

Executive summary

The Indonesian Seas GIWA region 57 contains most of the land and seas of the Republic of Indonesia; some 18 000 islands with 1.9 million km² of land area and 6 million km² of seas. The region is geologically and topographically diverse, lying at the global centre of tropical marine biodiversity. Because of the highly significant geographic, oceanographic, demographic and biodiversity differences within the region, the Assessment was conducted independently for three sub-systems:

- Sunda (western part of the region);
- Wallacea (central part);
- Sahul (eastern part).

The priority international waters issues and concerns vary markedly among the three sub-systems. Sunda's international waters resources are under most severe environmental and socio-economic pressure. Major concerns for the present include Pollution, Habitat and community modification and Unsustainable exploitation of fish. All of these concerns are already having severe environmental and socio-economic impacts and are expected to deteriorate further over the next 20 years, primarily because of population growth and lack of adherence to and enforcement of regulations. Freshwater shortage is, at present, exerting moderate to severe impacts on the sub-system and is also expected to cause severe environmental and socio-economic impacts in the future. For Wallacea and Sahul, the major concerns are Unsustainable exploitation of fish and Habitat and community modification, with the present moderate to severe environmental and socio-economic impacts expected to stabilise (habitats) and worsen (fish) in the future. There are expected to be complex linkages between global change effects on freshwater shortage and habitat loss, and also between continuing habitat loss and fisheries and increasing pollution and fisheries in all three sub-systems.

The present population of the region is approximately 210 million, with approximately 140 million living within 60 km of the coasts. Most

people live in Sunda, with 100 million on Jawa alone. Future scenarios suggest an overall human population increase of approximately 1.7% per year to approximately 300 million in 2020. There is expected to be increasing urbanisation and reliance on extractive industries; mining, plantation agriculture, aquaculture, mariculture and industrial fishing. There is already widespread overexploitation and use of inappropriate technologies, raising serious concerns as to even the medium-term (decadal) sustainability of the production systems. There are also likely to be limits to development of other sectors from freshwater shortage, particularly through linkages with habitat loss and global change.

Total pressures are likely to increase moderately to severely over the next 20 years, being driven by the continued population growth, which is expected to cause significant deterioration in environmental and socio-economic aspects of all major concerns. Importantly, rate of deterioration will be contingent upon the success of improved regulation and ongoing and future planned interventions by government and non-government organisations (NGOs).

The causal chain analysis was focused on destructive fishing practices; particularly poison fishing to supply the burgeoning international live fish food trade and ornamental aquarium trade. Destructive fishing, and poison fishing in particular, is an increasing problem of great future concern that already impacts all three sub-systems, both in terms of fish and habitat loss. It has major transboundary implications, both in terms of target species population dynamics and replenishment, and in terms of the driving forces of international market demand. The most significant root causes are the interactions among market trends (notably the insatiable international demand for seafood) and poverty among coastal people, driven by rapid population growth. Population growth is exacerbating the lack of employment and poverty, which are placing greater pressure on fisheries. Lack of enforcement of laws governing destructive fishing, abetted through corruption within

enforcement agencies and government, allows the illegal practices to flourish. Indonesia is party to most of the key international treaties and conventions, and the relevant government departments have proposed policies or legislation in relation to these obligations. However, only modest progress has been made to date in their effective implementation and the resolution of related problems.

Most laws and regulations are not well accepted and the effectiveness of implementation of national laws at provincial and local levels varies markedly. There is insufficient capacity for effective alleviation, in part related to currency depreciation, shifts in government spending and recent political instability. Despite a recent trend towards decentralisation in governance, there remains insufficient capacity for effective stewardship and control of the renewable resources. Key government departments, including the enforcement agencies, are hampered by a lack of qualified and experienced staff, and also by funding shortfalls and cutbacks.

Economics and market trends drive the unsustainable use of resources and also influence corruption and the illegal practices. Addressing the combined synergistic negative impacts of population growth, political instability and widespread poverty among coastal populations is at the core of developing successful policy options and implementing successful interventions, along with concurrent efforts to address international demands.

At present, policy options and legislation are neither sufficiently well developed nor integrated to facilitate implementation of the most urgent remedial measures. Recommended policy options for Indonesian Seas, from the broad-scale to the fine-scale, include:

- Improved integration of local, provincial and national laws and regulations in order to maximise effectiveness of the legislative instruments to control destructive fishing at local and national levels, and to better encompass all sectors and meet obligations under international conventions and treaties.
- Improved surveillance, enforcement and effective policing of laws to reduce illegal fishing practices, including development and effective implementation of export quotas, catch and fish size limits.
- Continued and expanded community education programmes;
- Improved incomes for fishermen through generation of ecologically viable alternative or additional incomes (e.g. well planned and ecologically-sustainable mariculture).
- Development of alternative legal supply lines for live fish, particularly through mariculture, with increased supply of such maricultured species to supplement dwindling catches of wild stocks.

- Expanded research and development to 'close' the reproductive cycles of the key mariculture species in captivity, with opportunities for increased regional collaboration.
- Major expansion and improved integration of the marine protected area (MPA) network, with improved management, including major focus on community co-management, particularly in relation to fisheries, with increased development of 'no-take' zones, and protection of spawning aggregation sites.

National surveillance strategies, with participation from all levels of government, NGOs and local communities may be the best way of bridging the gaps between formulation, legislation and enforcement of regulations. There are many national, regional and international "players" actively pursuing sustainable development initiatives, and best use of this developing network should be made during future policy implementation. Government – donor projects such as the Coral Reef Rehabilitation and Management Project (COREMAP) and Marine and Coastal Resources Management Project (MCREP), among others, and NGO programmes such as the Wallacea Bioregion (World Wildlife Fund), Komodo National Park Management Plan and others provide useful models for future improvements in fish and habitat protection.

In this regard, there has been recent convergence in views among scientists and resource managers on the crucial importance of MPAs and MPA network strategies as tools for sustainable fisheries management and resource protection. An integrated network of well-designed and well-managed MPAs should form the core of fisheries management and marine conservation strategies. The development of a functional, integrated network of MPAs is an extremely urgent priority and there is an immediate need for the establishment of substantial no-take zones, with the development of policy and legal frameworks that facilitate the process.

Two major foci for action are apparent:

- The urgent need for effective management of the existing MPA network.
- Careful planning and continued support for expansion of the network in terms of integration, particularly of cluster and transboundary protected areas with neighbouring nations in relation to the increasing effects of global change.

Successful implementation will primarily require a high degree of local intervention and community-based support, including application and local enforcement of 'no-take' replenishment areas in MPAs and protection of fish spawning aggregation sites, and also reliable stock assessment and monitoring. These need to be founded in an improved

understanding of the population biology of the target species and issues of ecological scale and connectivity in relation to replenishment, including:

- Catch volumes and Catch Per Unit Effort (CPUE).
- Traditional knowledge (e.g. locations of spawning aggregation sites of major commercial species), for development of protection measures.
- Natural changes in diversity, distribution and abundance of major commercial species, in relation to seasonality effects, predator-prey relationships, recruitment fluctuations.

Concurrently, policies addressing the international demand aspects of the fishery, both for food and aquarium fishes, need to be implemented. A useful model is provided by the Marine Aquarium Council (MAC). The Indonesian Ministry of Marine Affairs and Fisheries signed a Memorandum of Understanding (MoU) with the MAC in July 2003, formalising the strong government support for the MAC's work in developing fishery sustainability in Indonesia. With effective management, the aquarium industry can support long-term conservation and sustainable use of coral reefs in regions where other options for generating revenue are limited (UNEP-World Conservation Monitoring Centre Director Mark Collins). Thus, the recent MoU between the Government of Indonesia and the MAC regarding the collection and export of ornamental aquarium fish can provide a useful model for the live food fish industry.

The Indonesian Seas region lies at the centre of the world's marine biodiversity, support rapidly growing, generally poor, coastal populations and have rapidly deteriorating riverine, coastal and marine ecosystems, with continued degradation and possible collapse of many international waters resources. The policy options recommended herein affect much of society, and place major responsibilities on government, NGOs, educational institutions and the private sector. The challenge of gathering the cooperation necessary for the sustainable development of this critical region is great, but not insurmountable. More appropriate allocation of local funds with continuing international assistance will be required in the short-term. In particular, development and population policies require urgent review if growth over the next several decades is to be managed effectively and the present rapid rate of increase of impacts is to be curbed. In recognition of the central importance of Indonesian Seas in terms of global biodiversity, and the severe threat posed by the complex interaction of factors identified herein, the Task team suggests that Indonesian Seas be afforded the highest priority by the Global International Waters Assessment.