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# Food security and the Coral Triangle Initiative

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ABSTRACT

The Asia-Pacific's Coral Triangle is defined by its extremely high marine biodiversity. Over one hundred million people living in its coastal zones use this biodiversity to support their livelihoods. Hundreds of millions more derive nutritious food directly from the region's marine resources and through local, regional and global trade. Biodiversity and its values to society are threatened by demographic and habitat change, rising demand, intensive harvesting and climate change. In partnership with international conservation organisations and development funders, the governments of the region's six countries have come together to develop the Coral Triangle Initiative (CTI) on Coral Reefs, Fisheries and Food Security. The CTI has explicit goals and defined targets for marine biodiversity conservation, but not for the food security of the region's marine-resource dependent people, despite this being the wider aim used to justify conservation action. This article suggests how the food security aim of the CTI could be made more explicit. It outlines the complex pathways linking marine biodiversity with food security and argues that improved social science analysis, inter-sectoral policy and management interactions are necessary if conserving marine biodiversity is to contribute towards meeting food security challenges in the region.



## 1. Introduction

Biodiversity loss and food insecurity are two of the greatest challenges of the 21st century [1,2]. Sustainably managed coastal and marine environments are critical to addressing both [3], but the links between biodiversity conservation and improved food security are contingent on various assumptions, many of which may not be met in practice. Marine conservationists have recently begun to reorientate their analyses towards an emphasis on food security, but are doing so without adequate attention to what food security is, or how fish contribute to it. Conservation and development objectives can involve trade-offs and conflicts [4–6], yet integrated conservation and development policy continues to suggest that potentially disparate objectives can be reconciled. With reference to a major marine conservation and development intervention – the 'Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security' (CTI) – this article identifies the need to critically evaluate proposed food security-biodiversity conservation linkages before engaging in conservation that promises to deliver both outcomes.

Following some background information on the CTI, the role of fisheries in food security in the Coral Triangle will be reviewed, emphasising key challenges and drivers of change: trade, urbanisation, population growth, geographical differences and how to deal with marginalised groups. Drawing on this analysis of food security in the Coral Triangle, a constructive critique of the two

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key fisheries-related platforms of the CTI is then offered: Marine Protected Area (MPA) networks and the Ecosystem Approach to Fisheries Management (EAFM). In reviewing the potential of key CTI goals to deliver joint objectives of biodiversity conservation and food security, the important shortcomings of the assumptions underlying CTI regional policy and implementation to-date are highlighted. While the article does not prescribe solutions to the political challenge of achieving multiple governance objectives, it concludes with some thoughts on how the CT6 and partners may better engage with these important social and development issues.

## 2. The Coral Triangle Initiative

The global epicentre of marine biodiversity is located within the Asia-Pacific's Coral Triangle region, which contains 76% and 37% of the world's coral and reef fish species, respectively [7]. The region has a combined population of over 370 million people with around 120 million who benefit from marine ecosystem goods and services for fishery production, shoreline protection, and tourism [8]. Population growth and increasing global demand for the region's resources have resulted in widespread and often severe problems including coastal deforestation, unsustainable shoreline development, pollution, over-exploitation and destructive fishing practices [9]. High levels of threat combined with high economic dependence on coral reefs and associated ecosystems mean that significant numbers of people in the Coral Triangle region are ecologically, socially, and economically vulnerable to marine environmental degradation [10].

In an attempt to address the degradation of marine and coastal environments in the region, President Yudhoyono of Indonesia proposed the establishment of the CTI. The CTI is an intergovernmental agreement between six member states (CT6): Malaysia, Indonesia, Philippines, Papua New Guinea, Solomon Islands and Timor Leste, which covers an area of 5.7 million km$^2$, biogeographically delineated by high coral diversity (Fig. 1) [8]. External financial support of the CTI is provided by the Government of the USA in partnership with The Nature Conservancy, Conservation International, and The World Wide Fund for Nature (USD 42 million), the Global Environment Facility in collaboration with the Asian Development Bank (USD 90 million), and the Australian Government (AUD 2.5 million). High-level political commitment to the CTI occurred when the leaders of the six countries met in Manado, Indonesia in May 2009 and signed off on the Regional Plan of Action (RPOA). Following this, the CT6 drew up National Plans of Action to mirror regional objectives. Implementation of actions is expected to occur in the decade up to 2020.

The CTI provides a bold and transformative vision for regional coastal and marine governance articulated in five regional goals, namely: (i) Priority seascapes designated and effectively managed; (ii) EAFM and other marine resources fully applied; (iii) MPAs established and effectively managed; (iv) Climate change adaptation measures achieved, and; (v) Threatened species status improved [8]. The CTI regional vision suggests that biodiversity conservation, fisheries sustainability, and food security outcomes are expected to result from a long-term investment in these goals. The CTI plan of action has clear targets and indicators for the above goals, but no clear statement on its wider food security or poverty reduction aims, despite using these aims as its rationale for marine conservation action. There is thus, as yet, no clear articulation of how meeting the CTI goals will result in improved food security in the CTI countries and how this improvement will be measured and attributed to the programme's interventions. The CTI is part way through a ten-year programme of investment to 2020. This is a pertinent time for the CT6 and partners to re-think how the Initiative's overarching conservation and development objectives, in particular food security, can realistically be achieved.

## 3. Food security and fisheries across the Coral Triangle

Populations are said to be food secure when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle [11]. Food security has three components: availability of consistent and sufficient quantities of food; access to appropriate and sufficient foods; and consumption or appropriate use of basic nutrition and food preparation [12]. Fisheries are recognised as an important contributor to food security, particularly in coastal developing countries [13]. Marine products contribute to food security indirectly by the income, profits, taxes, licence fees and trade revenues they generate, enabling fishers and traders to purchase food, and supporting local and national economic growth, which in turn provide economic opportunity, that leads to wider food security [14]. Fish also contribute to food security directly as a source of important animal protein, essential fatty acids, and micro-nutrients (e.g., vitamin A, Iron) to consumers who may have limited alternative means of ensuring nutritional quality as a component of their food security [15]. Seafood is also a preferred and culturally important food choice in many places [16,17].

Throughout most of the Coral Triangle region, populations are heavily dependent on fisheries for direct consumption and for generating income to purchase other food supplies [18,19]. Revenues from licenses and trade in tuna, farmed prawns and coral reef fish also provide significant macro-economic contributions to the region. However, these multiple direct and indirect contributions to people's food security are threatened as demand rises, wild fisheries decline, and coastal and marine ecosystems

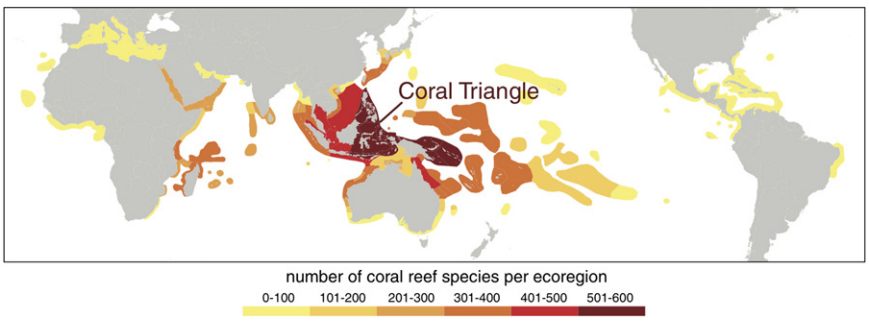


**Fig. 1.** Biodiversity of reef building corals, showing the location of the Coral Triangle. Colors indicate total species richness per ecoregion. (Adapted from [74]). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)