



Trends in Marine Resources and Fisheries Management in Indonesia

A 2018 REVIEW

CEA CALIFORNIA ENVIRONMENTAL ASSOCIATES



01

Executive summary

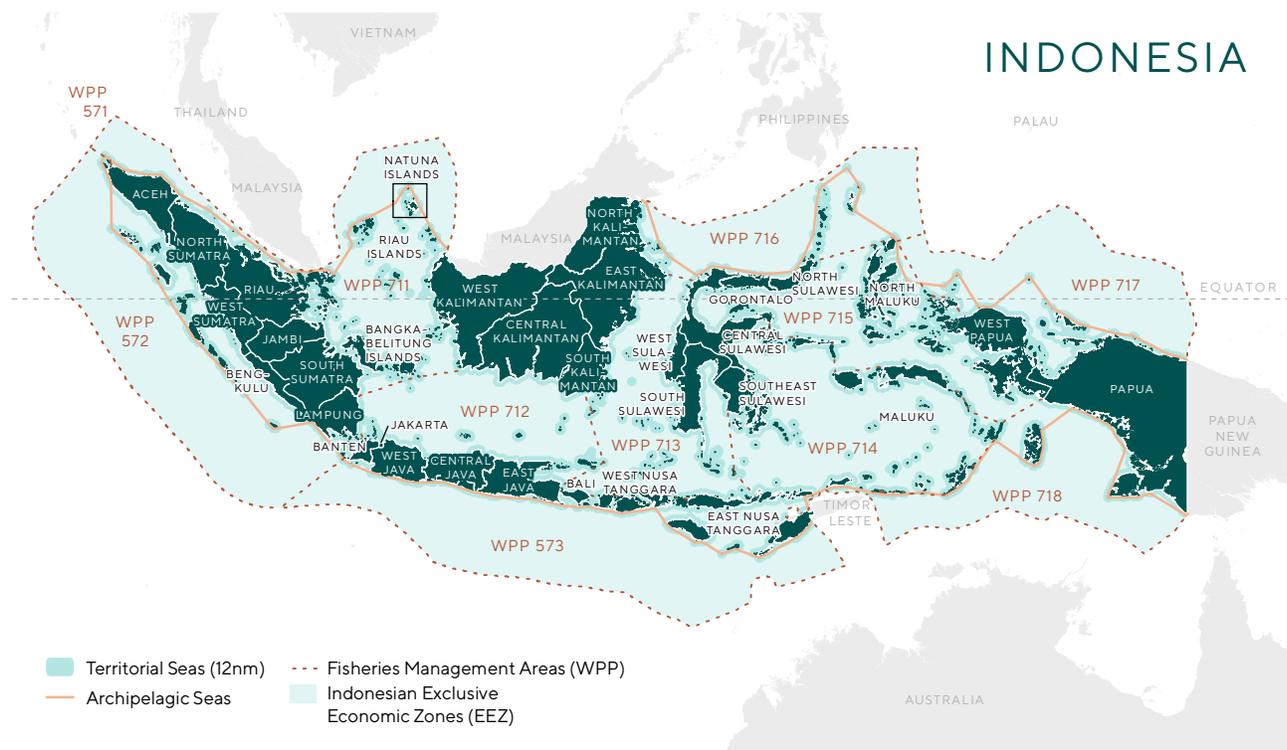
Executive summary

A country bridging two oceans

As the world's largest archipelagic state, the ocean plays an undeniably central role in Indonesia. With a water area that is nearly four times larger than its land area (Fig.1), the country derives pivotal benefits from the sea for its economy, geopolitics, culture, and natural environment. Situated at the center of major maritime trade routes, its seas are a gateway linking Europe, the Middle East, Africa, and South Asia. Its coastal and marine waters make up one of the most fertile fishing grounds in the world: Indonesia is the second largest fish producer in the world, second only to China. Roughly 55 percent of this production comes from coastal areas, particularly from seagrass beds, mangroves, coral reefs, and estuaries. The country has the world's largest area of mangrove forests which cover about 3 million hectares and contain five times as much carbon per hectare as tropical forests. A global hotspot and priority for conversation, Indonesia has one of the highest levels of marine biodiversity in the world and is home to world-renown marine reserves such as the Bird's Head Seascape and Sunda Banda Seascape.

While these resources present an abundance of natural capital, there are also material challenges in managing them effectively. Like many other countries, Indonesia's marine and fisheries sector faces urgent pressures, most notably overfishing, climate change, coastal development, and pollution. From a political perspective, there is intrinsic complexity in maintaining political unity and economic vitality for the country's population of 261 million people (Fig. 2) across dispersed islands (roughly 6,000 of the country's 18,000 islands are inhabited). Likewise, managing natural resources across such a vast expanse also presents its own complexities. This report seeks to provide an information base to better understand the current context in Indonesia, particularly as it relates to the marine and fisheries sector. The following Executive Summary presents a high-level preview of the individual chapters which follow.

Figure 1. Map of Indonesia's Territorial Waters and Fisheries Management Areas (WPP)



Map amended in August 2018.

Situational analysis

As the first president from outside the political or military elite, Joko Widodo's (Jokowi) election in 2014 represented something of a turning point. President Jokowi's small-town origins and man-of-the-people persona, combined with his success in improving bureaucratic efficiency first as mayor of Surakarta and then as governor of Jakarta, helped to foment a groundswell of support, particularly among rank-and-file Indonesians.

Figure 2. Indonesia - General Geographic and Economic Data¹

Total area	1,904,569 km ²
Land area	1,811,569 km ²
Inland water area	93,000 km ²
Length of coastline	54,716 km (2nd longest in world)
EEZ area	6,159,032 km ²
Population (2017)	261 million (4th largest in world)
Urban population (2017)	55.2% of total population
GDP, official exchange rate (2017 est.)	USD 1.011 trillion
GDP per capita (2017 est.)	\$12,400
GDP – composition by sector of origin (2017 est.)	Agriculture: 13.9% Industry: 40.3% Services: 45.9% (2017 est.)
Fisheries sector contribution to national GDP (2016) ³	2.56% (current prices)
Wild capture fisheries production (2016) ⁴	5.9 million tons (2nd largest in world)
Aquaculture production (2016) ⁵	4.4 million tons (3rd largest in world)
Seaweed production (2016) ⁶	11.3 million tons (2nd largest in world)
Value of wild capture/aquaculture exports (2017) ⁷	USD 3.17-4.09 billion*

*Ranges are due to conflicting data sources; differences may be due to exchange rate assumptions.

President Jokowi's political pragmatism and strength of vision were in evidence when he appointed the dynamic and unconventional Susi Pudjiastuti as Minister of the Ministry of Maritime Affairs and Fisheries (MMAF), instead of using the position for a political appointee that would strengthen his coalition.

Despite the political and economic ramifications, evidence is mounting that many of the recent MMAF's policies are having positive impacts. One study estimates that a 90 percent reduction in foreign fishing boats in Indonesia has translated into a 25-35 percent reduction in total fishing effort, and many, including Minister Pudjiastuti, have cited significant increases in catch in recent years. However, authoritative data are scarce, and the actual state of fisheries remains unclear. What remains missing, from the government's laudable efforts is the recognition that even legal fishing can deplete fish resources if unmanaged.

The primacy of economic development in the MMAF's current strategic plan is, of course, warranted and expected, particularly in a middle-income country context. However, without a more rigorous approach to management, including a reorientation of government agencies and staff towards sustainability rather than revenue maximization, gains are likely to be short term in nature. Despite the important victory of the campaign against IUU fishing by foreign boats, Indonesia's existing fisheries management regime has so far shown only limited success in halting destructive fishing practices (including trawling) and limiting fishing effort fueled by the expanding physical resources and capacity devoted to lucrative wild capture fisheries.

In terms of the projected expansion of aquaculture in Indonesia, further growth will require addressing financial, logistical, and capacity challenges, such as those associated with poor transportation infrastructure, variability in seed quality, and substandard practices. There appears to be no comprehensive approach to aligning production growth targets for aquaculture with approaches to managing the environmental impacts of such growth, including those surrounding land use, carbon emissions, feedstocks, and freshwater use. This will require increased and urgent attention from regulators to drive the required changes from current practices and approaches.

Political trends

One of the priority maritime issues for the Jokowi Administration relates to sovereignty. In 2017, President Jokowi issued a Presidential Decree asserting sovereignty over 111 islands, revising a 2005 decree that only mentioned 92 islands. According to MMAF Minister Susi Pudjiastuti, the decree was enacted “to prevent issues of occupation or claims of possession by other nations.” The islands of Natuna, which lie in the South China Sea within Indonesia’s exclusive economic zone (EEZ), have also been subject to long-standing conflict with China. In July 2017, in an effort to safeguard its claim over the area and to underline its long-held resistance to China’s expansive claims over the South China Sea, Indonesia renamed the northern area around its Natuna Islands as the North Natuna Sea. China opposes the change.

In terms of fisheries-specific priorities, MMAF’s core policies under Minister Pudjiastuti have been guided by the three pillars of the agency’s mission: sovereignty, sustainability, and prosperity. One of Minister Pudjiastuti’s first regulations, Ministerial Regulation No. 2/2015, banned all types of fishing trawl and seine nets effective January 1, 2017. This policy in particular has been the subject of debate and controversy, even though the use of cantrang, a kind of Danish seine net, damages coral reefs and the seabed ecosystem and even though trawl nets were banned on boats greater than 5 GT more than 35 years ago through Presidential Decree No. 39/1980. Faced with strong resistance to the ban, President Jokowi has delayed implementing the regulation several times. On January 17, 2018, following a meeting at the State Palace in Jakarta between President Jokowi and representatives of thousands of protestors purporting to be fishers from the northern Java coast, Minister Pudjiastuti announced that implementation of the ban would be extended indefinitely, but only for fishers operating off the coast of North Java. It is unclear whether the ban will be enforced elsewhere, and there is no firm indication as to when (if ever) the North Java exemption will end.

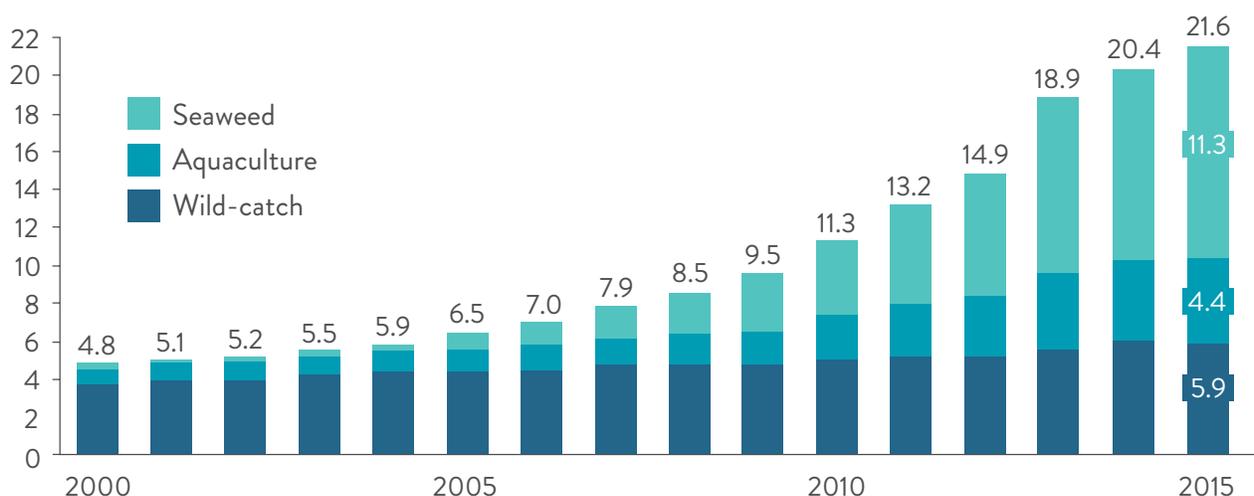
Minister Pudjiastuti’s most visible and hardline pursuit has related to tackling IUU fishing by foreign vessels in Indonesia’s EEZ. Under the “sink the vessels” policy, Indonesia instituted a publicly visible approach to implementing Law 45/2009, Article 69(4), which allows foreign-flagged vessels to be burned or sunk based on sufficient initial evidence. More than 360 vessels have been scuttled or destroyed, including 87 vessels in 2017 alone. In an effort to enhance transparency, in July 2017 Indonesia became the first country to share its vessel monitoring system data, with support from Global Fishing Watch. While the government’s focus on IUU by foreign vessels is notable, little attention has been directed to IUU fishing by Indonesian boats in domestic or foreign waters. Given that IUU fishing by foreign vessels has essentially been eliminated, a key question is whether MMAF will be able to design and implement effective measures to limit illegal fishing by Indonesian vessels and also enact preconditions for sustainable management of legal domestic fishing.



Wild fisheries and aquaculture

Indonesia is the second-largest fish producer in the world after China, with wild capture fisheries and aquaculture production of 5.9 and 4.4 million tons, respectively, in 2015.¹⁰ Similar to global trends, wild catch in Indonesia has plateaued in recent decades, while aquaculture production has expanded at a rapid rate. However, the rate of aquaculture growth in Indonesia has been even more staggering than the global average, as it has more than quadrupled from 2000 to 2015. Capture fisheries production showed a growth rate of less than 1 percent from 2014 to 2015, while aquaculture production increased by 9 percent (Fig. 3).¹¹ Excluding seaweed, aquaculture currently accounts for roughly 42 percent of fisheries production in the country.¹²

Figure 3. Volume of seafood production in Indonesia (2000-2015)



The fisheries sector is an important contributor to national food security and employment in Indonesia. A recent study ranked Indonesia as the eighth-most fish-dependent nation in the world, measured by dependence on fish-derived animal protein. In terms of livelihoods, the wild capture fisheries and aquaculture sectors employ approximately 2.7 million and 3.3 million workers, respectively. Additionally, over 1 million workers are involved in the processing and marketing of fisheries products. The majority of Indonesian fishers are small-scale fishers, with vessels under 10 gross tons (GT). The fisheries sector plays a particularly valuable role in coastal communities, where people are likely to engage in fishing as a form of subsistence and as a primary or secondary source of employment. However, the ability of capture fisheries to contribute to food security and nutrition security in Indonesia could become significantly compromised by overfishing, the ranging impacts of climate change on the ocean, and associated declines in fish catch.

Reliable data on stock status for capture fisheries in Indonesia are relatively scarce. Research suggests that the majority of targeted fish stocks in Indonesia are fully or over-exploited. Nearly half of Indonesia's wild capture fish stocks are overexploited, and at least seven out of Indonesia's 11 WPPs show no opportunities for immediate expansion of production. The total allowable catch (TAC) for all WPPs combined in 2017 was approximately 12.5 million tons, which the government uses to inform annual production targets. The government has set a fisheries production target for MMAF of 17.6 MT in 2018 and 22.32 MT in 2019. Additional increases of these levels will have significant and deleterious impacts on the future fisheries potential of the country.

Indonesia is second only to China as the largest aquaculture producer in the world. Although the country's aquaculture sector is forecast to overtake wild capture fisheries in next 10 to 15 years, its future sustainable growth is not considered secure. While aquaculture production can be ecologically efficient theoretically, its sustainability is dependent on species, production systems, and the intensity of production methods.

The national government has placed a high priority on aquaculture's development to drive increases in overall seafood production. Independent analysis has found that current aquaculture production targets set by the government are close to impossible to achieve due to lack of space on an already crowded and fast growing coastal zone that lacks comprehensive spatial management plans and zoning. Furthermore, this growth (if realized) would carry overwhelming environmental costs that would also bring immediate and long-term economic, social, and cultural costs. Investments and public policies designed to mitigate these environmental impacts will be essential to facilitate the sector's growth at the desired rate and scale.

As capture fisheries face increasing threats and likely declines from overfishing, the government must balance both aquaculture growth along with concerted efforts to improve capture fisheries management. The intersection of several issues—spatial planning, coastal zoning, livelihoods diversification, economic development, and food security—underscores the need for government programs and development agendas to marry the constraints and opportunities facing marine aquaculture and marine capture fisheries, along with that of freshwater aquaculture and freshwater fisheries management. Ensuring that these sectors work in harmony with each other, rather than in silos or in conflict with each other, will be essential to the sustainable growth of Indonesia's fisheries in the future.

Public revenue and funding

Indonesia's fisheries sector, as measured by gross domestic product (GDP), grew 7.3 percent in 2014 and 6.8 percent in 2017 (through Q3 2017). That said, the sector's contribution to GDP has remained small and relatively flat over the past several years, averaging about 2.0 to 2.5 percent (Table 1). Put differently, the fisheries sector has exhibited growth in recent years, but it has not been a growth sector itself. Of course, the sector's value to Indonesia extends well beyond its direct contribution to GDP; fisheries also contribute to food security and enable enterprises in supporting sectors such as energy, telecommunications, logistics, and ecotourism.

Table 1. Fisheries Sector Contribution to National GDP

	2010	2011	2012	2013	2014	2015	2016
Constant prices	2.09	2.12	2.13	2.16	2.21	2.27	2.27
Current prices	2.12	2.09	2.14	2.21	2.32	2.51	2.56

There are two sources of government revenue from the fisheries sector: non-tax state revenue (Penerimaan Negara Bukan Pajak, or PNBP) and tax revenue. In 2015, MMAF issued Regulation No. 75/2015 to increase PNBP tariffs. As a result, fisheries sector PNBP from the MMAF Directorate General (DG) Capture Fisheries, DG Aquaculture, and DG Business Competitiveness rose from USD 5.86 million in 2015 to USD 26.82 million in 2016. In 2016, USD 26.80 million, or 99.9 percent of the total, originated from DG Capture Fisheries. In 2017, fisheries PNBP amounted to USD 36.38 million, the highest level in the last ten years. While the increase in fisheries sector PNBP is notable, the fisheries sector's contribution to overall PNBP remains very low compared to other sectors. It increased from 0.03 percent of total PNBP in 2015 to 0.14 percent in 2016.

In terms of tax revenue, as of March 2017 there were only 3,910 listed taxpayers in the fisheries sector, and approximately 2.7 million fishers. Tax revenue from the fisheries sector is quite small; in 2016, approximately USD 62.19 million was collected from the sector, with a subsector breakdown of 5.84 percent from capture fisheries, 9.15 percent from aquaculture, and 85.01 percent from others (e.g., fish processing and trading). In 2017, tax revenues from the fisheries sector amounted to USD 80.15 million. As a result of the low tax collection, the fisheries sector tax-to-GDP ratio is significantly below the national level. From 2011 to 2016, the average national tax-to-GDP ratio was 11 percent, while the average fisheries sector tax-to-GDP ratio was 0.26 percent. This means that the tax collected from the sector did not even extend to 1 percent of the overall sector, as measured by GDP.

The Government of Indonesia provides support to the fisheries sector via a number of channels. The main ones include MMAF, the Ministry of Environment and Forestry (MEF), and loan subsidy programs. The initial budget plan for the last several years shows declines in MMAF's allocation: the allocation was USD 790.56 million in 2015, USD 786.28 million in 2016, USD 688.87 million in 2017, and USD 539.83 million in 2018. Taken alone, this trend would imply a de-prioritization of the fisheries sector, but it is not that simple.

One issue is that MMAF was unable to spend its allocated budget in prior years, resulting in a ratcheting down of its planned budget over time. For example, in 2016, actual spending amounted to only 61 percent of the planned budget. In terms of spending, goods for communities and regional government amounted to nearly USD 100 million in 2016. This is about USD 70 million less than in 2015, but still constitutes a (significant portion of the overall MMAF budget and represents a large and important source of funding for communities. Most, if not all, of this funding was provided in the form of capital assets (e.g., boats) as opposed to funds for developing governance systems or other sustainable fisheries management components.

The MEF, which holds management authority for all of the national parks (Balai Taman Nasional) in Indonesia, spent USD 42.28 million for management of national parks in 2016, or about half of the Natural Resources and Ecosystem Conservation Program expenditures of USD 83.47 million. This included USD 8.29 million for the ten national parks with significant marine areas.

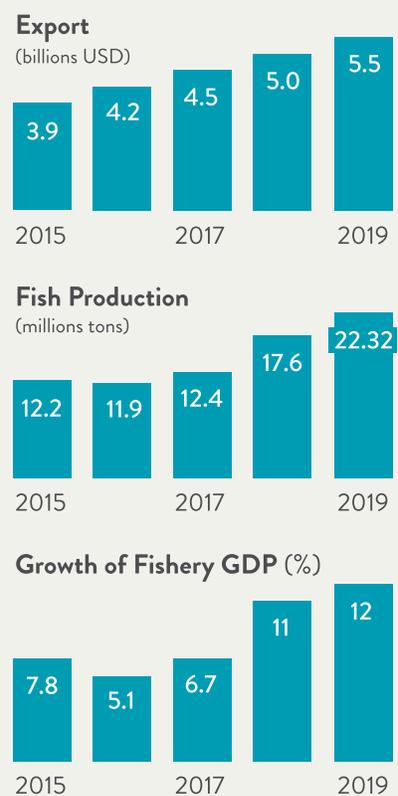
To facilitate access to finance for micro, small, and medium enterprises, which represent more than 60 percent of Indonesia's GDP and employ over 114 million people (approximately 97 percent of total private sector employment), the Indonesian government operates a number of credit guarantee and loan subsidy programs. The main ones relevant to the fisheries sector are the People's Business Credit Program, the Ultra-micro Credit Program, and The Institute for Capital Management of Maritime and Fishery Enterprises. At present, none of these programs link stock health or sustainability of fisheries practices to loan amounts or interest rates.

Private sector investments

In 2016, the government of Indonesia adjusted the areas in which foreign direct investment (FDI) can be made into the fisheries sector. Most notably, 100 percent FDI is now allowed for cold storage and processing, while wild capture fishing was added to the Negative Investment List, which restricted investment in boats and harvesting to domestic sources only. Reported foreign and domestic private investment in the Indonesian fisheries sector amounted to approximately USD 406.4 million in 2016: USD 164.9 million in new loans and USD 241.4 million in new equity investments. These figures likely underestimate the actual scale of investments into the fisheries sector; some investments are likely not reported and/or are made outside of the formal system (e.g., by middlemen or boat owners to fishers). In terms of the subsector breakdown, more than half of all investment was made in the processing industry.

Despite efforts to increase private sector investment into the fisheries sector, as of June 30, 2017, loans outstanding to the fisheries sector by domestic banks amounted to only USD 1.93 billion. This represents 0.58 percent of the USD 332.67 billion in total loans outstanding by all banks to all sectors. Similarly, efforts to increase the export value have come up short. Indonesia targeted an export value of USD 7.62 billion of fish and other sea catch in 2017 (Table 2), an ambitious target given an actual export value of about USD 3.8-4.2 billion in 2016, and ultimately only exported USD 3.2-4.1 billion in 2017 (Fig. 4).

Figure 4. MMAF Targets (2015-2019)



Note: 2017 figures indicate actual values, measured in Q3 2017.

Table 2. Indonesia Fisheries Export Value Targets Versus Actual (USD billion)²⁰

	2015	2016	2017
Target	5.86	6.82	7.62
Actual	3.95	3.78-4.17*	3.17-4.09*
% of Target	67.4%	55.4-61.1%	41.6-53.7%

*Ranges are due to conflicting data sources; differences may be due to exchange rate assumptions.

Note: 2017 figures indicate actual values, measured in Q3 2017.

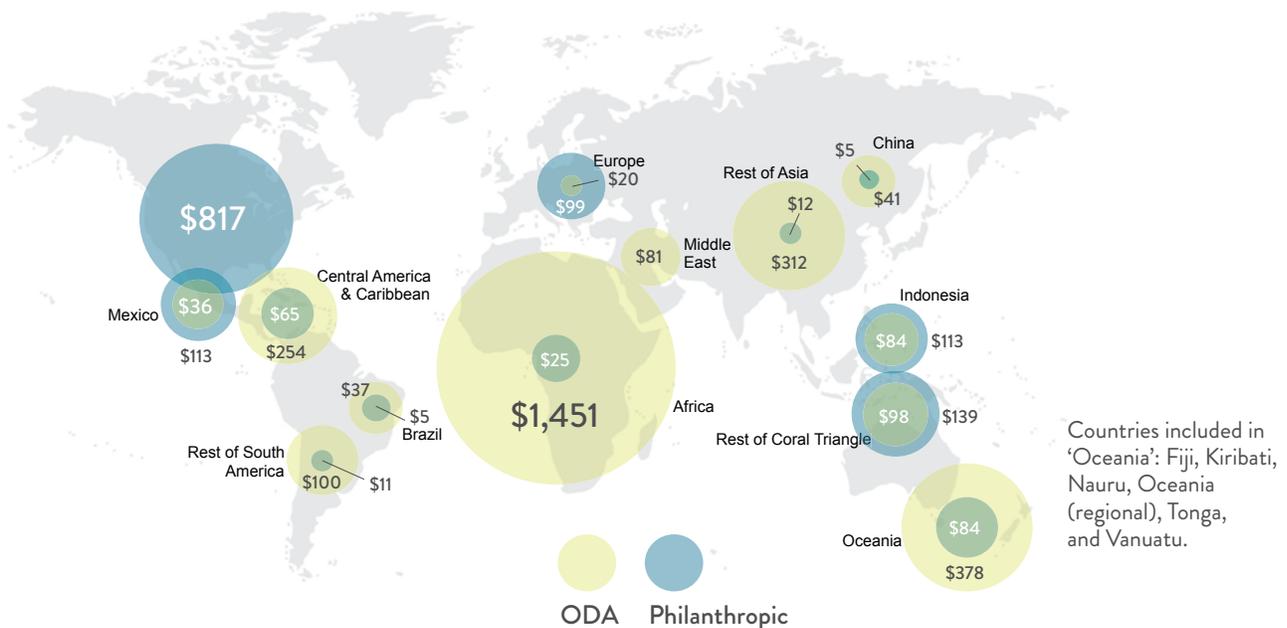
Of course, it is not the size of the investment flows but what that investment actually does that matters for the creation of sustainable and productive fisheries. Nearly half of Indonesia’s wild capture fish stocks are overexploited, and at least seven out of Indonesia’s eleven fishery management units (WPPs) show no opportunities for immediate expansion of production.

A number of important investment funds are specifically targeting investment in Indonesian “sustainable” fisheries. The Althelia Sustainable Ocean Fund and the Meloy Fund are the two main impact investment vehicles currently doing so. Successful outcomes from these investments will be important to demonstrate that sustainable fisheries can yield positive social, environmental, and financial outcomes. However, these funds are likely to encounter a number of challenges (e.g., limited investment pipeline, borrower risk aversion to foreign-currency denominated loans, and impact constraints due to treatment of the ocean as de facto open access). These funds may also be dwarfed by investments into the sector that do not factor in sustainability considerations. For the fisheries sector to successfully transition to sustainability, all debt and equity investments must be made with similar objectives in mind. As of now, there are no formal mechanisms or government institutions that track, prioritize, or incentivize investment in sustainably managed fisheries.

Marine conservation funding

Aside from public funding and private sector investments, private foundations and development aid organizations (which includes both bilateral and multilateral donors) also provide an important source of funding for marine and fisheries issues in Indonesia. Between 2007 and 2015, the philanthropic sector provided USD 113 million in funding and the development aid sector provided USD 84 million in ocean-related grants in Indonesia (Fig. 5).

Figure 5. Total Oceans-Related Grants from Philanthropic Versus ODA Funding, 2007-2015



Foundation grantmaking for marine-related issues in Indonesia has risen substantially in recent years. Between 2007 and 2016, grantmaking has increased by more than 300 percent—from USD 12.5 million in 2007 to more than USD 34 million in 2016. These increases are driven primarily by large commitments from long-standing funders as well as the entrance of new funders to the field (e.g., Oceans 5, Vulcan Philanthropy, and Leonardo DiCaprio Foundation). The Indonesia Marine Funders Collaborative (IMFC)—an initiative of foundations that share a vision of restoring and protecting coastal and marine resources while enhancing fisheries management in Indonesia—has been a key exchange for facilitating donor coordination and alignment among foundations.

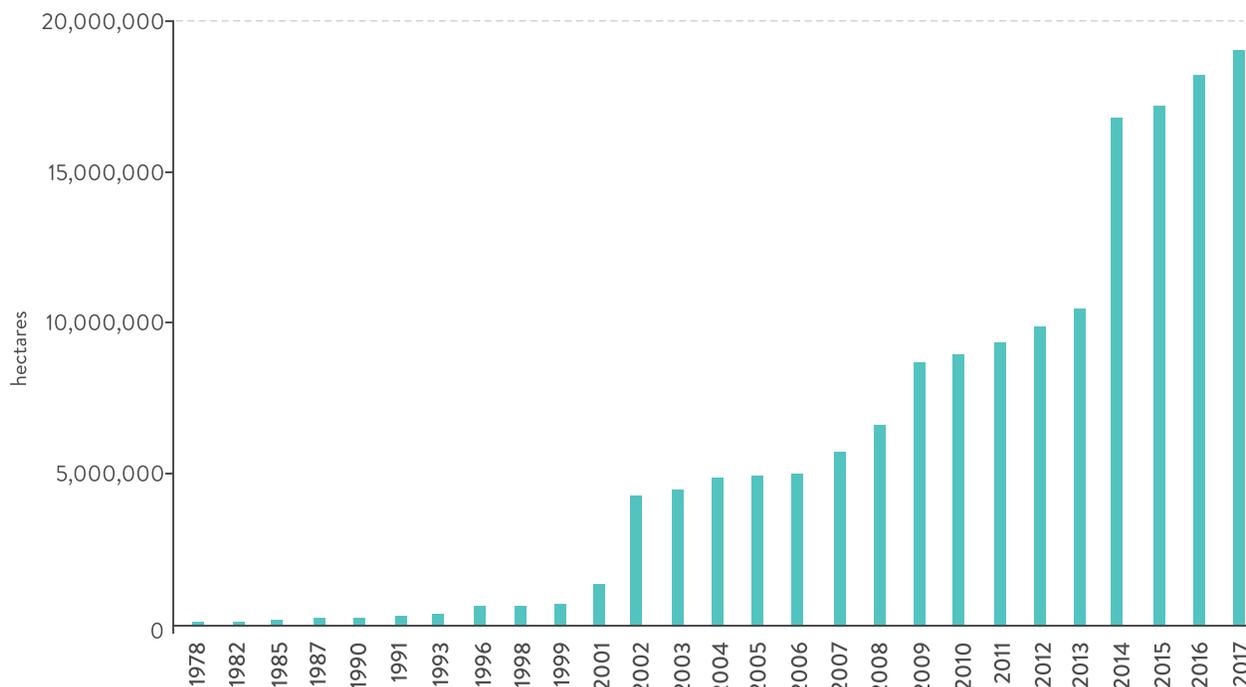
Between 2007 and 2016, Indonesia received USD 459 million in marine-related official development assistance (ODA) funding. By category, infrastructure received 36 percent of this funding, while fisheries received 34 percent. The remaining share was allocated to science and conservation categories. By flow type, roughly 60 percent of the total amount was in the form of grants and the remaining 40 percent came from an equal proportion of loans and non-export credits.

Considering marine-related ODA grants alone (with a fisheries or conservation focus and excluding infrastructure-related projects), Indonesia received approximately USD 150 million in grants between 2007 and 2016. The top grantmakers during this timeframe included Japan, Germany, and the United States.

Marine reserves

At the Coral Triangle Initiative Summit in 2009, then-President Susilo Bambang Yudhoyono declared a commitment to protect 20 million hectares of MPA in Indonesia by 2020. Based on a trendline of steadily increasing MPA designations in recent years, Indonesia appears to be on track to achieve its MPA target of 20 million hectares by 2020. According to MMAF data, the country had set aside 19.14 million hectares of MPAs as of 2017. Of particular note is the steady increase in MPA coverage following the announcement in 2009 to achieve 20 million hectares of coverage by 2020 (Fig. 6).

Figure 6. MPA Coverage in Indonesia, 1978-2017



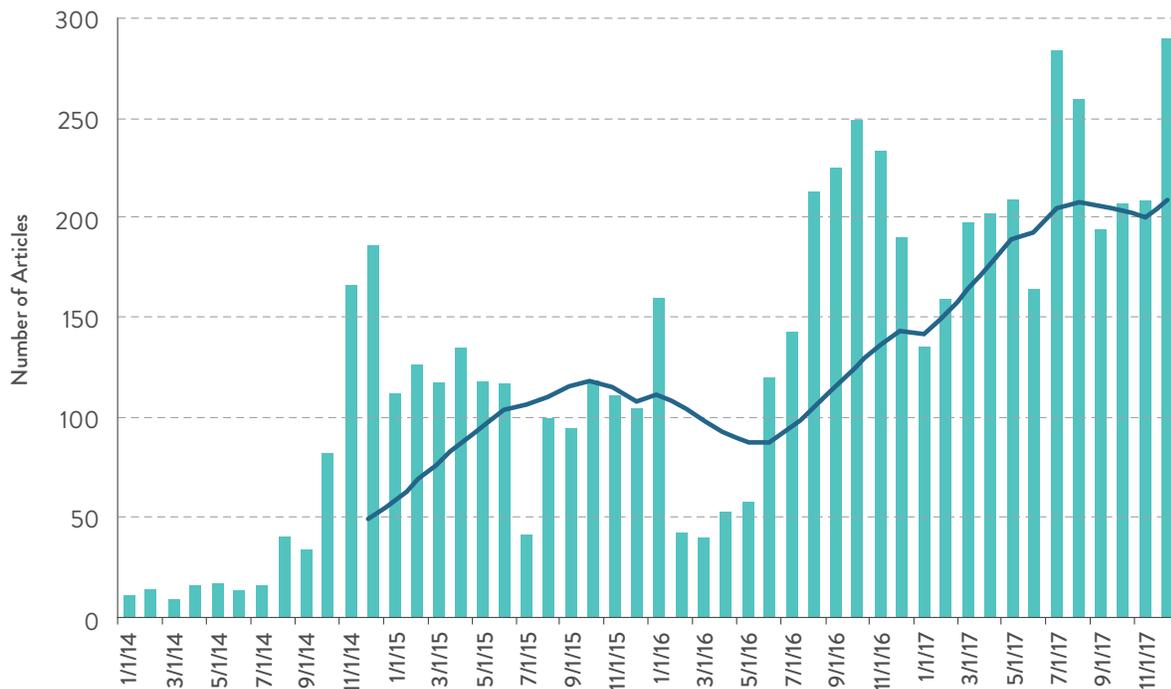
While Indonesia has set aside notable expanses of marine and coastal areas for protection in recent decades, recent research has underscored the role of complementary factors—adequate staff and budget capacity, in particular—to make ocean protection work. A recent study found that globally, staff capacity and budget were the strongest predictors of fish population outcomes—even after accounting for factors such as MPA size, longevity, and presence or absence of fishing. MPAs with adequate staff and budget capacity had fish recoveries which were three times as large as those without adequate capacity.

MPA investments have produced noteworthy results—socially, ecologically, and economically—both globally and in Indonesia. However, the rapid expansion of MPAs without a parallel increase in investment (particularly for staff and budget capacity) has the potential to undermine MPA performance. Considering approaches for integrating MPA spatial management with fisheries resource management will be a key challenge and opportunity for stakeholders in Indonesia going forward. Designing MPAs with adaptive capacity will also be critical to support these systems in confronting emerging stressors, such as climate change, ocean acidification, and pollution.

Media coverage

Media coverage of fisheries issues in Indonesia has risen year-over-year, according to multiple measures (Fig. 7). The number of articles mentioning fisheries management or marine conservation in Indonesia's top media outlets increased each year from 2015 through 2017. An analysis of media coverage shows that across ten focal Indonesian outlets, over 1,300 fisheries stories were produced in 2017, which is more than double the number in 2016. Despite an increase in the number of articles mentioning fisheries issues, most of this coverage consisted of brief news articles rather than in-depth analysis or feature coverage. Few stories addressed solutions for sustainable fisheries management.

Figure 7. News Articles in Bahasa Indonesia Mentioning Indonesian Fisheries Management Issues (January 2014–December 2017)



Public interest in fisheries management issues in Indonesia also appears to be increasing in Indonesia-language queries, as indicated by a growing number of searches on various terms related to fisheries and marine conservation. One hypothesis is that the strong personality of Minister Pudjiastuti and recent MMAF policies—which have been both lauded and criticized—have elevated the profile of marine and fisheries issues. Historically, there has not been such significant interest in the MMAF minister or policies.

In Indonesia, social media play an important role in influencing public opinion. The most prominent social media influencer who regularly discusses marine conservation issues in Indonesia is Minister Pudjiastuti, who is active on Twitter, Instagram, and Facebook. No individual approaches Minister Pudjiastuti's reach in terms of following or user engagement. At the organizational level, WWF Indonesia, Greenpeace Indonesia, WALHI, TNC Indonesia, and SaveSharks have the largest following among Indonesian NGOs engaged in marine issues. International NGOs have a significantly larger following but lack an exclusive focus on Indonesia.



Since 1984, California Environmental Associates (CEA) has supported the work of environmental foundations and nonprofits as well as sustainability-oriented businesses with in-depth research and analysis, program design and evaluation, and strategic planning. Learn more at www.ceaconsulting.com.



The David and Lucile Packard Foundation is a family foundation that is guided by the enduring business philosophy and personal values of Lucile and David, who helped found one of the world's leading technology companies. Their approach to business and community participation has guided our philanthropy for over 50 years: we invest in effective organizations and leaders, collaborate with them to identify strategic solutions, and support them over time to reach our common goals. We work on the issues our founders cared about most, including improving the lives of children, enabling the creative pursuit of science, advancing reproductive health, and conserving and restoring the Earth's natural systems. Learn more at www.packard.org.