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ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT IN INDONESIA: REVIEW ON INDICATORS AND REFERENCE VALUES

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Abstract

Although many definitions present the concept of the ecosystem approach to fisheries (EAF),there are lack of consensus on the definition and scope for the management. Design and implementation of this specific management are still ambiguous because the formulation criteria are not specified. Supporting by Coral Triangle Initiative (CTI), EAF in Indonesia has been implemented since 2010. Among 32 EAFM indicators used, standard CPUE, fish size, juvenile caught proportion, and species composition will be reviewed based on the reference values which are more useful in showing single-species approach management. Balance fishery as the alternative of single-species approach will be introduced.

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1. Introduction

There are many definitions which are useful in presenting concept of the ecosystem approach to fisheries (EAF) but there are also lack of consensus on the definition and scope of the ecosystem approach in fisheries management. Definition of ecosystem itself is a community of many living organisms (biodiversity) in conjunction with the non-living components of their environment to live, feed, reproduce and interact. Ecosystem approach under the 1995 FAO code describes conservation all species belonging to an ecosystem and together with monitoring and

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evaluation of the impact of human activities on ecosystem (Morishita [1]). In fisheries management, quality, diversity and availability of fishery resources should be maintained in sufficient quantities for present and future generations. By assembling all those meanings and goals of fisheries management, ecosystem approach to fisheries management should include the impact of fishing on the component of ecosystem and tries to courage other activities to protect the ecosystem. Depend on the fishing activities conducted, large scale orsmall scale fisheries, consensus on definition and scope of EAF for managing the fishery vary.

Design and implementation of ecosystem approach for fisheries management are still ambiguous due to the formulation criteria are not specified (Garcia et al. [2]).EAF requires that fisheries should be managed to limit their impact on the ecosystem to the extent possible (Zhou et al. [3]). There are several basic-principle to implementEcosystem approach to fisheries management included:i) impact of fisheries is limited to the marginal of ecosystem toleration; ii) protection of ecological interaction between resources and its environment; iii) compatibility of management tools for all kind of fish; vi) cautiousness in decision making processand v) assurance of balancing human needs and ecosystem (Budhiman et al. [4]).

The 2002 World summit on Sustainable Development Plan of Implementation requires the development and the implementation of an ecosystem approach together with the deletion of destructive fishing practises, establishment of marine protected area or other time/area closure, adoption of coastal-land use and water-shed planning, and the integration of economic sector into marine and coastal area management (Garcia and Cochrane. [5]). Recently, there are numbers of attempts is growing as fisheries scientists, managers and stakeholders deal with specific details of how to do EAFM (Murawski [6]) and we are in the middle of how to implement (Link et al. [7]).

Significant legislative and political emphasis has been placed in 6 Coral Triangle Initiative (CTI) member countries on ecosystem-approach fisheries management. Marine Protected Area Governance (MPAG) and consortium NGO have committed to support the implementation of EAFM roadmap in Indonesia which has been developed by Working Group 2 National Coordinating Committee - Coral Triangle Initiative (WG2 NCC-CTI).Indonesia has subdivided their fishing grounds into 11 fisheries management areas (FMAs), defined and tested their EAFM indicators and formed an expert panel to support EAFM implementation. A number of area-based and species-based fisheries management plans have been developed. We note that the main idea of EAFM implementation in Indonesia is to perfectly improve the current fisheries management by putting more concern not just on economy but also social live. However, regarding the ecosystem itself, the way of managing the fisheries is still using the current system, single-species assessment. Our goalsare to review some of indicators used in EAFM implementation in Indonesia and promote balance fishery that provide less or no impact on ecosystem.

2. Indicators And Its Implementation

Indicator is a variable, pointer, or index that measures the current condition of a selected component of the ecosystem and guide to achieve sustainability in fisheries management. As EAF is an integrated approach, the availability of a set of ecological indicators with its reference values play important role (Garcia and Cochrane [5]). There are 3 main aspect of the footprint of fisheries on ecosystems: gear impact on habitats, mortality because of bycatches of other marine organisms and indirect trophic impact because of the altered abundance of targeted and bycatch species (Rice [8]). It is therefore advisable to express both the aspect of fisheries and the elements in the ecosystem, and identify the relevant indicators and references points marking a target, limit or threshold (Garcia [9]). EAFM in Indonesia has 32 indicators represented 6 domains of habitat and ecology, fish resources, fishing technology, economy, social and institution. Thirteen indicators (40%) related to fisheries ecosystem aspect (Budhiman [4]). Fish resources domain with 4 indicators will be discussed.

2.1. Standard Catch Per-unit Effort Indicator

The Catch per Unit of Effort (CPUE) is already a standard tool among biologists to determine developments in fish stocks and among economists as an indicator for the efficiency of the fishing operation. The relative simplicity of the measure renders it a potential tool for continuous fisheries operation monitoring (van Hoof and Salz [10]).The goals of Indonesian fisheries management are determined by maximum sustainable yield (MSY) following the