

SECTOR ASSESSMENT (SUMMARY): AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT (MARINE AND FISHERY SUBSECTOR)¹

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. Indonesia, the world's largest archipelago, with around 5.8 million square kilometers (sq km) of coastal and marine waters and 85,000 sq km of coral reef area, has an abundance of marine resources and an exceptionally high coral and fish diversity. Indonesia's highly productive coastal ecosystems serve as an important base for the country's economic growth. Coastal habitats play a key role in the daily lives of people in terms of livelihoods, economic output, and food security. Indonesia has the largest reef-associated population in the world, with nearly 60 million people living within 30 kilometers (km) of a coral reef,² as well as the highest total fish and seafood consumption in Southeast Asia and the fifth highest in the world.³ About 60% of the population is dependent on fish as the primary source of protein, with over 55% of the national fishery harvest occurring in coastal waters.

2. Marine and coastal economic activities account for 25%–30% of Indonesia's gross domestic product (GDP) and provide employment to about 20 million people.⁴ A recent study notes that coral reef habitats produce marine products worth \$15,000 per sq km per year, providing an important source of food as well as economic opportunities for about 67,500 coastal villages (footnote 2). The same study finds that reefs also play an important role in marine-based tourism, and are estimated to be worth from \$3,000 per sq km per year in low potential areas to \$500,000 per sq km per year in high potential sites. Fringing coral reefs dissipate wave energy and protect coastal lands from storms and wave erosion, providing net benefits estimated at \$15,000–\$120,000 per sq km of reef, depending on the value of adjacent coastal infrastructure. With Indonesia supporting 18% of the world's coral reefs—more than 39,500 sq km—the total annual value of these habitats may be as much as \$1.5 billion from coral reef fisheries, \$127 million from tourism, and \$387 million from shoreline protection (footnote 2).

3. Despite the importance of coral reef ecosystems to global biodiversity and to Indonesia's economy and society, these resources have not been managed sustainably. They have been depleted by (i) overfishing and destructive fishing methods, (ii) lack of control of breeding grounds, (iii) siltation and pollution from land-based activities, (iv) tourism, and (v) industrial development. These activities have altered the biological mix of living resources, damaged the ecosystem, and degraded water quality. Resource use and exploitation have led to extensive coastal zone degradation, including destruction of coral reefs, depletion of fish stocks, reduction in water quality, and biodiversity loss. Nearly 95% of coral reefs in Indonesia are threatened by local human activities, with more than 35% in the high or very high threat categories (footnote 2). The proportion of healthy and very healthy reefs has decreased over the past 10 years.⁵ Due to high dependence on coral reefs and low capacity to adapt to such loss, Indonesia has among the highest social and economic vulnerability to coral degradation and loss in the world (footnote 2).

¹ This summary is based on Asian Development Bank (ADB). 2013. *Coastal and Marine Resources Management in the Coral Triangle-Southeast Asia*. Consultant's report. Manila (TA7813-REG).

² L. Burke et al. 2002. *Reefs at Risk in Southeast Asia*. Washington, DC: World Resources Institute.

³ Food and Agriculture Organization. 2010. *FAO Yearbook. Fishery and Aquaculture Statistics 2008*. Rome.

⁴ ADB. 2012. *Country Partnership Strategy: Indonesia, 2012–2014. (Sector Assessment, Strategy and Roadmap Agriculture, Natural Resources and Environment)*. Manila.

⁵ Global Coral Reef Monitoring Network. 2008. *Status of Coral Reefs of the World*. Queensland.

4. The marine and fishery subsector is beset with a number of problems. Foremost among these are the interrelated issues of resource degradation and the pervasive poverty among coastal communities. A rapid social assessment of coastal villages in the project districts found that 65%–83% of the population at the proposed project sites live below the national poverty line and are deprived of basic social amenities and services like potable water supply, sewerage and sanitation, and health and education. In these areas, the extensive coral reef and associated ecosystems are subject to continuing threats from natural processes and human activities. Overfishing and destructive fishing are the greatest threats, affecting more than 90% of reefs. Destructive fishing (blast or poison fishing) is widespread and threatens nearly 80% of Indonesia's reefs (footnote 2). With coral reefs providing about 90% of the fish caught by coastal fishers, their degradation rapidly diminishes fisheries production. Catch per unit of effort has been steadily declining, adversely affecting incomes. The average income of coastal fishers is below the national average, and coastal fishing communities are among the poorest segments of Indonesian society.

5. In addition, the subsector continues to suffer from policy, legal, and institutional constraints.⁶ Pollution control at urban and industrial centers near the coast is weak. Poor spatial planning and weak enforcement of spatial plans contribute to neglected coastal areas.⁷ Coral mining, coastal development, watershed deforestation and runoff, sedimentation, pollution (domestic, industrial, and port activities), as well as land use conversion (mangrove forests converted to fish and/or shrimp ponds, housing, industrial use) and global threats, such as climate change and ocean acidification, exacerbate these issues.

6. Indonesia has developed an ambitious protected terrestrial and marine area system, but many of the areas face severe funding constraints. The overall functions of marine protected areas (MPAs) include (i) protection of critical places and biological processes for endangered species and fish (biodiversity), (ii) recovery of fish stock (food security), and (iii) resilience of ecosystems against climate change (livelihoods). To deliver these functions, MPAs need design, effective implementation, legal management activities and compliance, and resources (human and financial). In 2006, it was estimated that a budget of \$70 million per year was needed for the then existing 80 MPAs covering about 14 million hectares (ha). This budget takes into account economies of scale for larger MPAs and lower costs for "no-take" areas. Of this budget, about \$2.5 million was available from national and local governments. The overall level of investment in 2004 was found to be only \$2.35 per ha in Indonesia, compared with \$5.75 per ha in the Philippines and \$20.65 per ha in Thailand.⁸ A working group of marine experts, government officials, and nongovernment organizations (NGOs) was established recently in 2010 to estimate costs for MPA management and to design sustainable financing mechanisms. This working group estimated that an amount of Rp630 billion per year for existing MPAs is required for optimal management, including operations, development and maintenance, and investment. The amount available in 2010 was about Rp80 billion, including contributions from local governments and NGOs, leaving a funding gap of Rp550 billion at optimal management levels.

2. Government's Sector Strategy

7. Indonesia's environmental policies have been formulated with the goal of achieving development in harmony with the natural environment to benefit present and future generations.

⁶ ADB. 2010. *INO: Sector Assessment, Strategy and Roadmap Agriculture, Natural Resources and Environment*. Manila.

⁷ ADB. 2012. *Indonesia Country Environment Note: Indonesia. 2012 Update*. Manila.

⁸ Colin McQuistan et al. 2006. *Protected Area Funding in Indonesia*. Bali: The Nature Conservancy Coral Triangle Center.

The current Long-Term National Development Plan (2005–2025) and the National Medium-Term Development Plans (2004–2009 and 2010–2014) have mainstreamed the principles of sustainable development in national development policies and programs. The policies focus on development of environmental services and ecotourism through ecosystems management and development, and species conservation in coastal zones and marine areas. These developments include improved management of coral reefs, mangroves, and seagrass areas, as well as identification and mapping of marine conservation areas and protected species. The government has taken an approach focusing on (i) institutional capacity building, (ii) development of models for MPAs, and (iii) reduction of coastal poverty through income-generating infrastructure and sustainable livelihoods.

8. The Ministry of Marine Affairs and Fisheries (MMAF) was established in 1999 and is responsible for managing about 60% of MPAs, while the rest are under the Ministry of Forestry. The MMAF's share will increase as more MPAs are gradually transferred to its authority and more local MPAs are established. The MMAF has additional functions under the legal framework for decentralized resource management.⁹ These include increasing democracy and local capacity, enhancing social prosperity, and fostering public participation. The MMAF was the executing agency for the recently completed Coral Reef Rehabilitation and Management Project (COREMAP) II.¹⁰ Despite initial delays, the overall performance of the MMAF was found to be satisfactory and the project was completed satisfactorily. The MMAF demonstrated good leadership and strong institutional capacity, and was able to establish close and effective coordination with other agencies involved in project implementation. However, there was a lack of capacity and funds for integrating participatory sustainable management of marine and aquaculture resources, and institutions for participatory management were weak.

9. The Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI) is a six-country¹¹ program of regional cooperation to sustainably manage coastal and marine resources in the region of the “coral triangle”, an expanse of ocean covering 5.7 million sq km considered as the epicenter of marine life abundance and diversity on the planet. The CTI has become the common ground on which Indonesia is working with other governments and partners to ensure regional-level protection of marine resources within a 10-year plan of action. As part of its commitment to the CTI, the Government of Indonesia pledged to conserve 100,000 sq km of its marine area in MPAs by 2010. This target was exceeded in 2009 with the declaration of the Savu Sea Marine National Park, covering an area of 35,000 sq km. In 2011, the Anambas National Marine Park was established with an area of 12,600 sq km, bringing the total MPA area to 139,000 sq km. This further increased to 157,000 sq km in 2012 and is planned to expand to a total of 200,000 sq km by 2020.

10. Indonesia has established its National CTI Plan of Action (NPOA), whose goals and activities are closely tied to the CTI Regional Plan of Action as well as to the government's medium- and long-term strategies related to coral reefs, fisheries, and food security. The NPOA guides and streamlines Indonesia's effort to achieve conservation of coral reefs for the sustainability of fisheries and food security and to help ensure that local targets are consistent with regional goals.¹² The NPOA has five goals: (i) the sustainable management of marine and coastal resources within all priority seascapes, (ii) ecosystem-based approach to fisheries management and resources fully applied, (iii) the effective establishment and management of

⁹ First Law on Local Government (Law 22/1999).

¹⁰ ADB. 2012. *Completion Report: Coral Reef Rehabilitation and Management Project Phase II*. Manila.

¹¹ Includes Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, and Timor Leste.

¹² Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security. Indonesia.
<http://www.coraltriangleinitiative.org/country/indonesia>

marine protected areas, (iv) climate change adaptation measures achieved, and (v) improvements to the status of threatened species.

11. During 2010–2014, government development expenditure in agriculture and natural resources was forecast at \$19.65 billion (including \$3.29 billion for the MMAF) of which about half was to be mobilized from the private sector and development partners.¹³ Of the expenditures of the MMAF, about \$0.41 billion was allocated specifically for management of marine and coastal areas, and another \$0.33 billion for surveillance of marine resources. Budget allocations for the next medium-term plan are not expected to be much higher.

3. ADB Sector Experience and Assistance Program

12. The Asian Development Bank (ADB) has been a long-standing partner of the government in its agriculture and natural resources (ANR) sector development. ADB assistance in the ANR sector is aimed at improving sustainable management of natural resources, addressing food insecurity, reducing pollution and land degradation, and building capacity to mitigate and adapt to climate change (footnote 8). ADB has provided loans and grants of \$4.05 billion and technical assistance resources of \$82 million to the ANR sector in Indonesia since 1969, including \$546 million for coastal resources and fisheries. There has, however, been a decline in ADB support to the sector, which in part is due to the growth and needs of other sectors.

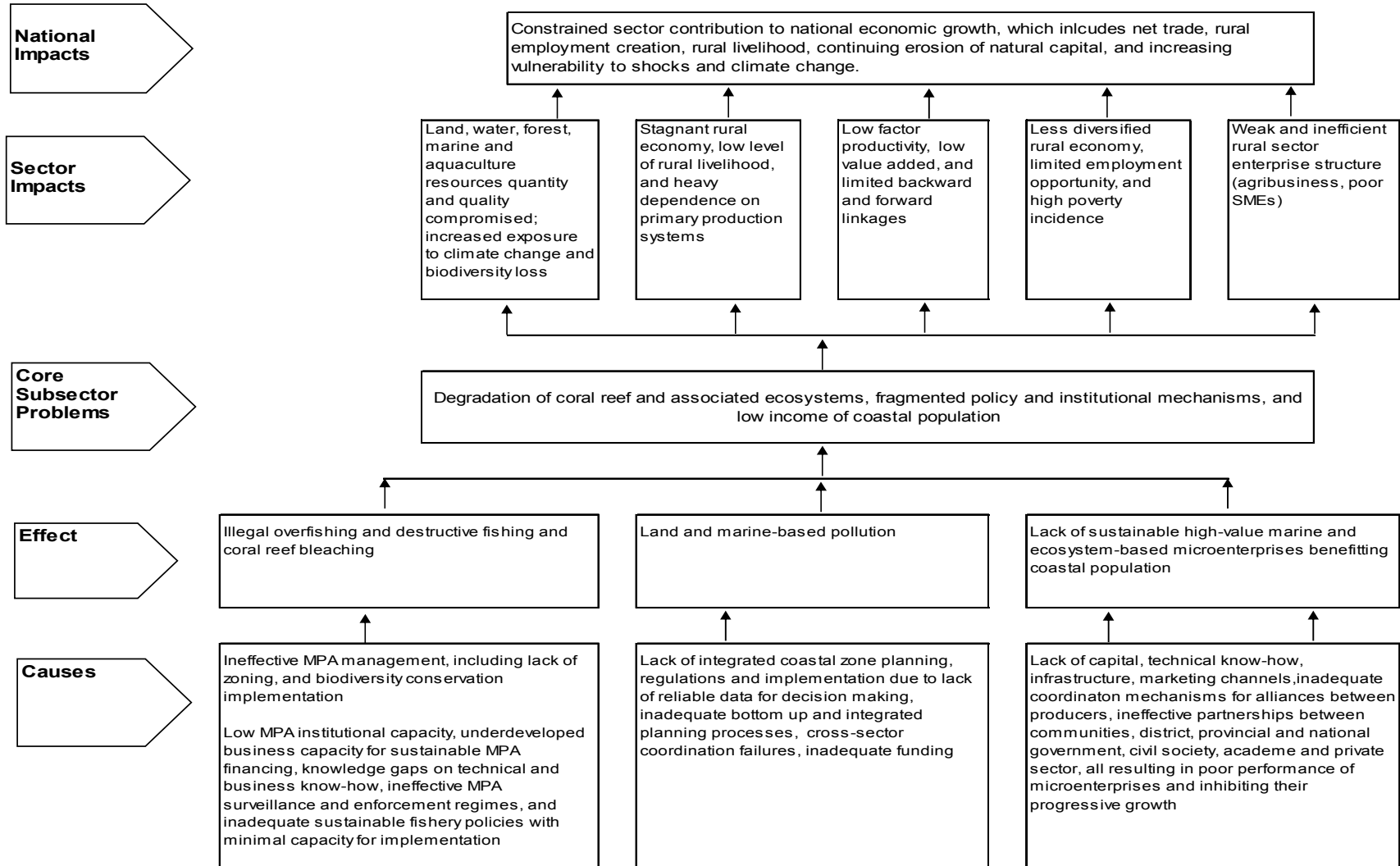
13. ADB's performance in the ANR sector in Indonesia has been mixed. The 2005 Country Assistance Program Evaluation for Indonesia noted that projects suffered from weak and complex project design, inadequate capacity of local governments, and a lack of focus.¹⁴ To address these challenges, the evaluation recommended (i) targeting areas and selectivity based on strong support from the government, (ii) pursuing activities commensurate with ADB resources, and (iii) supporting activities where ADB has a solid track record or where implementation constraints can be addressed. Future support will be highly selective and prioritized to focus on those areas in which (i) the government has expressed its preference for ADB support, (ii) ADB can make a positive contribution to policy and institutional reform, and (iii) projects can play a catalytic role. ADB support will include a focus on improved management of coral reef ecosystems of high national and global significance, including climate change resilience and enhanced livelihoods for poor coastal communities, and strengthened sectoral capacity for engagement with subregional and global environmental initiatives.

14. ADB, together with the World Bank, has supported the government's efforts through two phases of the COREMAP. COREMAP I established a viable framework for a national coral reef management system in Indonesia. This was primarily achieved through ecological and socioeconomic information collected through the project. COREMAP II built upon the framework established under COREMAP I, adopting a holistic, community-based approach for coral reef management. This second phase focused on supporting decentralized coral reef management through community participation and built strong public awareness. It also initiated institutional development for model MPA systems and tested the feasibility of sustainable livelihood activities for reducing fishing pressures in targeted coastal communities. The third and final phase, COREMAP—CTI, will support the government's sector development plan and targets for establishing effective MPAs.

¹³ Development Coordination (accessible from the list of linked documents in Appendix 2 of the RRP) provides details of external assistance to the marine and fisheries sector.

¹⁴ ADB. 2005. *Country Assistance Program Evaluation: Indonesia*. Manila.

Problem Tree for Agriculture, Natural Resources and Environment Sector (Marine and Fishery Subsector)



MPA = marine protected area, SME = small and medium enterprise.

Sector Results Framework (Agriculture, Natural Resources and Environment, 2012–2014)

Country Sector Outcomes		Country Sector Outputs		ADB Sector Operations	
Outcomes with ADB Contribution	Indicators with Targets and Baselines	Outputs with ADB Contribution	Indicators with Incremental Targets	Planned and Ongoing ADB Interventions	Main Outputs Expected from ADB Interventions
Climate resilience and sustainability to enhance freshwater, marine, and forest resources management for improved food security	<p>Increased water availability to 42 billion m³ by 2014 (baseline: 30 billion m³ in 2010)</p> <p>Protection of 48,700 ha from flood risks</p> <p>Increased rice production to 78.3 million metric tons by 2014 through irrigation development, rehabilitation, and improved management (baseline: 66.3 million metric tons in 2010)</p> <p>Reduction of greenhouse gas emissions with a target of 26% reduction by 2020 from business as usual scenario of 2.95 gigaton CO₂ equivalent in 2020</p> <p>Effectively manage 4.5 million ha of marine management areas by 2014 (baseline: 0.2 million ha effectively managed in 2010)</p>	<p>Improved watershed conditions through increased provision of bulk water supply in selected river basins, reduced flood risks in selected river basins, increased irrigation service area through participatory irrigation management, and improved institutional framework for protection of forest and marine resources through forest management units and marine management areas</p>	<p>Increased availability of raw water supply with capacity of 43.4 m³/s in major water source areas (baseline: 6.31 m³/s in 2010)</p> <p>Improved management (2,000 km), new development (216 km), and rehabilitation (386 km) of flood control infrastructure, and 0.5 million ha of critical watershed rehabilitated</p> <p>Irrigation service area increased by 129,380 ha by 2014 (baseline: 115,000 ha 2010) and 1.34 million ha rehabilitated by 2014</p> <p>FMUs increased to 199 in 2014 (baseline: 11 in 2010)</p> <p>Additional 4.50 million ha of coral reefs conserved through MPAs (baseline: 13.5 million ha in 2010)</p>	<p>Planned key activity areas Irrigation, drainage and flood protection (50% of total funds); forestry (6% of total funds); water based natural resource management (44% of total funds)</p> <p>Pipeline projects Citarum PFR II (\$130 million)</p> <p>Flood Management in Selected Basins (\$110 million)</p> <p>Rehabilitation of Irrigation Facilities (\$100 million)</p> <p>Heart of Borneo: Sustainable Forest and Biodiversity Management in Borneo (\$4.5 million)</p> <p>Forest Investment Program: Community Focused Investments to Reduce Deforestation and Degradation (\$17.5 million)</p> <p>COREMAP—CTI (\$45.52 million)</p> <p>Ongoing projects Citarum Tranche I (\$ 50 million) and GEF Biodiversity Component (\$3.75 million)</p> <p>Participatory Irrigation Sector Project (\$88 million)</p> <p>Sustainable Aquaculture for Food Security and Poverty Reduction Project (\$35 million)</p>	<p>Pipeline projects Increase bulk water supply to Bandung area from 3.4 m³/s to 7.6 m³/s and rehabilitation of critical watershed for 15,000 ha</p> <p>At least 3 major river basins with reduced flood risks, including 300 km of flood control infrastructure and rehabilitation of critical watershed for 20,000 ha</p> <p>Development and rehabilitation of irrigation systems through participatory irrigation management totaling 250,000 ha</p> <p>At least 3 FMUs supported through REDD+ pilots</p> <p>0.7 million coral reefs conserved through MPAs</p> <p>At least 30% of project beneficiaries are women</p> <p>Ongoing Projects: Improved water conveyance for West Tarum Canal from 16 m³/s to 31 m³/s</p> <p>100 ha of deforested land rehabilitated and 40,000 ha in better forest management</p> <p>600,000 ha of irrigation systems rehabilitated</p> <p>4,100 ha of fishponds rehabilitated</p>

ADB = Asian Development Bank, CO₂ = carbon dioxide, CTI = Coral Triangle Initiative, COREMAP = Coral Reef Rehabilitation and Management Program, FMU = forest management unit, GEF = Global Environment Facility, ha = hectare, km = kilometer, m³ = cubic meter, m³/s = cubic meter per second, MPA = marine protected area, PFR = periodic financing request, REDD = reducing emissions from deforestation and degradation.

Source: ADB. 2012. *Country Partnership Strategy: Indonesia, 2012–2014*. Manila.