Fisheries scientists invented the concept of sustainability. That may be stretching things, but the concept of sustainability was a central part of fisheries management long before it entered the general vocabulary in the 1980s. Achieving maximum sustainable yield (MSY) was the general goal of fisheries management from at least the 1930’s. The development of production modelling of fish populations in the 1950’s provided quantitative methods for determining MSY, and the more complex population modelling techniques developed at this time were also applied to determine sustainable yields.

So, what is a sustainable fishery? It is a fishery in which multiple dimensions in each of the three pillars of sustainability are addressed: environmental (sustainable yield from the target stock, environmental fluctuations, ecosystem impacts; etc), economic (profitability, distribution of incomes, etc) and social (institutional structures, equity, maintenance of traditional communities, etc) are addressed. By the 1970’s, MSY was sufficiently well established in fisheries management to be cited as a guiding principle in the UN Law of the Sea (UNCLOS) (1982). UNCLOS Article 119a, which provides guidance on conservation of fish stocks in international waters, specifies that the overall goal should be “maximum sustainable yield as qualified by relevant environmental and economic factors”.

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Wise fisheries people have always recognised that trying to attain a simple equilibrium-based theoretical maximum yield will lead to problems - proper application of MSY requires consideration of multiple factors. The UNCLOS wording makes this clear – MSY must be qualified by environmental and economic factors. The famous (still readable and relevant) paper by Larkin (1977) pointing out the problems with simple application of MSY, and proposing use of optimal sustainable yield (OSY), taking account of environmental and socioeconomic factors, is a fine guide to a broad interpretation of sustainability in the fisheries context.

“Sustainability” entered the general vocabulary with “Our Common Future”, the report of the Brundtland Commission on Environment and Development (1987). This report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”, which, after decades of

debate over details, remains as good a general definition as is needed. Much has been made of definitions of “development”, “needs” and other issues, and the devil is indeed in the details in making such a general concept operational – but the definition remains sound, for fisheries as well as for other areas of human activity.

Since 1987 “sustainability” has become a popular theme in discussions of the management of human activities. It has become clear that three areas must be addressed to ensure sustainability (often called the three pillars of sustainability): environmental, economic and social. A fourth pillar, institutional, is sometimes added.

The dimensions to be addressed in deciding whether a fishery is environmentally sustainable have expanded in the past decade or two. Originally “sustainable yield” in simple equilibrium population models meant the theoretical maximum that could be taken from the population over time, and this remains at the heart of determining whether a fishery is sustainable. It was recognised from early days that changes in production dynamics due to environmental fluctuations would have to be taken into account to determine truly sustainable yield. It became clear that considering a fish population as a simple dynamic pool of identical individuals oversimplified the biology, and that managing changes in size composition and sex ratios was part of sustainability. The Reykjavik conference on responsible fishing in ecosystems (2001) catalyzed thinking on the need to manage ecosystem impacts of fishing – impacts on habitats, on genetic structure of exploited populations, on bycatch species.

The economic and social dimensions of sustainable fisheries have also been the subject of much thought in recent decades, with work on such issues as catch share systems, participation of harvesters in management systems, and development of strong institutional structures among many other topics.

So, what is a sustainable fishery? It is a fishery guided by the general definition from the Brundtland report (above), and in which multiple dimensions in each of the three pillars of sustainability are addressed: environmental (sustainable yield from the target stock, environmental fluctuations, ecosystem impacts; etc), economic (profitability, distribution of incomes, etc) and social (institutional structures, equity, maintenance of traditional communities, etc) are addressed.

The Marine Stewardship Council certification system puts many of these dimensions (mainly environmental and institutional) into checklist form, and other sustainability checklists exist.

Given the multidimensional nature of sustainability as recognized today, checklists or similar formats may be the best approach to ensuring that fisheries are truly sustainable.

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