Introduction to fisheries science pdf

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1.1 History of fisheries science Now makes the history of the exploitation of human resources a depressing reading. Almost the first data on fisheries are those relating to the reduction in the yield of one or the other fishery. The record continues today. However, it was not until the second half of the 19th century that catches of plaice in the North Sea were in bad shape. The increase in fishing effort did not lead to increased catches, reduced fishing effort per unit and the average weight of mite in the catch decreased. It showed all the signs of what in today's terms is called overfishing. However, the fisheries had collapsed in the past without initiating studies. But the same factors that led to overfishing, industrialization and advanced technology, were also providing money to pay scientists to investigate the causes of the collapse. As a result, numerous public inquiries were carried out, mainly in Great Britain, to gather information to answer the question of why the stock of mite in the North Sea has fallen and to determine what could be done to remedy the situation. It was the birth of fisheries science. 1.2 History of fisheries When statistics on fisheries in the fisheries sector were examined, it soon became clear that they showed a common picture for everyone. (Figure 1.1). As the total fishing effort increased over time, the total catch initially reached maximum and then flattened or sometimes even much lower than was achieved by low fishing effort. At the same time, both the fishing effort per unit and the average weight of individual fish in fishing were steadily reduced. Although it is clear that the main reason for this is quite simple - too many fish were caught - a detailed analysis is needed in each particular fishery to determine how many fish (and what size) should be fished each year to assess the future of fishing. This analysis depends on whether the correct information is of its own, most of which can be obtained by fishing itself. 1.3 Why investigate fishing? In the face of this, the history of human exploitation has been one of the most important successes since the 1950s. The increase in the yield has been achieved mainly through the use of one virgin stock after one another, leaving many depleted stocks unable to yield their best yields. It cannot continue indefinitely, ways of controlling fishing must be found. The usual sequence of events in uncontrolled fishing is that the increase in the number of fishing units usually stops because the fishing effort per unit falls to such a low level that it is no longer economic. This number is often reduced because the least are eliminated from fishing and the more mobile vessels, such as fish trawlers and freezers, move on to other stocks. It is unusual for fishing to collapse completely (rate A in Figure 1.1), unless fishing has had some serious biological effects on fish, such as reducing the herd to such a low level that recruitment almost ceases; one such example is the English East Anglian herring fishery. Assuming this does not happen, fishing shall stabilise at the level shown by B on each curve shown in Figure 1.1. This is far from an ideal situation; the total catch is much lower than the maximum possible catch and the fishing effort required for this is high and therefore uneconomic. If the fishing effort per unit increases sufficiently, it may attract back some mobile vessels and catches, then it oscillation. The obvious objective is to reverse the sequence of events and stabilise fishing at some point in C but outside the optimum, or in point D, where the maximum total catch is taken, or in point E, where less than the maximum total catch is taken but is taken most economically. Before decisions can be made on how these objectives can be realised, the factors underlying the shape of these curves must be identified. 1.4 It is important to consider the role of fisheries scientist before discussing this point. Most fisheries are international and many are regulated by international committees that either regulate all fish stocks or certain species in a given region. The first are, for example, the North-East Atlantic Fisheries Commission (NEAFC) and the International Northwest Atlantic Fisheries Commission (ICNAF), which regulates fishing largely in the North Atlantic between them, and an example of this is the Pacific Halibut Commission, which regulates its halile fisheries. Any country fishing for fish stocks in the Commission's region or fish stocks in a single species committee should be representative of its legitiil, if it is efficient and normally is. Fisheries scientists provide their data to committees, but scientists do not make final decisions on the basis of regulations. They are made by administrators and politicians, both of whom take into account national and international interests. It is clear from the regulations of the Fisheries Commission that short-term national interests outweigh longer conditions or international interests. This trend increases when scientific advice is uncertain or unclear. The history of the International Whaling Commission is a classic example. Thus, the fisheries scientist is not only obliged to collect data so that he can provide advice, but also an obligation to collect his data in the best possible way in order to can be given with confidence and confidence. As fishing fluctuates year after year, it must also monitor it, carry out its assessments and continue to study the improvement of its methods. 1.5 How to investigate fishing Before a fisheries scientist can even start giving advice, he/she must know what information he needs to collect to describe his fishing. These are a series of investigations, many of which provide data. 1.5.1 Fishing and fishing effort data These data are provided by fishing and are often the only data available. The total catch data are usually available long before any other information, as information on the catch and its value is important for economic reasons. But the catch tells us little about the state of fishing; as shown in Figure 1.1, the same total catch may be taken from both underfished and overfished stocks. In order to gain a real understanding of fishing, a certain effort measure is needed. It is not always easy to collect a meaningful effort index, but sometimes quite the ratings of the valleys are sufficient. 1.5.2 Length and age composition data Other fishing data are the composition of length and, but not always, age data. However, the catch is usually very large; for example, the number of anchovies caught by Peruvian vessels per year may exceed 10 000 000 000. Not all of them can be measured and a sampling system must be developed to ensure that the measurement of some fish provides reliable information on the total catch. Where samples taken from the catch and the intended structure are sampled using a good statistical system, the characteristics of the population (e.g. the distribution of the length of the anchovy in Peru) may be assessed with the desired accuracy. 1.5.3 Biological research The fisheries scientist must carry out certain investigations. The most important of these is the determination of the structure of stocks, as it is important to link the catch to the stock from which they have been caught. This is usually determined by tagging or less usually by another method, such as a study of the meristic nature. Fish are also part of their environment and react to it when migrating, so studies of currents are important. In up-polluting areas, the pattern of the current systems can have a decisive impact on fishing. The physical and chemical characteristics of the current also largely determine the main productivity of the area on which the final stocks depend. The study of phytoplankton, zooplankton and fish feeding is all links in this chain, although studies have little use to help solve fishing problems. 1.5.4 Population dynamics To put all this information into use in population dynamics methods, allow the fisheries scientist to answer questions relating to the exploitation of stocks previously identified. Population dynamics depend on building models that describe fishing and make it possible to predict. Given the exact data a better model better the right prediction is. 1.6 The scope of this Manual The series of studies described in sections 1.5.1 to 1.5.4 are the main elements of any fisheries investigation and this manual presents the main ways in which these studies are to be carried out. No section is comprehensive, as further research into each subject is intended to show which research methods are available and how to best carry out this research so that the fisheries scientist can achieve his or her objectives. According to Gulland (1971), the yield of traditional bonbon stocks is almost 100 000 000 tonnes per year and there are few unused stocks. For further expansion, we will then depend on non-traditional resources such as krill. In this situation, we are even more obliged to use our traditional fish stocks in the best possible way. To do this, the fisheries scientist has to play a big game. 1.7 References to Gulland J.A. 1971, stocks in the ocean. Fishing News (Books) Ltd., London, 255 pp. Fig1.1 General history of fishing