die-offs.

Figure 11: Indonesia's Rich Marine Biodiversity

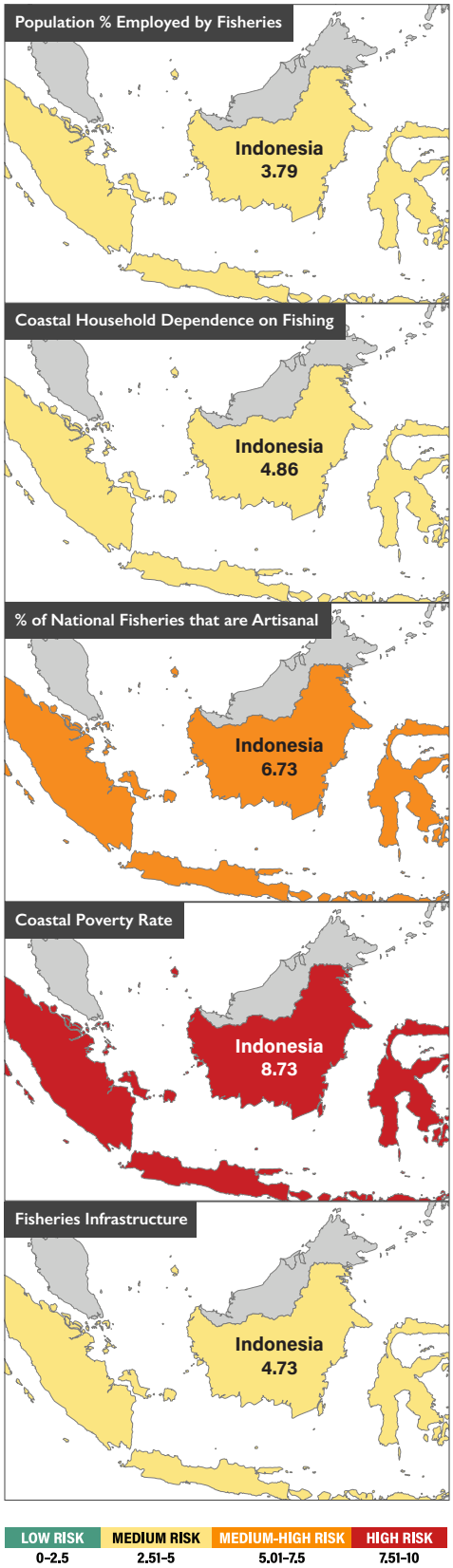


KEY

- ■ Square (any color): Sightings of marine mammals
- ● Circle (any color): Sightings of turtles
- ◆ Diamond (any color): Sightings of sharks and rays

Visualized data collected between 2006-2019 from the Coral Triangle Atlas shows the densest instances of sightings of marine mammals, sharks, rays, and turtles occur within Indonesia's territorial waters. The prevalence of these species is a useful indicator for the general abundance of fish species within a defined area.

Figure 12: Indonesia Economic Scores by Indicator



ECONOMIC RISK

Economic risk ranks the highest among three risk categories and was calculated as *(6.63)* when five indicators are averaged together. The two highest indicator risk factors are the *percent of the population employed by fisheries (7.07)* and the *percent of national fisheries that are artisanal (7.70)*. The fisheries industry directly employs 2.7 million people, approximately 95 percent of whom are artisanal fishers.[44] Artisanal fishers harvest approximately 80 percent of total catch. In the SSS, 80 percent of tuna vessels are smaller than 30GT.[45] According to KIs, local communities have access to fish stocks that are relatively more depleted and struggle to compete with commercial vessels. Data from the Indonesian Statistics Bureau (BPS) estimates that the number of households involved in capture fisheries was cut in half — from 2 million households in 2000 to 966,000 in 2016.[46] This shows a decline in the economic viability of marine capture fisheries, particularly for small-scale fishers. Further threatening artisanal and small-scale fishers is a new quota-based fishing policy implemented by MMAF which leaves only a small portion of the total capture quota for traditional, artisanal, and small-scale fishers. Experts note that this quota will further alienate small-scale fishers and reinforce imbalances in the distribution of marine resources.[47]

Increased economic risk to coastal fishers is also reflected in the medium-high risk indicator scores for *coastal poverty rate (6.73)* and *household economic dependence on fishing in coastal communities (6.70)*. While Indonesia is the second-largest wild-capture fisheries producer, the country's fisheries product does not rank in the global top ten in seafood exports.[48] This reflects the importance of the fisheries industry for domestic economic production and food security. Economic pressure on coastal communities is driving small-scale fishers to engage in IUU fishing. Recent analysis finds that, absent intervention, economic viability of fisheries resources will continue to decline for coastal communities due to the deterioration of fish stock, poor management, and the threat of climate change.[49]

In addition to fisherfolk, the SSS contains a significant onshore small and medium-scale industrial tuna processing industry. First, KIs report that port infrastructure in SSS is robust. There are five PSMA compliant ports in Indonesia, including the Oceanic Port of Bitung in Sulawesi. Robust port infrastructure is reflected in the medium categorical risk of *fisheries infrastructure (4.80)*. In 2018, 55,000 metric tons of tuna were landed in the Bitung region.[50] Second, there are approximately fifty processors in the Bitung region that primarily employ local women. According to KIs,

women provide important support for logistics, trade, and processing in factories. Approximately 80 percent of the catch is exported, mainly to the U.S., Middle East, Japan, and Vietnam.[51]

BEST PRACTICES: BITUNG OCEAN FISHERIES PORT TUNA TRACEABILITY SYSTEMS

The Bitung Ocean Fisheries Port (PPS) is one of five PSMA compliant ports in Indonesia and operates directly under the jurisdiction of MMAF and the central government.[52] PPS Bitung implements a traceability system for tuna that is intended to promote legal, recorded, and regulated fishing. According to data from the Central Bureau of Statistics, 358,626 tons of tuna were produced in Indonesia in 2021.[53] According to KIs, data is collected from vessels at both arrival and departure. MMAF mandates catch certification data and distributes Certificates of Application of the Traceability System to compliant vessels at PPS Bitung. Vessels must implement an internal and external traceability system to land tuna at the PPS Bitung.[54] The internal traceability system refers to the fish processing unit's[iii] (UPI) ability to trace the location of fish catches from when they are received to when they are ready for sale, while the external traceability system refers to the ability to trace the origin of fishery products to the destination of product distribution. To streamline monitoring vessels for traceability systems, UPIs are designated to vessels depending on their knowledge of the vessel's destination-country catch certification requirements. In 2018, approximately 55,000 metric tons of tuna were landed at PPS Bitung, and 80 percent of the catch was exported.[55]

Bitung Ocean Fisheries Port, Indonesia. Adobe.

iii The fish processing unit is responsible for receiving tuna from fishing vessels, checking the quality of the tuna, and processing it into frozen products.

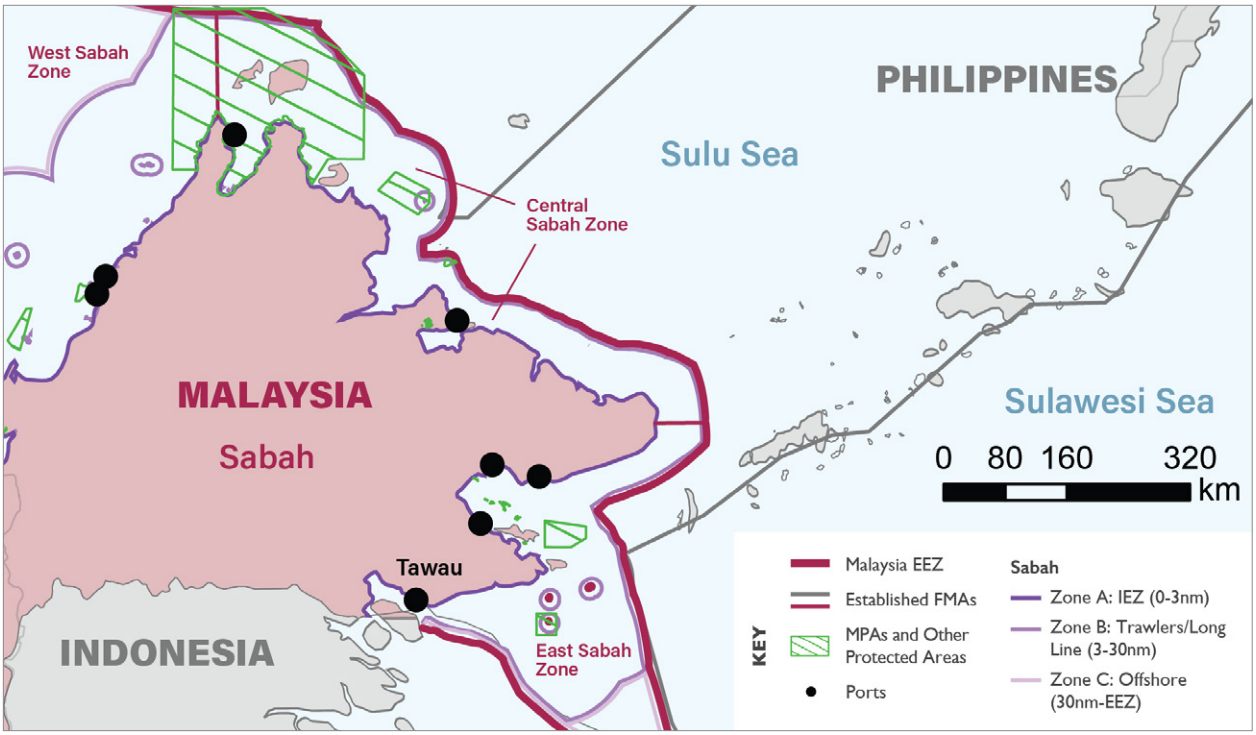
MALAYSIA

OVERVIEW

Summary risk scores for Malaysia are medium-high for the environmental (5.75) and governance (5.19) categories and medium for economic (4.96) category.

Each year IUU fishing costs the Malaysian fishing sector $1.4 billion (RM 6 billion), representing more than half the total catch.[56] Approximately 70 percent of the population lives in coastal zones of Malaysia,[57] and the country is ranked as one of the highest consumers of fish and seafood in the world at 53.3 kilograms consumed per capita in 2020.[58] The fishing industry nets $2.5 billion per year[59] and directly employs 116,000 Malaysian fisherfolk alongside many foreign workers on Malaysian vessels.[60] Approximately 10 percent of the SSS, one of the world's most biodiverse and productive marine ecosystems, is within Malaysia's maritime boundaries.[61] All of Malaysia's territory within the SSS is located off of the coast of Sabah, which is located on the northern portion of Borneo, in the region of East Malaysia. The primary species targeted in Malaysia's SSS are shrimp and reef fish, in addition to a large market for illegally caught and trafficked sea turtle and shark species. According to Malaysian stock assessments, in 2022 the total marine capture fish caught in Malaysia amounted to 1.21 million tons, a 16.5 percent decline from 1.57 million tons in 2016.[62]

Figure 13: Map of Malaysia's Sulu-Sulawesi Seascape



Note: Labeled features on the map above are specific features mentioned in this country profile.

Management of Malaysian fisheries is divided between the federal government, the governments of Malaysia's 13 states, and the nation's three federal territories.[iv] The Department of Fisheries (DOF) further divides the Malaysian coast into 68 fisheries districts for local management. In Sabah, which is Malaysia's only coastal state bordering the SSS, fisheries management is administered by Sabah's state agencies, including Sabah's Department of Fisheries. The Sabah Department of Fisheries oversees more than 76,000 square kilometers, including 12 fisheries districts that are targeted by more than 30,000 fishers.

The Malaysian Fisheries Act of 1985 is the primary piece of legislation guiding IUU fishing regulations in Malaysia. This act prohibits foreign fishing and transshipment in Malaysian waters unless approved by the government. In 2012 and 2019, the Malaysian Fisheries Act was amended to ban the trade of live fish and the use of illegal gear types. The Malaysia Maritime Enforcement Agency (MMEA) works closely with the Malaysian Marine Police, Navy, Ministry of Fisheries, and other relevant agencies to support on-the-water enforcement. In Sabah's maritime zone, 0 to 3 nautical miles (nm) is reserved for traditional and small-scale fishers. From 30nm to the end of the EEZ is reserved for industrial vessels (50+GT). Outside of Sabah, maritime zones have different regulations (see Figure 16). Industrial vessels operating beyond 5 nm must have Automatic Information Systems (AIS) on board their vessels, and vessels operating in the EEZ but beyond 12 nm must install Vessel Monitoring Systems (VMS) on their vessels. Additionally, Malaysia has 42 MPAs designated to protect nearshore coral reefs. Some of these MPAs are no-take protected areas that are closed to fishing, but some MPAs permit traditional fishing and mariculture operations.

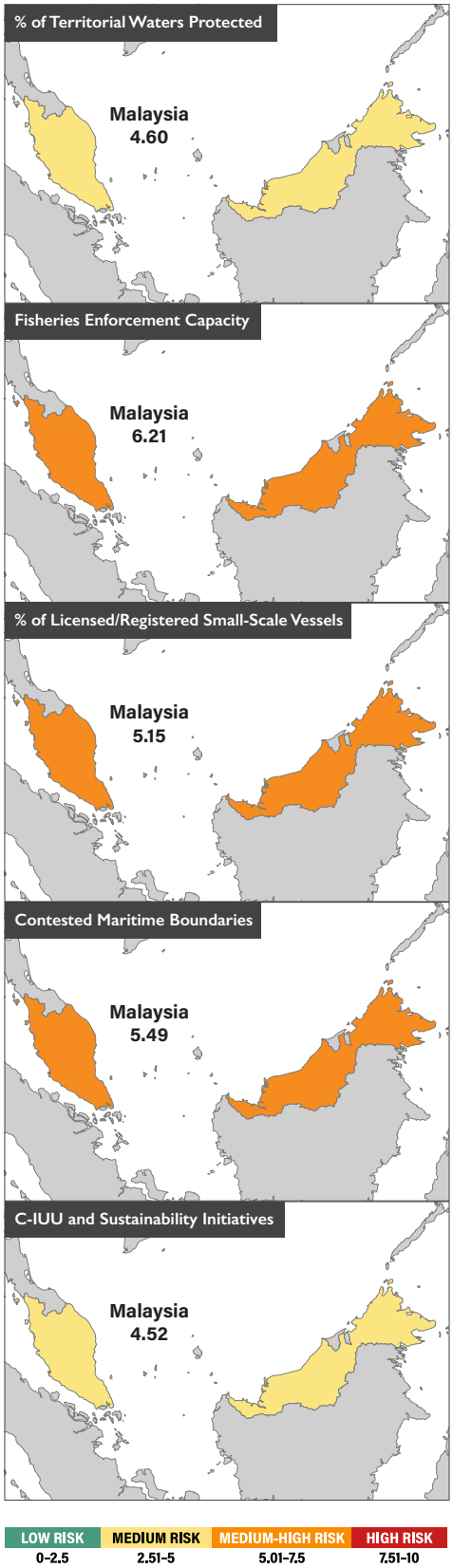
View of Mabul Island, Sabah State, Malaysia. Photo by ahmadfiaz/Adobe.

GOVERNANCE RISK

Governance risk is perceived as medium-high *(5.19)* when averaged across five risk indicators. The *capacity of fisheries enforcement (6.21)* risk indicator was calculated at medium-high risk—a high score in this case reflects KIs perceptions of low enforcement capacity. First, high administrative turnover in DOF hampers fisheries management and the fight against institutional corruption. Second, a weak chain of custody for evidence and laws restricting evidence hampers prosecution for IUU-fishing related crimes. Third, large patrol areas limit at-sea enforcement capacity. For example, the Sabah DoF is responsible for patrolling 76,000 square kilometers (about the area of Scotland) but only has 60 enforcement officers and 13 small patrol vessels.

iv Federal territories carry the same status as states, but without heads of state or separate legislatures.

Figure 14: Malaysia Governance Scores by Indicator

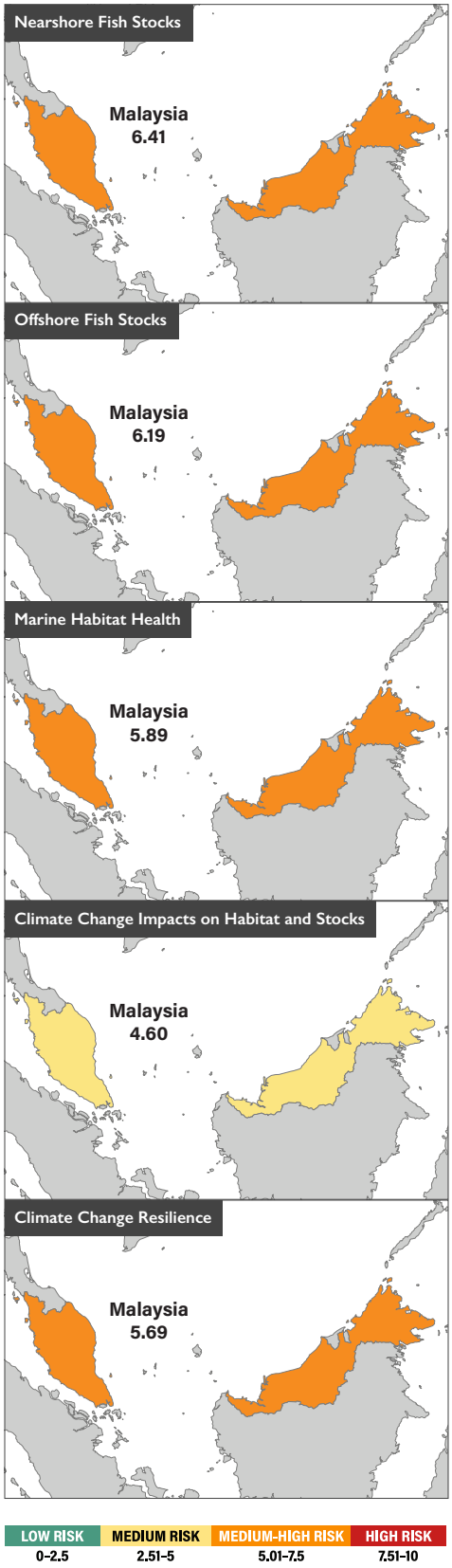


KIs report that most IUU fishing in Malaysia's SSS waters is perpetuated by domestic artisanal fishers who use illegal gear, catch ETP species, and fish in the incorrect zone. Therefore, the *percent of artisanal/small-scale vessels licensed (5.15)* is also perceived as medium-high risk. Indeed, cumbersome license and registration requirements incentivize "license cloning," through which fishers register several vessels under one license, hampering effective monitoring and management. KIs report that cloned licenses can be used to obtain fuel subsidies from the government that otherwise unregistered fishers would not have access to. Domestic small-scale and artisanal fishers are disproportionately impacted by enforcement efforts—artisanal fishers are jailed because they cannot pay the fines, but commercial fishers can simply pay the fines and continue their fishing activities.

Contested maritime boundaries (5.49) is perceived as medium-high risk. This perception is driven by Vietnamese- and PRC-flagged vessels, speculated to be connected to transnational organized crime, breaching Malaysia's territorial waters in the SSS. PRC- and Vietnamese-flagged vessels target turtles and sharks that are then sold on illegal markets. Recent analysis from TRAFFIC logged 452 instances of confiscated smuggled wildlife in the SSS from 2003 to 2021, amounting to 125,000 metric tons of wildlife.[63] 125 of the reported confiscations occurred in Malaysia—including turtles, clams, seahorses, sharks, and rays. Additionally, KIs report that illicit actors fund fish bombing, a destructive form of fishing that uses explosives, typically dynamite, to kill hundreds of fish at once.

The *percent of territorial waters document as protected (4.6)* was perceived as medium risk. This reflects both a positive perception toward Malaysia's network of marine parks conserved for tourism and traditional fishing, and a negative perception toward incursions into MPAs by foreign actors and domestic fisherfolk. Malaysia has designated 13 MPAs within its SSS maritime domain. To address low enforcement capacity and incursions in Malaysia's SSS, the Malaysian government has ramped up regional cooperation and domestic enforcement initiatives. In November 2023 at the Asia-Pacific Economic Cooperation Leaders' Meeting, representatives from Malaysia and Vietnam agreed to boost cooperation in their shared seascapes to address illegal fishing in Malaysian Waters.[64] Additionally, current DOF Director Adnan Hussain is standardizing the MCS Program under the Fisheries Act of 1985 to streamline fisheries management.[65] These initiatives are likely reflected in the indicator *government initiatives to counter-IUU fishing (4.52)*, which was perceived as medium risk.

Figure 15: Malaysia Environmental Scores by Indicator

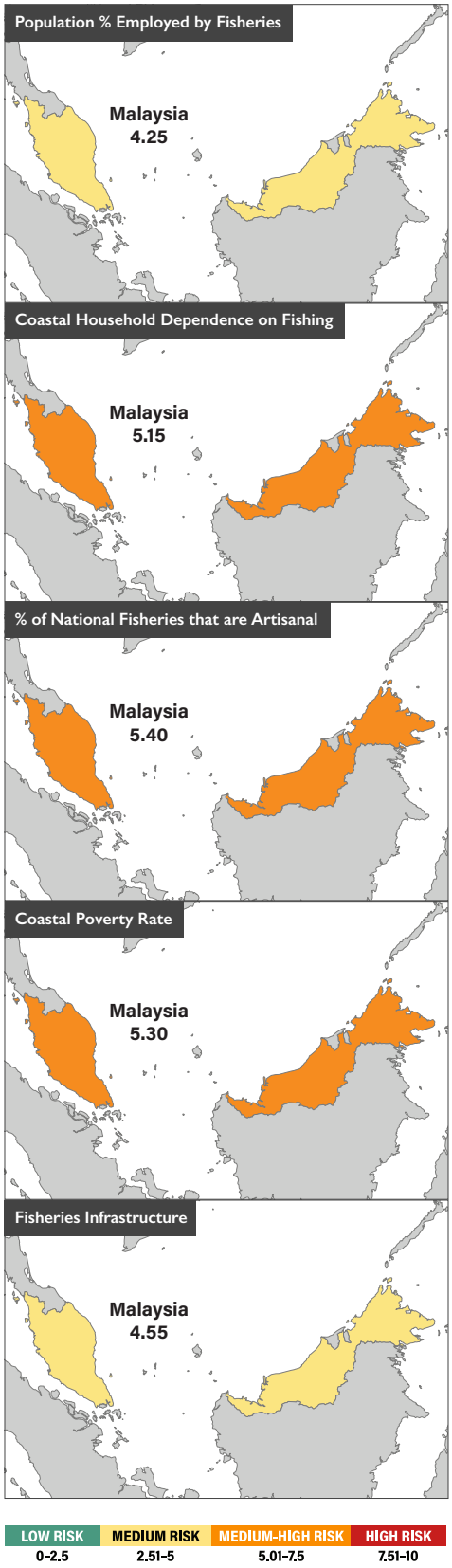


ENVIRONMENTAL RISK

Environmental risk is rated at a medium-high *(5.75)* when averaging five indicators. *Nearshore fish stock (6.41)* and *offshore fish stock (6.19)* is perceived as the highest risk among the five indicators. The Malaysian government does not conduct regular fisheries stock assessments, which limits sustainable fisheries management. The most recent national assessment was released in 2016 and revealed that the demersal fish stock (groundfish) had dropped nearly 88 percent since the 1960s.[66] According to DOF data, there was a 16.5 percent decrease in total catch between 2016 and 2022.[67] Current DoF Director Adnan Hussain recently stated that the drop in fish catch can be attributed to the intrusion of Vietnamese- and PRC-flagged vessels into Malaysian waters to poach at-risk species in the SSS. In addition to declining fish stocks, IUU fishing practices in Malaysia cause damage to the overall *marine habitat health (5.89)*, which was perceived as a medium-high risk. KIs report that artisanal and small-scale fishers take advantage of low enforcement capacity to intentionally fish in protected zones that are closed to fishing activities. Twin trawl vessels — which drag nets along the seafloor, routinely encroach on the IEZ, tearing up seafloor-dwelling plants and animals, and displacing sediment. Additionally, in Sabah, fish bombing causes damage to coral reefs in the SSS. According to KIs, fish bombing by the Sama-Bajau, a stateless ethnic group, is reportedly sponsored by Vietnamese- and PRC-flagged vessels with speculated links to transnational organized crime. The Unique Threats section below explores this allegation further.

Climate change impacts on marine habitat health and fish stocks (4.63) is reported as medium risk. According to KIs, climate change is delaying monsoons, shifting fish seasons, and changing the species harvest cycle. Malaysia is experiencing 0.9 centimeters of sea level rise per year. This is estimated to increase the intensity of coastal flooding, damaging mangrove ecosystems, and reducing fisheries production by RM300 million annually (USD 63.6 million) by 2100.[68] By degrading marine habitats, damaging fishing infrastructure, and altering fishing seasons, climate change poses a severe risk to the fishing industry in Malaysia. As a result, the risk for *climate change resilience (5.69)* was perceived as medium-high. This score is partially tempered by recent government- and community-led initiatives to protect the livelihoods of small-scale fisherfolk. The Malaysian National Fishermen Association (PNK) recently introduced an affordable protection scheme worth RM 100 (USD 20) per year to protect small-scale fishers from climate change-related threats.[69] In addition, in 2016 the association expanded insurance coverage for fishermen who are involved in

Figure 16: Malaysia Economic Scores by Indicator



accidents while fishing to RM 150,000 (USD 31,820), an increase from RM 50,000 (USD 10,606). Expansions in insurance coverage reflect the impacts that climate change will have on the economic viability of small-scale and commercial marine capture fisheries in Malaysia.

ECONOMIC RISK

Economic risk ranks lowest among the three risk categories and is rated as medium risk *(4.96),* when five indicators are averaged together. About 70 percent of the total population of Malaysia lives in a coastal zone.[70] Additionally, coastal zones are some of the poorest regions of the country. A 2016 study quantifies that 28 percent of respondents living in coastal regions were living in extreme poverty (below USD 98, RM 420), and 81.5 percent were living in poverty (USD 149, RM 638).[71] The fisheries sector supports coastal communities through small-scale business, industries, and entrepreneurs.[72] Additionally, fishing is seen as a safety net for coastal Malaysians. During the COVID-19 pandemic, coastal community members who lost their jobs due to pandemic lockdowns turned to fishing to bolster their incomes.

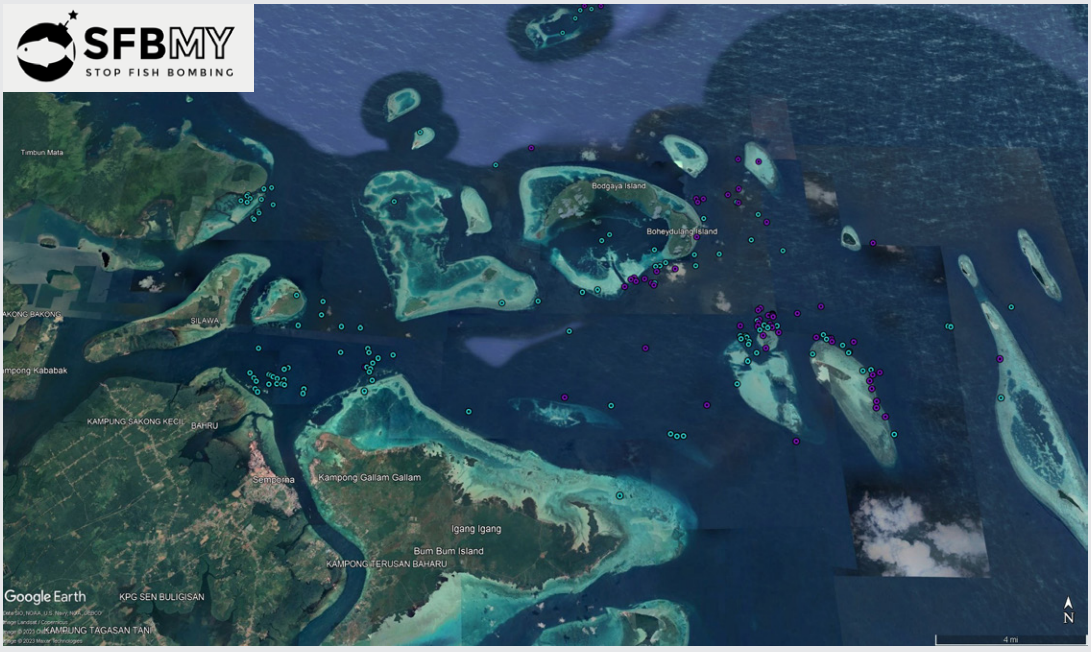
Risks associated with *coastal poverty rate (5.30)* and *household economic dependence on fishing (5.15)* are rated as medium-high. Artisanal and small-scale fishers are the most exposed to economic shocks in the fishing industry as they are forced to compete with commercial vessels and are confined to provincial zones. According to survey data of coastal habitants in Sabah, 60% of Malaysian fishers along the SSS are small-scale.[73] Therefore, reduced economic viability of fishing due to stock depletions and threats to marine habitats pose a risk to Malaysia's most vulnerable populations. KIs report that economic pressure is leading some small-scale fishers to engage in IUU fishing or seek out other employment. This perception is reflected in the medium-high rating for the *percent of national fisheries that are artisanal (5.40)* indicator.

Conversely, the risk indicator *percent of population employed by fisheries (4.25)* is ranked medium risk, given that a relatively small percent of the population is employed in the fisheries sector. This relatively lower risk score is also reflected in the observation made by KIs that 90 percent of workers onboard Malaysian deep-sea vessels are from other countries. The risk indicator *fisheries infrastructure (4.55)* also ranks as medium risk and reflects the relatively high quality of domestic port regulations, despite Malaysia not being a signatory to the PSMA. The Eleventh Malaysia Plan (2016-2020) expanded port capacity, access, and operations through the National Port Policy.[74] The Malaysian government

has also established a Standard Operating Procedure (SOP) to address foreign fishing vessels that are suspected of engaging in IUU fishing.

UNIQUE THREATS: FISH BOMBING

Fish bombing, a practice where explosives are directed at fishery habitats to drive fish to the surface to be netted, is rampant in Sabah's nearshore waters. The activity destroys critical fishing habitats and reduces the ability of existing biomass to regenerate. According to KIs, cases of fish bombing occur daily. Fish bombing has caused the destruction of 80 percent of coral reef cover in some locations in Malaysia's SSS, with less than 25 percent of undamaged reef structures remaining intact.[75] According to KIs, the only remaining healthy coral reefs are within nearshore MPAs. There are laws in place to protect marine habitats from destructive fishing practices, and KIs note that curbing fish bombing is a high priority for the Malaysian government. However, KIs highlight three limitations to reducing fish bombing. First, criminal networks exploit coastal communities for bomb smuggling and to sell illegal catch. Second, fish bombing is conducted in part by a vulnerable population, the Sama Bajau fishers. The Sama Bajau are the second largest ethnic group in Sabah. KIs report that due to their stateless status, the Sama Bajau have no access to the formal economy and rely in part on informal markets created through smuggling and marketing illegal catch. Recent research from Reef Check Malaysia has highlighted a need for more alternative forms of income to reduce destructive fishing practices in Sabah.[76] Lastly, the Sabah Department of Fisheries does not have the enforcement capacity to monitor the frequency of fish bombing occurrences.



NGO Stop Fish Bombing actively tracks fish bombing activity in Sabah, Malaysia. Image shows fish bombing instances (purple and teal circles) tracked near Semporna, Sabah.

THE PHILIPPINES

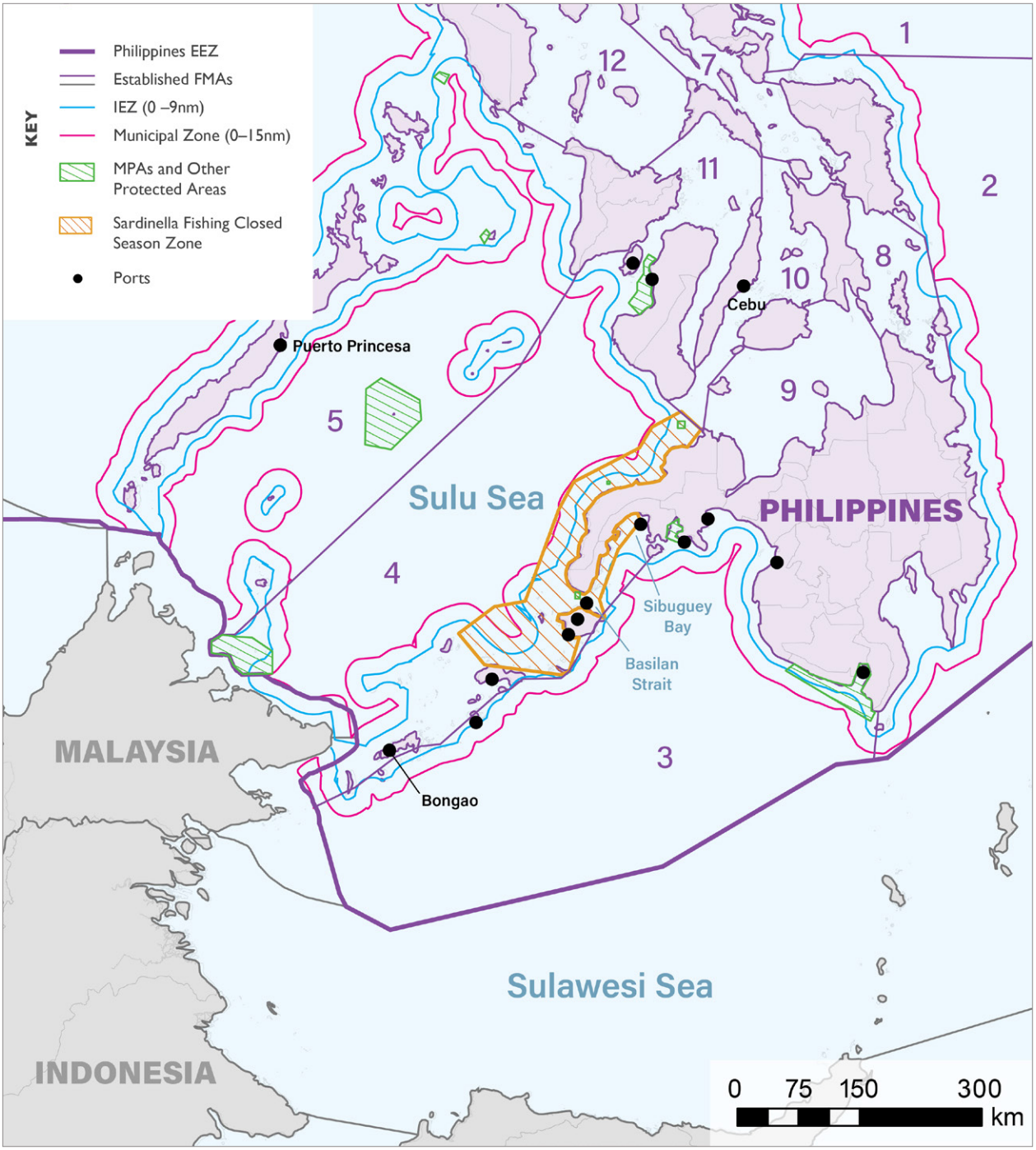
OVERVIEW

Categorical risk scores for the Philippines rank medium-high risk in the governance (5.09) category and high risk in the environmental (6.94) and economic categories—the highest level of risk assessed of the three countries in the Sulu-Sulawesi Seascape (SSS).

Long archipelagic coastlines and a large EEZ translate into an estimated annual loss of $1.3 billion (PHP 75.3 billion) to IUU fishing in the Philippines, accounting for 27-40 percent of the total catch.[77] Coastal areas in the Philippines are some of the most densely populated in world with 141 people per square kilometer. 60 percent of coastal Filipinos rely directly on marine resources to support their livelihoods. In 2021, marine captures fisheries production in the Philippines was valued at $2.83 billion.[78] There are 2.08 million registered fishers in the Philippines,[79] half of whom are employed by marine capture fisheries.[80] Approximately 70 percent of the SSS lies within the EEZ of the Philippines.[81] Primary species targeted by fishers in the SSS are small pelagic species, tunas, sharks, corals, and marine mammals.[82] Sardinella harvests account for 25 percent of total catch, and small pelagic species comprise 67 percent of total commercial catch in the SSS. Approximately 70 percent of the Philippines' fisheries are overfished.[83] Additionally, KIs report that Vietnamese-, Malaysian-, and Indonesian-flagged vessels routinely encroach on the Philippines' waters and target ETP species in the SSS.

In response to a 2014 "yellow card" issued by the EU, Fisheries Administrative Order 263 (2019) created 12 FMAs. These FMAs are co-managed by Local Governance Units (LGUs) and the National Bureau of Fisheries and Aquatic Resources (BFAR). BFAR is responsible for managing and enforcing regulations from 15 to 200 nm, while LGUs are responsible for enforcement in municipal waters from 0 to 15 nm. Waters up to 9nm are reserved for municipal fishers as an IEZ. The Philippines national government has two primary laws which support IUU fishing enforcement efforts. Republic Act No. 10654 (2015) established a framework to prevent IUU fishing, while Republic Act No. 9147 (2001) established a fund to support counter-IUU fishing efforts, including enforcement. In municipal waters, LGUs maintain their own fisheries regulations and are responsible for enforcement. Monitoring of fishing vessels is also delineated between LGUs and BFAR; vessels operating in municipal waters, including in the IEZ, are registered to and monitored by LGUs, while commercial vessels operating beyond municipal waters are monitored by BFAR. Approximately 30 percent of the municipal fleet is unregistered.[84] The municipal sector is not required to report their catch at all and up to 422,000 metric tons of fish go unreported by commercial fishers each year.

Figure 17: Map of the Philippines' Sulu-Sulawesi Seascape

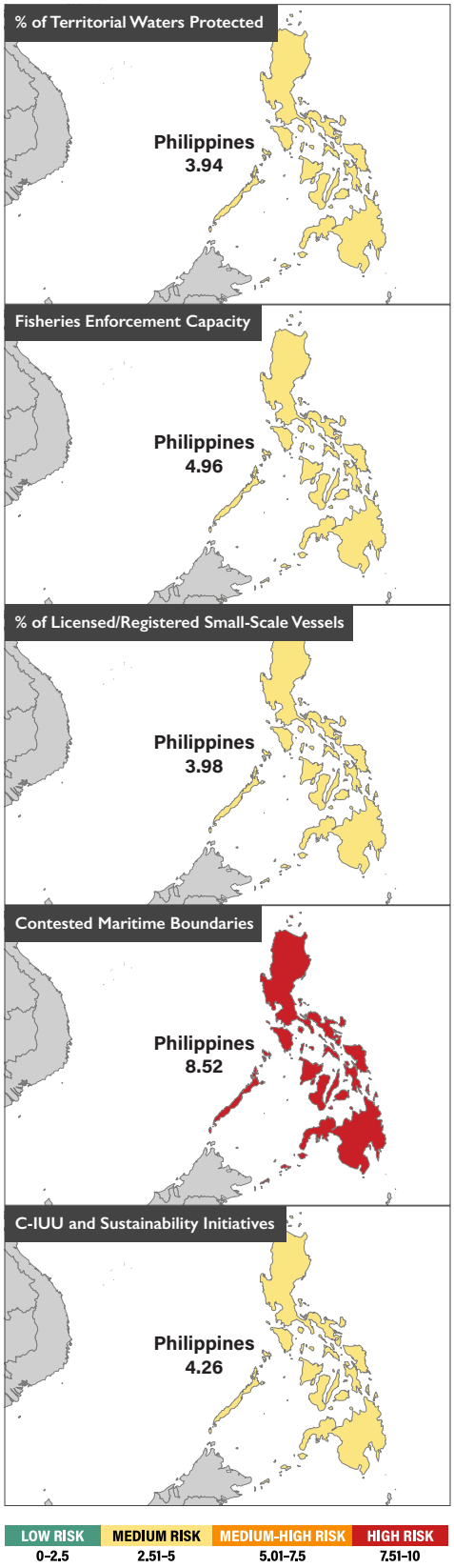


Note: Labeled features on the map above are specific features mentioned in this country profile.

GOVERNANCE RISK

Governance risk is measured as medium-high risk *(5.09)* when averaged across five risk indicators. The highest risk indicator is *contested maritime boundaries (8.52)*. Incursions into the Philippines' waters in the SSS are primarily conducted by criminal organizations, as well as foreign-flagged vessels from Vietnam, Malaysia, and Indonesia. Recent analysis from TRAFFIC quantified that between 2003 and 2021, 53 percent of confiscations

Figure 18: Philippines Governance Scores by Indicator



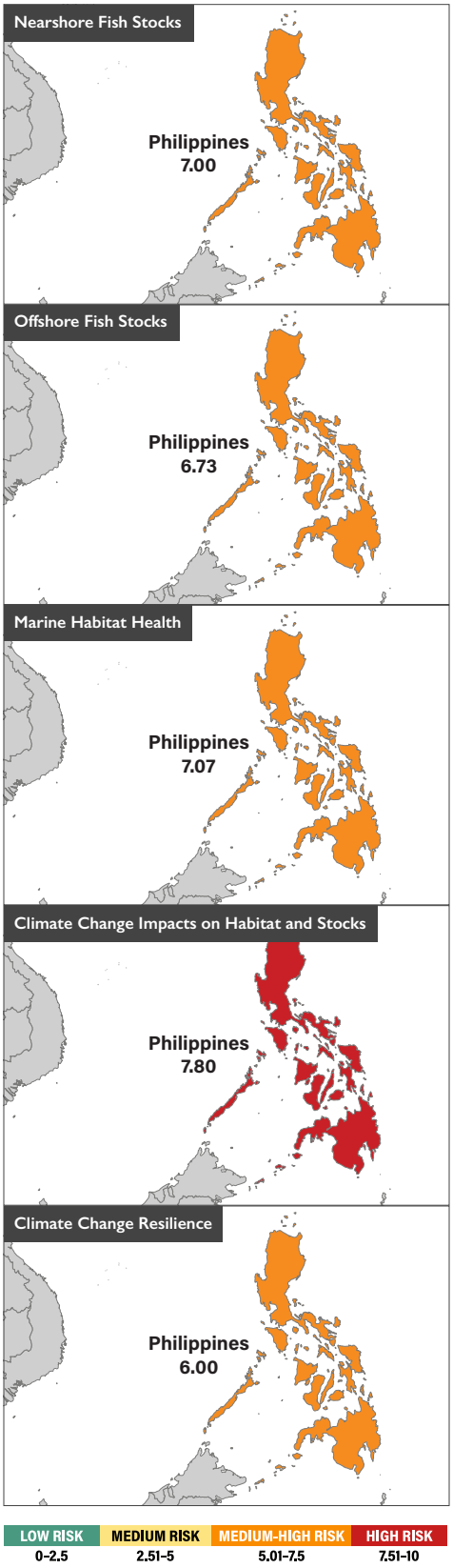
of smuggled wildlife in the Sulu Sea occurred in the Philippines' territorial waters, reflecting the scope of transnational crime and difficulties combating IUU fishing in the SSS.[85]

The next-highest perceived risk indicator is *capacity for fisheries enforcement (4.96)*. Most IUU fishing activity the SSS is in the form of unreported fishing. Unreported fishing can be many things, including underreported catch, commercial vessels breaching the IEZ, and the use of illegal gear, according to KIs. Underreporting, misreporting, or not reporting catch is exacerbated by the lack of mandatory catch reporting requirements for small-scale fishers. Enforcement of IUU fishing, particularly by small-scale fishers, is hampered by critical differences in the interpretations of IUU fishing and overlapping rules at the federal and municipal levels. For example, there are frequent agency jurisdictional and operational overlaps on the enforcement side; while on the fisheries side there is reported confusion between waters open to fishing and protected waters that are closed to fishing.[86] Moreover, limited government enforcement capacity due to limited patrol resources and lack of manpower hinders at-sea enforcement of IEZ boundaries, as well as rules related to destructive fishing practices. KIs report that both commercial and small-scale fishers use dynamite, cyanide, and illegal nets to catch fish in the SSS. Overall, this risk score is tempered by the Marcos Administration (2022) declaring sustainable fisheries and food security a priority.

The percent of territorial waters documented as protected (3.94) and the *percent of artisanal/small-scale vessels licensed (3.98)* are rated as medium risk. There are over 1,500 MPAs in the Philippines that are co-managed by LGUs and coastal communities (16 within the Philippines' SSS).[87] According to recent analysis of 564 MPAs examined only 34 percent were improving fish biomass. MPAs in the Philippines face challenges from intrusions by foreign vessels and overfishing by small-scale fishers. Small-scale and artisanal fishers have open access to municipal fisheries—fish are harvested at a rate 30 percent higher than they can reproduce.[88] BFAR requires that small-scale fishers obtain licenses, but cumbersome and unclear licensing processes represent a significant obstacle for fishers seeking to acquire a license. Additionally, varying regulations at the national and municipal level leads to small-scale and artisanal vessels unintentionally or unknowingly fishing in protected areas.

Due to these shortcomings, BFAR has been assisting with vessel registration and catch reporting in recent years, but according to KIs these actions have been met with pushback from coastal communities. The role of *government initiatives to counter IUU fishing (4.26)* was therefore perceived as

Figure 19: Philippines Environmental Scores by Indicator



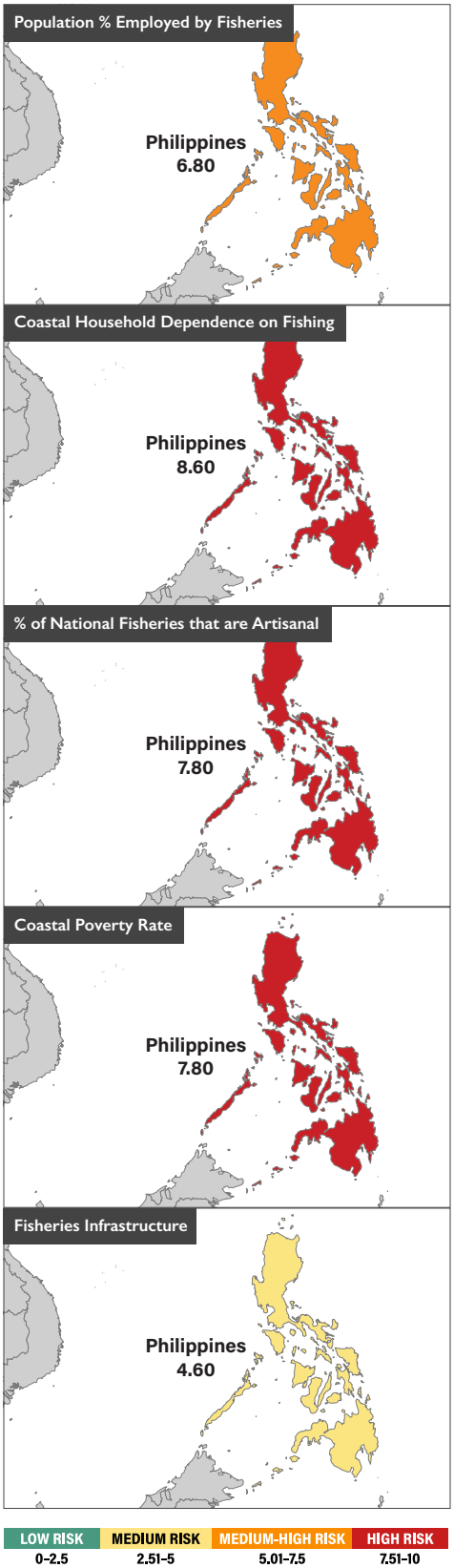
medium risk. In addition to expanding the role of BFAR in monitoring municipal vessels, the Philippines' Ministry of Agriculture, Fisheries, and Agrarian Reform has organized mass distributions of fisheries inputs, like seaweed farm inputs (SFI), non-motorized boats, and boat engines, to the Sulu province to promote agri-fishery productivity and sustainability.[89]

ENVIRONMENTAL RISK

Environmental risk is reported as medium-high risk *(6.94)* when averaged across five indicators. The highest risk indicators are *marine habitat health (7.07)* and *climate change impacts on marine habitat health and fish stocks (7.8)*. Destructive and illegal fishing practices have compromised coral reef ecosystems, reduced biodiversity, and damaged critical coastal habitats, like mangroves and seagrass beds. Moreover, coral harvesters violate laws prohibiting coral gathering; these harvesters take substantial amounts of corals that are then smuggled out of the country, according to KIs. Current approaches to land development are also having spillover effects on the health and resilience of nearshore and coastal fisheries. For example, artisanal fishing communities report that runoff from nickel mines in Sulu has rendered some territorial waters unfishable, prompting fishers to travel far beyond their typical fishing grounds for their daily catch.[90] Marine habitats are under further threat from climate change. Coral reefs in the SSS are under threat from instances of coral bleaching, caused by increases in sea surface temperatures. Knock-on effects of climate change, such as more frequent and intense storms, decrease available fishing days and destroy fishing gear. BFAR has responded by supplying new gear to fishers and the national government has begun planting mangroves to reduce storm surge, address storm-related flooding, and stabilize the coastlines, according to KIs. According to the Philippines' Development Plan (2023-2028), critical support for accessing climate financing mechanisms and risk insurance will be expanded to small-scale farmers and fishers.[91] The threat of climate change and adaptive initiatives are represented in the *climate change resilience (6.0)* indicator, which was ranked as medium-high.

Nearshore fish stocks (7.00) and *offshore fish stocks (6.73)* are both calculated as medium-high risks. BFAR conducts stock assessments every five years, with fish stocks declining by 50 percent in the last stock assessment. Between 2020 and 2022, municipal production fell from 222,390 metric tons to 281,730 metric tons. Similarly, between 2020 and 2022 commercial production fell from 201,540 metric tons to 177,720 metric tons.[92] Small pelagic species comprise 67 percent of the Philippines' total commercial catch. Spawning of sardinella is managed by closed seasons in parts of the SSS.

Figure 20: Philippines Economic Scores by Indicator



ECONOMIC RISK

Economic risk *(6.96)* is calculated as the highest categorical risk when averaged across five indicators. In 2021, marine captures fisheries production was 1.5 million metric tons.[93] Approximately 60 percent of coastal Filipinos rely on coastal and marine resources for their livelihood.[94] There are 2.08 million registered fisherfolk, approximately 50 percent of which are employed by marine capture fisheries.[95] In the Filipino fishing sector, there is no standardized payment practice, with fishermen typically getting a share of catch instead of direct payments. Additionally, KIs report that there are rampant labor rights violations throughout the industry. For instance, carrier vessels stay at sea for six to eight months; this length of time at sea creates an atmosphere conducive to lack of oversight and abuse. The children of fisherfolk often work on vessels 3-20GT using passive gear. Therefore, the *percent of population employed by fisheries (6.8)* and *household economic dependence on fishing in coastal communities (8.6)* are calculated as high risk. Roughly 80 percent of Filipino fisherfolk are artisanal fishers. According to BFAR, from 2011 to 2020 the municipal and aquaculture subsectors contributed 73 percent to total fisheries production. Small-scale fishers are among the country's poorest and most socially vulnerable sectors. Fisherfolk have the second highest poverty rate of any profession in the Philippines, with 26.2 percent living below the official poverty threshold.[96]

Overfishing acts as a threat multiplier to livelihood risk for fisherfolk. KIs report that due to overexploitation, subsistence fishers are leaving coastal areas, with fishing becoming a last-resort profession. Lobbying efforts by the commercial fishing industry to reduce the IEZ and cut into municipal fishing zones are further threatening the livelihoods of small-scale fisherfolk. Due to these risks, *coastal poverty rate (7.8)* and *percent of fisheries that are artisanal (7.8)* are also high risk. To address IUU fishing concerns while meeting an increase in demand for jobs and food security, the Philippines has a growing mariculture industry. According to KIs, since 2001, an emphasis has been placed on cage farming of high value species such as groupers, sea cucumbers, tilapia, seaweed, milk fish, and crab. Currently, 21 companies own 700 cages. Even though aquaculture-based endeavors can represent an alternative livelihood opportunity for fisherfolk, expansion of the industry has encouraged overfishing of juvenile and trash fish to serve as inputs for these mariculture ventures.

The *fisheries infrastructure (4.6)* risk indicator was calculated as medium-low risk. The Philippines has been party to the PSMA since 2018. With 7,100 islands, there is a complicated system for bringing in seafood harvests. KIs report that carrier vessels can linger for six to eight months before

unloading at port or transferring fish to legal vessels. Once the fish arrives at port, fish are then often comingled, making oversight a challenge. Indeed, catch reporting largely occurs via self-declaration. Naturally, this creates an environment of mis- or under-reporting. Since 2021, the Philippines Fisheries Development Authority (PFDA) has launched three programs to improve port infrastructure — the Regional Fish Ports Program and the Municipal Fish Ports Program, which provide training and facilities to facilitate catch reporting and compliance with IUU fishing laws, and the Ice Plants and Cold Storage Program which prevents waste of fisheries products.[97] In 2024, the Department of Budget and Management approved Php 6 billion (102.36 million) to improve and maintain regional fish ports throughout the Philippines.[98] The Philippines' SSS is home to two major ports: the port of Puerto Princesa (Palanwan) and the port of Cebu.

BEST PRACTICES: CLOSED SEASONS FOR SARDINELLA

Small pelagic species comprise 67 percent of the Philippines' total commercial catch in the SSS. Sardinella and mackerel are also targeted by artisanal fishers and are a crucial source of protein and income for poor coastal communities. Women in coastal communities are often employed in the processing of sardinella. In 2012, BFAR implemented a closed season for sardinella in the East Sulu Sea, Basilan Strait, and Sibuguey Bay from December 1 to March 1 to allow stocks to regenerate.[99] In September 2023, the National Fisheris and Aquatic Resources Council unanimously approved a resolution to adjust the closed season dates to November 15 to February 15, reflecting recent studies on stock regeneration in the seascape.[100] The bans do not apply to municipal fishers operating in municipal waters. In municipalities adjacent to the Sibuguey Bay area closure, the catch per unit effort of municipal and small-scale commercial fishers has declined. However, combined catch data from all three closure areas shows a significant increase in sardinella catch at the end of seasonal closure periods but show no significant change in sardinella catch across years in participating provinces.[101] Refer to Figure 17 for a visualization of the sardinella closed season zone.

METHODOLOGY

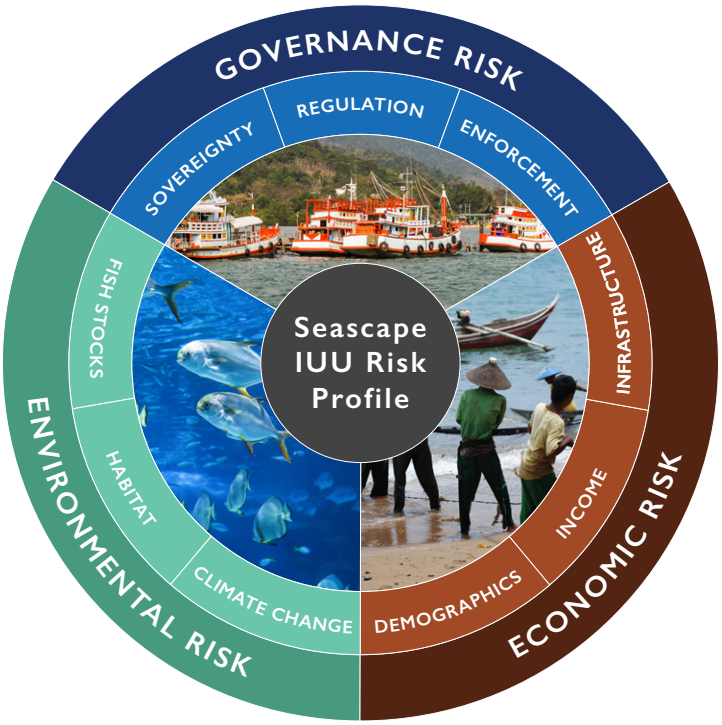
Illegal, unreported and unregulated (IUU) fishing costs the Indo-Pacific region an estimated $5.8 billion each year.[102] IUU fishing threatens the food and human security of over five million people living in the ASEAN member states, undermines the rule of law and the sustainable management of the region's fisheries, and is connected to organized crime and forced labor. Foreign vessels from distant water fleets and neighboring states threaten the sovereignty and territorial integrity of ASEAN countries. USAID Sustainable Fish Asia Technical Support (SuFiA-TS) works to promote sustainable fisheries management and marine biodiversity conservation in the Indo-Pacific, address gender and forced labor concerns in the seafood supply chain and provide technical support services and tools to combat IUU fishing.

To develop effective policies aimed at reducing the harm caused by IUU fishing requires critical data and information on IUU fishing activities across the ASEAN region and within the territory and maritime domain of individual countries. However, the inherently clandestine nature of IUU fishing makes it difficult to access adequate local and regional data needed to accurately estimate risks associated with IUU fishing. IUU fishing in the maritime domains of ASEAN member states and regional water bodies is perpetrated by a variety of fishers and other actors in the seafood supply chain: foreign and domestic, artisanal, small-scale, and industrial. In addition, IUU fishing activities are distinct and actions to combat IUU fishing require approaches that are

sometimes unique to the offenses requiring different interventions to eliminate them. Yet IUU fishing also requires a combined, all-of-government approach to address the multi-pronged nature of the problem. Each country surveyed by the SuFiA-TS team has distinct enabling economic, environmental, and governance conditions that allow IUU fishing to continue, further complicating a comparative risk assessment.

To address the challenges of a data-scarce environment in the country and subregional waterbody-based IUU fishing risk assessments conducted in SuFiA-TS, the activities which produced this seascape risk profile employ an adapted version of the Climate and Ocean Risk Vulnerability Initiative (CORVI) methodology designed by the Stimson Center's Environmental Security Program. The CORVI method has been applied in 16 coastal cities and Small Island Developing States (SIDS) around the world. CORVI is a data-driven, stakeholder-led process to help governments, businesses, and financial institutions assess climate risks and pinpoint priority areas for building resilience to climate change. The SuFiA-adapted CORVI methodology takes an integrated approach to risk by assessing the economic, environmental, and governance factors that drive IUU fishing in the region. This relies on a mixed method approach to quantify the risk of IUU fishing in each country and regional water body surveyed. The quantitative data generated by this methodology is coupled with qualitative data from semi-structured expert interviews conducted in country and virtually to provide a holistic IUU fishing risk profile.

Figure 21: Seascape IUU Risk Profile



WHAT IS THE SUFIA-ADAPTED CORVI METHODOLOGY AND HOW DOES IT BUILD IUU FISHING RESILIENCE IN DATA SPARSE ENVIRONMENTS?

SuFiA-adapted CORVI is an analytical tool developed by the Stimson Center's Environmental Security and Southeast Asia Programs to support regional bodies in assessing vulnerabilities to IUU fishing in data sparse environments. It pinpoints areas in need of adaptation by providing a comprehensive understanding of the economic, environmental, and governance risks associated with IUU fishing. SuFiA-

adapted CORVI assesses the vulnerability of ASEAN countries within a regional seascape to the impact of IUU fishing by comparing 15 different IUU-related risk factors across 3 different categories, using the structured expert judgement (SEJ) method to quantify risk in data-sparse environments.[103] Through structured interviews and surveys with subject matter experts, accompanied by a weighting process to ensure representative data points, the SEJ method provides quantitative insight. Through this analysis on a diverse range of economic, environmental, and governance risks, SuFiA-adapted CORVI produces robust assessments of the vulnerabilities and resilience of ASEAN countries to current and future IUU fishing impacts and allows for risk-level comparisons between countries within a pre-defined regional seascape.

These risk assessments—consisting of SEJ-derived risk scores, semi-structured expert interviews, and literature reviews—help to identify countries' strengths and weaknesses in addressing IUU fishing resilience and vulnerability mitigation. They also highlight discrepancies between risk scores, existing literature, and subject matter experts. The combination of quantitative risk scores and qualitative insight from experts form the basis of actionable policy recommendations, which, in turn, can be communicated to a broad range of stakeholders through tailored messaging to specific groups in a structured and concise manner. Through the implementation of this process, SuFiA-adapted CORVI can assist in the prioritization of actions, development of targeted policy solutions, and improvement of the decision-making process.

HOW THE SUFIA-ADAPTED CORVI METHOD IS DIFFERENT

The SuFiA-adapted CORVI Method builds on the work of previous indices but is distinct in three ways.

1. Regional Seascape-Based: Unlike many other indices that tend to focus on the national or sub-national level, this method focuses on comparative country-level analysis within the context of IUU fishing within a regional seascape. This focus is based on extensive interviews with key stakeholders and actors who noted the difficulty of applying risk assessments to the regional seascape scale to inform policy action to reduce and address issues of IUU fishing and reduce sustainable fisheries management.

2. Holistic: This method looks across a broad set of governance, environmental, and economic risk factors that are connected to IUU fishing and influence sustainable fisheries management. As part of the category and indicator selection process, indicator inclusion was primarily based on its ability to capture and explain IUU fishing risks within a respective seascape and not on whether data was available. This approach promotes a holistic understanding of risks to IUU fishing.

3. Data-Driven: Through its utilization of SEJ, this method is suited to producing actionable insights in data-sparse environments. By combining empirical and survey data across a wide range of indicators, this method fills data gaps to provide a holistic assessment, while reducing data availability bias. This approach provides a contextual and data-driven evaluation of IUU fishing risks.

RISK INDICATORS

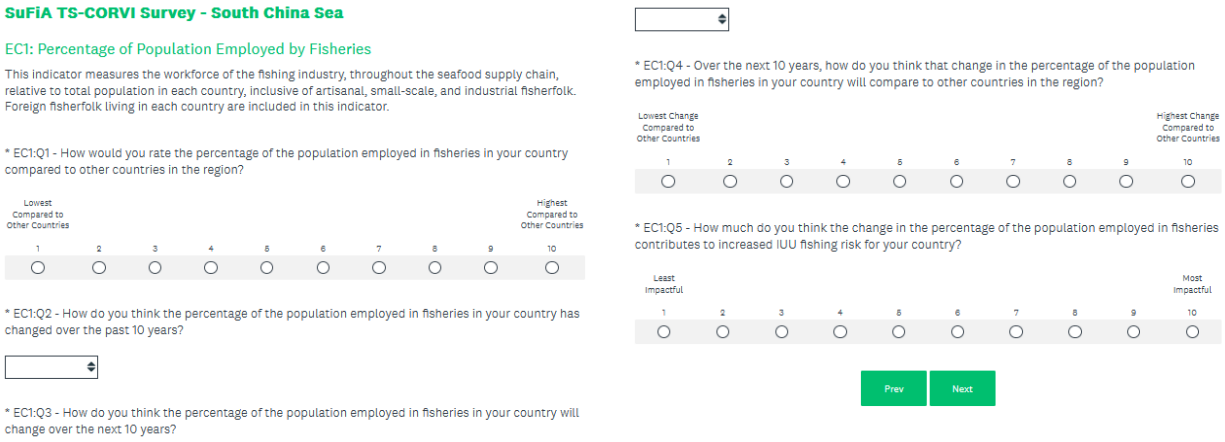
To ensure that the SuFiA-adapted CORVI indicator scores provide a holistic risk rating, each comprises five factors: current, past, and expected trends, the rate of change of the risk, and the impact of this risk on the country.

1. **Baseline** measures the current level of IUU fishing risk for an indicator relative to other countries in the seascape.
2. **Past Trend** assesses the trend of risk for the past ten years.
3. **Expected Trend** assesses the anticipated trend of risk in the next ten years.
4. **Magnitude** measures the degree of expected future trend change relative to other countries in the seascape. Change that happens more quickly than expected are assumed to increase risk when compared to changes that take place over a longer time scale. This assumes that longer periods of change contribute to less risk, as decision makers have more time to adapt and build resilience.
5. **Impact** assesses the importance of change for an indicator in describing future risk in the country.

Figure 22: Indicator Factors

In the SuFiA-adapted CORVI survey, respondents are asked to answer five questions per indicator derived from the process outlined above. The questions are also informed by extensive desk research and expert interviews carried out during the survey design process. Figure 23 is a representation of the five survey questions related to an individual indicator.

Figure 23



DATA COLLECTION AND STRUCTURED EXPERT JUDGEMENT METHOD

To fill data gaps, SuFiA-adapted CORVI employs structured expert surveys to collect data that is otherwise unavailable. This primary data is combined with secondary data using SEJ to produce a comparative score for each category in the assessment. SEJ is a well-established social science technique that seeks to quantify risk when preexisting secondary data is inadequate. Through interviews and surveys, and a series of weighting procedures to ensure the data is representative, SEJ allows researchers to quantify topics that might otherwise be challenging to study systematically.

To apply SEJ to SuFiA-adapted CORVI, subject matter experts across academia, government, civil society, and the private sector were identified by the SuFiA-TS Regional Experts Technical Team (RETT). These experts were interviewed by the research team and then asked to complete the survey. To guard against confirmation bias, survey answers are compared to a regional secondary empirical dataset to weigh the expert responses by utilizing a coherence check.[104] The coherence check ensures that experts whose answers do not match secondary data are not weighed as highly as those who do and are adjusted accordingly. Weighted survey answers per question are then averaged to determine a weighted mean score per indicator. The five weighted indicator scores are then averaged to determine a mean score for each respective category.

Figure 24: Survey Participants

Who Took the Survey?	Academic Expert	Government Official	Private Sector Representative	NGO representative	Total
# of respondents	4	12	2	9	27

This approach has several strengths. First, SuFiA-adapted CORVI incorporates the views of subject matter experts and local stakeholders at each stage of its implementation. This allows the final product to better reflect the specific context it is seeking to measure and provide more focused information for end users. Second, pairing primary survey data with secondary data through SEJ allows SuFiA-adapted CORVI to provide insight into risks relating to IUU fishing that existing secondary datasets do not cover. While the use of SEJ allows SuFiA-adapted CORVI to assess a diverse range of risks, it should not be regarded as a substitute for empirical data collection. Rather, SEJ is best viewed as an alternative research technique specialized to analyzing topics with significant data gaps.[105]

CONCLUSION

By conceptualizing risk profiles for IUU fishing in the SSS, this report offers an opportunity for key actors to understand the drivers of IUU fishing and develop potential pathways for future collaboration on fisheries management and marine conservation. While domestic-level enforcement initiatives were noted as relatively lower risk by KIs, these initiatives are still hindered by confusion about overlapping rules at municipal and federal levels of enforcement. In addition, KI statements and data from SSS countries illustrate that the vast majority of funding towards fisheries issues goes towards input-based technologies for at-sea enforcement, and significantly less goes towards fisheries management and marine conservation. KIs highlighted that the primary perpetrators of *illegal* fishing in the SSS are foreign-flagged and transnational criminal networks. Incursions into the SSS have the two-fold impact of increasing tensions between regional actors and limiting at-sea enforcement capacity.

To address funding shortcomings for domestic-level management and conservation initiatives, regional governments and NGOs should share best practices and increase investment in conservation efforts and fisheries management. One such best practice is improving capacity for fisheries management and conservation by working with nontraditional partners in the Indo-Pacific such as local communities, or trusted nations outside the SSS like the U.S., Australia, and Japan. For example, the recent debt-for-nature swap between Indonesia and the US which aims to protect critical reef habitats in Indonesia's EEZ. Additionally, regional NGOs can promote using dialogue between states to resolve boundary disputes and incursions, reducing required investment in at-sea enforcement, and promoting collaborate on management. Research notes that improving regional collaboration on fisheries can help elevate collective commitments to marine conservation and enforcement by reducing tensions between states.

In order to advance marine conservation and transboundary MCS capacity in the SSS, regional organizations should promote and increase cooperation between state governments on data sharing. Through bilateral MoUs and the Trilateral Agreement, nations on the SSS collaborate and share information and technology regarding at-sea enforcement of fisheries-related crimes. Regional organizations should promote expanding data-sharing to encompass fish stocks, vessels, and marine ecosystems to promote transboundary ecosystem-based management in the SSS. Database sharing promotes trust between regional actors and is critical to identifying locations in the seascape that are at-risk. RPOA-IUU notes that status quo nongovernmental data sharing initiatives in the Coral Triangle are hindered by a lack of standardization between respective databases.[106] Regional partners should work to standardize databases to promote robust monitoring of marine ecosystems in the SSS. Data sharing and transboundary MCS development would improve enforcement against transnational criminal networks and foreign-flagged vessels in respective EEZs by improving trust between regional states, promoting further dialogue on collective management and conservation, and streamlining regulations in different territorial waters to reduce confusion amongst patrol officers and fisherfolk.

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