ECOSYSTEMS IMPROVED FOR SUSTAINABLE FISHERIES (ECOFISH) PROJECT

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FRAMEWORK FOR THE STATE OF THE MARINE RESOURCE REPORT

ECOFISH Document No.: 11-2013
Version: Final

Implemented with:
Department of Agriculture-Bureau of Fisheries and Aquatic Resources
National Government Agencies
Local Government Units
Assisting Organizations

Supported by:
United States Agency for International Development
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Framework for the State of the Marine Resources Report (SMRR)

1 Introduction: State of Marine Resources Reporting

1.1 Rationale and Objectives

As a signatory to the UN Millennium Declaration, the Philippines is committed to pursue the attainment of the Millennium Development Goals (MDG), one of which is to ensure environmental sustainability (MDG #7). In the context of aquatic environmental systems, the marine fisheries stocks are vitally important resources that provide sustenance and livelihoods to many of the country's population inhabiting its 7,107 islands. Additionally, the Philippines also ranks amongst the top exporters of fisheries products in the world. The continuingly growing demand for fish and fishery products over the years has challenged the sustainability of the Philippines' marine fisheries resources. Studies have shown that a significant portion of the country's demersal fish stocks have already reached their maximum yields in as early as the late 1960s (Silvestre and Pauly, 1989; World Bank, 2005). Fishery statistics have likewise demonstrated decreasing trends in capture fisheries production relative to increasing trends in fishing effort (Armada, 2004a; Armada, 2004b; Campos, 2004).

Currently, the National Stock Assessment Program (NSAP) of the DA-BFAR is the singular comprehensive national program that monitors and assesses the country's fisheries stocks on a per region basis. The bays and other fishing grounds that NSAP is not able to monitor are customarily covered by project-based, and therefore short-term, fishery assessment studies. Unfortunately, there is no systematic process to consolidate all relevant information generated by NSAP and the independent fishery assessments to provide a concise and authoritative reporting of the status of the various Philippine fishery stocks. This is in contrast to the information generated from the assessments of coastal and marine habitats that are systematically and regularly consolidated by the Coral Reef Information Network of the Philippines (PhilReefs), MPA Support Network (MSN), and the Department of Environment and Natural Resources (DENR) (see Coral Reef Information Network of the Philippines (Philreefs), 2003, 2008, 2012). Such gap in the consolidation of available information on fisheries is a major factor to the lack of a common sustainability indicator that will allow for the estimation of *the proportion of fish stocks within safe biological limits* (MDG indicator #7.4). With this proposed State of Marine Resources Report framework, we hope to initiate a transparent process to consolidate all relevant fisheries information that will lead to (1) determining the appropriate indicator/s to describe the status of the country's marine fisheries stocks, and (2) establishing a consistent and standard documentation and reporting system to be undertaken by the designated agency/institution [*note*: likely NSAP-BFAR-NFRDI at the national level and regional NSAPs at the local level (on-going)] with the consensus of various partners involved. The desired outcome of this status

reporting is the provision of clear and technically reliable information that will promote timely and responsive management of the Philippine marine fisheries resources.

1.2 Audience/Intended Users of the Information

The State of Marine Resources Report is intended to present the status of the country's marine fisheries resources at a national- and system-level (regional, fishing ground, bay) to a wide range of stakeholders, including:

- Fishers and associated stakeholder groups (e.g. various sectors from the commercial fishing industry and municipal fisherfolk organizations)
- Government agencies and offices with the mandate to manage the country's fisheries resources (e.g. DA-BFAR at the national level, LGUs at the local level)
- Non-government organizations and other such groups/entities with interest in fisheries and marine resources, such as for biodiversity conservation and protection purposes
- Academe and other research institutions

2 The DPSIR Framework

The DPSIR framework is proposed for the reporting of the state of marine [fisheries] resources. DPSIR is a conceptual framework that was initially developed and used in the 1990s by the Organization for Economic Co-operation and Development (OECD, 1994) to aid in the decision-making process with regards to the environment. The framework is an extension of the Pressure-State-Response (PSR) model that was developed by Anthony Friend in the 1970s. Since then, it has been adopted by several countries and organizations such as the United Nations (United Nations Division for Sustainable Development, 1997) and European Environment Agency (EEA, 1999) in the monitoring, assessment, and reporting of the status of different types of environmental systems, and in the evaluation of environmental policies and management strategies such as in land use (Porta and Poch, 2011), forest management (Fürst et al., 2007; Vacik et al., 2007), river restoration (Song and Frostell, 2012), air quality improvement (Weishan et al., 2011), coastal zone management (Pirrone et al., 2005), and reef fisheries management (Mangi et al., 2007) among several others.

Box 1. What does DPSIR stand for?

- **Drivers** or driving forces – Driving forces represent society's needs that have to be fulfilled; it can be very basic such as the provision of shelter, food, and water for a growing population; or it can represent the need of a particular sector or industry to maximize profits
- **Pressures** – refers to the pressures that human activities exert on the environment that result from consumption and production purposes; relevant examples include overharvesting of resources and coastal and marine habitat degradation/loss
- **State** – refers to state of the environment resulting from the pressures exerted by society; in the State of Marine Resources Report, the focus will be on the biological component of the marine environment, particularly the fishery stocks
- **Impact** – refers to the overall quality of the ecosystems and the welfare of society with respect to the state of the environment or its components; in the context of marine fisheries, a specific impact could be an increase or decline in fishery production and the corresponding economic gains or losses
- **Response** – refers to the response of society as a result of the changing states of the environment; this may be in the form of a management strategy, legislation, designing of incentive schemes, further monitoring, etc.

DPSIR is an acronym for Driver-Pressure-State-Impact-Response (see Box 1). Evidently, the framework assumes a cause-effect relationship between the interacting components of the environment and society – a framework that is aligned with the basic assumptions and principles of the ecosystems approach to fisheries management (EAFM) (FAO Fisheries Department, 2003; Garcia and Cochrane, 2005). Applied to the reporting of the state of marine resources, the process of organizing and structuring of available information allows for comparison of the various data and information types that describe the fishery stocks, with an environmental/biological-social-economic lens. This is intended to prompt more holistic management response strategies relative to the reported resource status. Furthermore, this approach to status reporting is complementary to the nation's State of the Coasts and to the regional State of the Coral Triangle reports that are already well-established.

3 Selection of Indicators

Standard indicators must be used in describing the state of the marine fisheries resources. To facilitate the process of selecting the suitable indicators, a round of workshops with partners and authorities in the field of fisheries biology and assessment will be conducted for them to propose and review indicators that may be included in the SMRR (see Section 4, this document). Attributes of suitable indicators include the following: evidence-based and measurable, representative of the biological resource stocks, commonly used/measured by past and present stock assessment studies, concise, and easy to interpret so as to be able to cater to a wide audience. Also, a strategic selection of the indicators is to be adopted in order to have an objective basis in ascribing a categorical status to the various stocks relative to the "*safe biological limits*" MDG indicator. A preliminary list of some proposed indicators are given in Table 1. Potential sources of information include:

- NSAP – viewed as the lead source of information for fisheries stock assessment data
- Academe and other research institutions
- Project reports (e.g. FSP, FRMP, DOST-supported projects, FISH Project, ECOFISH Project)
- Fishing industry

Table 1. Matrix of proposed indicators, descriptions and utility

Candidate Indicators	Description	Stock Level	Used/Measured by
E-value	- Refers to the exploitation rate of the stock measured as the ratio of mortality caused by fishing and the total mortality (E-F/Z)	Species level	NSAP Independent researches in various Philippine fishing grounds (e.g. Sapian Bay, Visayan Sea, Lingayen Gulf,

Candidate Indicators	Description	Stock Level	Used/Measured by
			San Pedro Bay, etc.)
MSY	- Maximum sustainable yield (from Surplus Production models) - Aggregate approach treats the whole species assemblages exploited by the fishery as if they were a single species, and aggregates the effort of all fishing gears as if they were one fleet	Species level or Aggregate	Select NSAP regions Independent researches in various Philippine fishing grounds
MEY	- Maximum Economic Yield - Incorporating fishing costs into the assessment (Surplus Production model) to provide overall estimates of fishery profits	Species level or Aggregate	Philippine demersal stocks (Silvestre and Pauly, 1989) Philippine pelagic stocks (Dalzell et al., 1987)
Standing stock or biomass (per defined area)	- Measure of stock abundance in a given area, i.e. fishing ground, reef system	Species level or Aggregate	Independent surveys of demersal stocks in various Phippine fishing grounds (e.g. Manila Bay, San Pedro Bay, etc.) Reef fish assessments
Size-frequency distribution in the catch vis-à-vis L_m	- Ideally, mean sizes of fishes caught should be greater than their estimated size at maturity - $L_{\bar{x}} < L_{mat}$ is a manifestation of growth overfishing	Species level	NSAP Independent researches in various Philippine fishing grounds
Species composition of the catch and corresponding mean trophic level (T.L.) of the catch	- Changes in species composition in the catch may reflect systemic changes in the exploited community - Diet studies that are the basis for estimating TLs	Aggregate	NSAP Other fisheries-dependent surveys/ assessments (e.g. FISH, ECOFISH) BINU

Candidate Indicators	Description	Stock Level	Used/Measured by
	are scanty - FishBase may be sourced for its comprehensive database on estimates of TL per species		
CPUE	- Catch per unit effort - An index that provides an indirect measure of the density of the exploited stock - Best interpreted with time-series data	Gear-based: Individual gears or for the entire fishery	NSAP Other fisheries-dependent surveys/ assessments
No. of fishers in the area (e.g. fishers/km coastline)	- Social component - Indirect indicator of degree of resource exploitation	Aggregate	Mapping of heavily-exploited areas in the Philippines (Tandog-Edralin et al., 1987)

4 Process to Finalizing the State of Marine Resources Report

As specified in the Life of Project Work Plan, ECOFISH wil conduct Five Review Sessions with partners in Year 2 of project implementation and these will cover the following:

Session 1: Presentation of Proposed Framework	- Workshop format
	- Participants evaluate the framework and provide inputs
	  - Agree on specific questions that the report is supposed to answer
	  - Propose and draft preliminary outline of report
	  - Agree on standard and consistent graphical presentation of the status indicators –i.e. which information to present as graphs? Which to show in a map? Which to present as tables?
	  - Agree on the frequency of updating and publication of subsequent SMR Reports
	- Tasking

Session 2: Review of available information relative to the proposed status indicators	- Workshop format - Partners collate and present information available for various fishery stocks, by fishing ground/area/region

	- Assessment of indicators: commonly measured and used in various assessments? clear and easily understood by peers? suitably representative of stock status? information required to estimate/calculate the specific indicator relatively easy to collect? etc. - Partners agree of final status indicators to use
Session 3: Drafting of SMRR	- Writeshop format - Finalization of report format and key contents - Also, prioritization of stocks (which species and groups) to include in the report/sections (e.g. top 10 in overall catch composition; rare and/or sensitive species; species that were recorded to be once abundant but currently with low biomass, etc.)
Session 4: Review of progress and development of SMRR sections	- Series of meetings with partners
Session 5: Finalization of the draft SMRR	- Write-shop format - Finalization and refinement of individual sections of the report, and as a whole

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