

Wild Marine Catch

Key findings

The oceans contain a large proportion of global biodiversity and play a significant role in the water cycle and climate regulation.

Fish accounts for 16% of the global population's animal protein intake, increasing to 20% in low-income food-deficit (LIFD) nations. The majority of LIFD nations are in the Tropics.

Marine fish catch peaked in 1996 and is exhibiting a slight downwards trend.

The marine catch is increasing in the Tropics, and decreasing in the Rest of the World. The Tropics now accounts for 42% of wild marine catch, up from 12% in 1950. The majority of the growth has occurred in South East Asia.

The majority of communities that rely on small-scale fisheries for food and income security are in the Tropics. These communities are particularly vulnerable if fisheries become overexploited or damaged, either by local practices or large scale fishing operations.

Lost economic benefits in marine fisheries from poor management, inefficiencies and overfishing are estimated at US\$50 billion per year.

Effective management of fisheries is vital, and for many fisheries this will require developing frameworks which address complex economic, social and environmental issues. This may become easier as the risks of inaction become increasingly evident to policy makers and the general public.

Over the next 20 to 30 years population growth is expected to be the major pressure on fisheries. In addition, unless climate change is adequately addressed, it will have significant impacts on the health and productivity of global fisheries.

A number of leading institutions from across the world have joined forces to assess and report on the critical questions facing one of the world's most important and fastest growing regions: the Tropics.

Over the past half-century the Tropics has emerged as an increasingly critical region. More than 40% of the world's population now lives in the Tropics and this is likely to be close to 50% by 2050. The region generates around 20% of global economic output and is home to some 80% of the world's biodiversity.

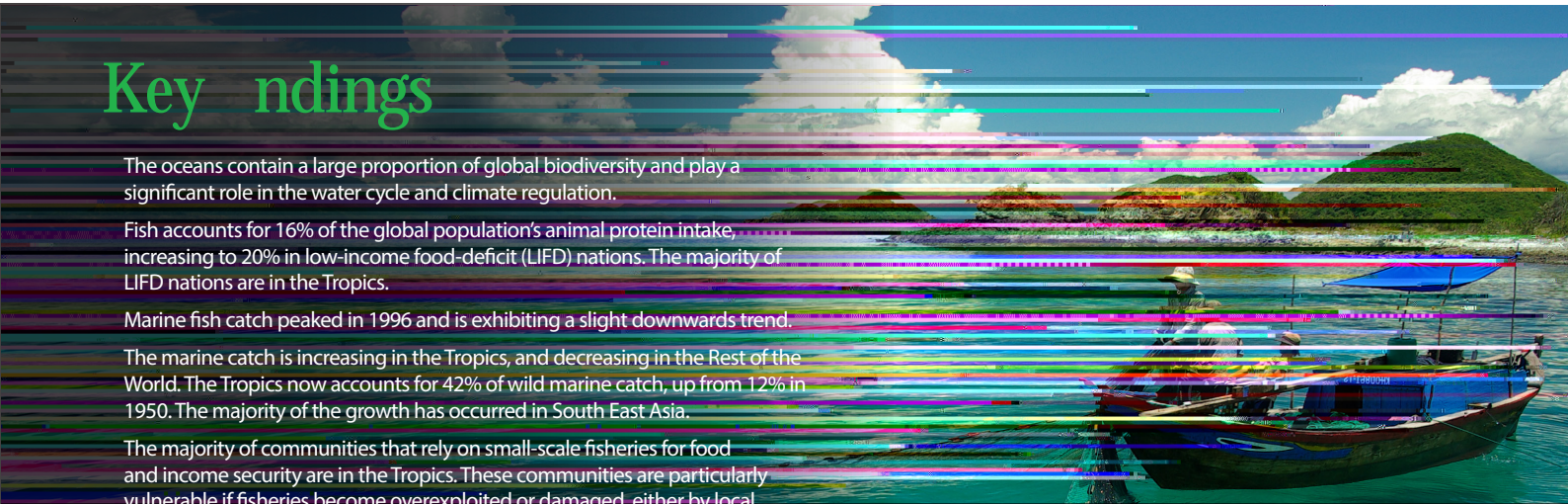
However, the resources to sustain larger populations and

economic growth are imposing ever-increasing pressures. Issues of concern include relatively poor health outcomes, with more than one billion people suffering from tropical diseases, unacceptable levels of infant mortality and reduced life expectancy; extreme poverty; poor educational outcomes; environmental degradation; and, in some cases, political and economic instability.

In early 2011 a group of leading institutions decided to examine the condition of life in the Tropics. The group met in Singapore in mid-2011 to scope a project, and decided

to share their expertise to prepare a report assessing a broad range of environmental, social and economic indicators.

This work will culminate with the release of the *State of the Tropics Report* in mid 2014, which will shine a light on key issues of the tropical world, and contribute to efforts to improve the lives of the peoples of the Tropics and



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More than 2,000 years ago Aristotle described the world as being divided into three zones – the Frigid Zone, The Temperate Zone and the Torrid Zone. He decided that the Torrid Zone was too hot for civilised habitation, and that humans could only live and work productively in the Temperate Zone. While Aristotle's Torrid Zone was not precisely defined geographically, it is clear his uninhabitable region was what we know as the tropics.

Other ways of viewing the world have subsequently waxed and waned: north/south was a focus of attention during early European expansion; east/west as this expansion accelerated and political and economic systems developed; as we became aware of economic, social and political

inequalities there was a focus on a first world/third world perspective; and, in the post-WWII environment, it has been on OECD/non-OECD or developing/developed countries dichotomies.

Each of these world perspectives generated temporally relevant insights, but also papered over Aristotle's fundamental insight – his lateral view of a world. We might expect Aristotle's three geographic and climatic zones to share common problems and challenges, and for there also to be issues unique to each zone.

The range and significance of issues facing nations and territories in the tropics suggests it is now time to examine the world using Aristotle's insight, viewing the tropics as a discrete region

and defining its characteristics and issues. With the exception of Europe and Antarctica all continents are partly in the tropics, and there are 144 nations and territories either fully or partly in the tropical region¹. More than 40% of the world's population is estimated to already live in the tropics – up from 30% in 1950.

While annual economic growth has been around a full percentage point higher than the Rest of the World over the past 30 years, the disparity between population (40% of the world's population) and economic output (20%

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Nonetheless, overfishing, defined as when production exceeds the capacity for replacement by reproduction and growth, is common. Fisheries typically progress through sequential stages of development, going from being undeveloped to developing, fully exploited to overfished to collapsed, and then to rebuilding¹³.

Marine capture fisheries is probably the single most important way in which wild species are directly used by humans¹⁷, providing food security and income for millions of people. However, many of the world's fisheries are severely overfished. The source of this over-exploitation can be from both small-scale, subsistence fishers and large-scale, commercial fishers.

Small-scale fisheries account for more than half of the global fish catch and employ more than 90% of the world's 35 million capture fishers⁷. Almost all of the catch from small-scale fisheries is used for human consumption, and many of the communities that rely on these fisheries are in the Tropics – in Asia, Africa, Latin America, the Caribbean and Oceania.

Despite the significant contribution of small-scale fisheries to food security, its catch and economic status are poorly understood. For example, research undertaken in a number of tropical nations suggests that poor data for small-scale fisheries contributes to the actual marine catch being 1.7 to 6.2 higher than official estimates^{18,19,20}. This general lack of data impacts the effectiveness of fisheries management and increases the likelihood of fishing access being over-licensed, to the detriment of marine ecosystems and national food security.

Unlike large-scale commercial fisheries, small-scale fisheries also have a low visibility and receive little attention from policy-makers. The communities supported by small-scale fisheries are typically

poor, have insecure access rights to fishery resources and are not adequately represented in decision making processes. In the short term these communities are likely to be the most affected by the implementation of sustainable fisheries management, but they have the most to gain in the long run if more equitable fisheries management can be achieved. The FAO is currently taking leadership to address these issues (see Box 2).

The development of large, capital intensive, commercial offshore fleets using modern technologies to target fish is affecting small-scale fisheries, often reducing the volume of stock accessible to coastal subsistence fishers using small and often non-motorised craft. Reflecting the small-scale and localised nature

of fishing in Africa and Asia, production in these regions is less than 2.5 tonnes per fisher per annum, compared with 24 tonnes per fisher in Europe's more industrialised fisheries⁷.

The spread of distant-water fishing contracts which allow foreign nations to fish another country's waters is also affecting fishing communities in many developing nations. Licence fees for these contracts are typically paid to central governments, and the fishing communities that bear the major costs of these contracts – through reduced fish stocks and habitat destruction – typically see limited benefits from the allocation of contract revenues.

Fishing effort is undertaken in a range of marine environments ranging from coastal habitats (such as mangroves and seagrass beds), coral reefs and deep water habitats. The wellbeing of each of these environments is being impacted by climate change, as well as a range of other risks such as pollution from land-based sources, destructive fishing practices and overfishing.

Many climate change impacts will not be felt immediately, but will accumulate over time if not addressed. For example, the International Panel on Climate Change's high carbon dioxide emission scenarios suggest that drastic changes in tropical oceans and coastal habitats will occur by the end of the century. Resulting habitat degradation and environmental change could

reduce fisheries productivity in the Tropics by up to 50%, especially in near shore, shallow water environments such as coral reefs²¹.

One reason for the declining marine catch is the 'tragedy of the commons' where, in the absence of clearly defined property rights, anyone with access to a shared resource has an interest in overexploiting it, and it is in no individual's interest alone to maintain it. This can lead to significant over capacity as fishers have incentives to invest in larger and more modern vessels to ensure larger individual shares. Without intervention, collapse of the resource is inevitable, with significant socioeconomic and ecological consequences.

The tragedy of the commons effect has been exacerbated by

government subsidies, particularly in Europe and East Asia, which can act to support otherwise marginal fisheries. Globally, capacity enhancing fishing subsidies – such as for fuel and boat construction or renovation – were estimated at US\$16.2 billion in 2003²², which is contributing to a fleet capacity that is significantly greater than is needed to fish sustainably²³.

An indicator of the direct impact of overfishing is the Marine Trophic Index (MTI) which, until the early 1980s, showed the global fisheries catch increasingly consisted of smaller fish, lower in the food web¹⁷. This process, known as 'fishing down marine food webs', is a major issue as it shows larger predators are being caught preferentially in such numbers that their stocks do not recover. The loss of top predators and the

