Fisherman with a smartphone, GPS application and artificial intelligence

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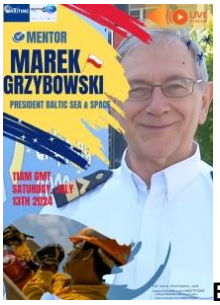


By Marek Grzybowski

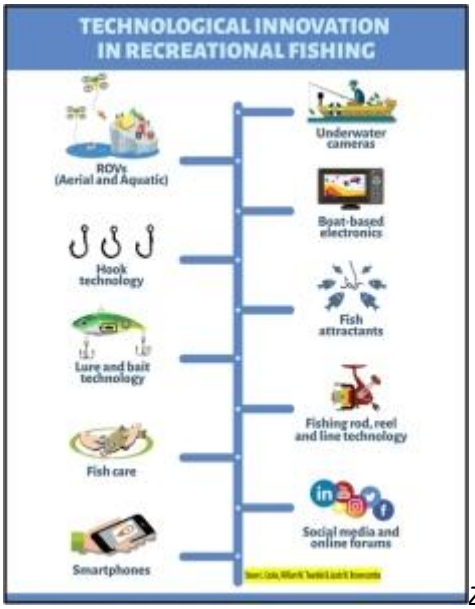
Almost 5 million fishermen use satellite and ICT technologies. The same number of devices operate on fish and seafood farms. New technologies are making a wide entrance not only into ports, commercial shipping, maritime tourism, sailing or offshore. They are also widely used in fishing and fish and seafood production on farms. They are also widely used by the recreational fishing sector, as well as anglers. Searching for and observing the migration of stocks, controlling the work of fish farms, and finally the development of recreational fishing, have led to the use of the latest technologies in fishing and breeding aquatic organisms, as well as in the recreational fishing industry.

Information and satellite technologies are also used to control fisheries and combat overfishing. According to a British study, about one in five fish consumed in the world is caught illegally, without proper reporting or regulations protecting the sustainable development of fish populations. This activity is worth up to 50 billion US dollars per year. In this way, some of the poorest coastal communities are deprived of food and income. Illegal fishing is exacerbating the decline of stocks and threatening the recovery of many species, according to research led by David J. Agnew and his team.

In 2022, global catches reached 92.3 million tonnes, comprising 91.0 million tonnes (live weight equivalent) of aquatic organisms and 1.3 million tonnes (wet weight) of algae. This was accompanied by 7,700 tonnes of other aquatic products such as corals, pearls, shells and sponges. Catches of aquatic organisms reached 91 million tonnes, down 0.2% from the average of the previous three years, the FAO said in its latest report.

In the seas and oceans, 79.7 million tons were caught in 2022, which means a decrease of 0.7% compared to 2021 and is 5.5% less than the last record catch of 84.4 million tons in 2018. At that time, relatively high catches of anchovies were reported by Peru and Chile. According to the FAO, global trends in marine catches in recent years have continued to be largely driven by the main producers.

Leading fish producer China plans to reduce ocean catches. Recently, there have also been significant fluctuations in the numbers of the main species that are overfished. Populations of species such as the anchovy (Engraulis encrasicolus), and in the Pacific Ocean, the Pacific sardine (Sardinops sagax) and the Pacific horse mackerel (Trachurus symmetricus) are highly variable and are influenced by El Niño phenomena and changes in climatic and hydrometeorological conditions.



Źródło: Steven J. Cooke,Technological innovations in the recreational fishing sector, springer.com

Fisherman with an application

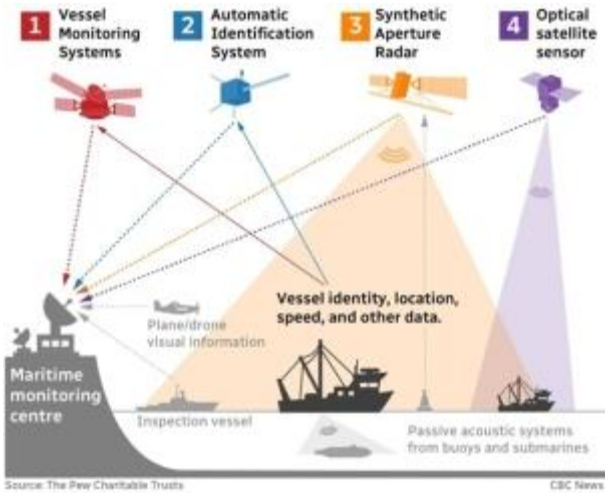
People use new systems to track the environment and changes in fish populations and the migration of increasingly difficult to identify stocks. Satellite systems, information technologies with artificial intelligence, IoT, VR, block chain support people in observing the environment, searching for fish in vast waters of oceans and seas, controlling fishermen and the entire supply chain of fish and seafood to the consumer.

Modern technologies mean that we have at our disposal applications that, thanks to smartphones, allow us to find fishing grounds and catch fish even in an amateur version. A smartphone allows even a “Sunday” fisherman to reach a natural fishing ground, access previously inaccessible waters. Social media gives anglers the opportunity to share their exploits with the environment.

Technology has completely changed all aspects of recreational fishing. It has also changed the conditions of fishing for professional fishermen. The widespread availability of technical systems, sonars and satellite technologies have put fish and other living organisms in a losing position. Widespread poaching and the failure to adhere to fishing restrictions contribute to overfishing and the destruction of stocks.

While these innovations would superficially be seen as positive from the perspective of the angler and fisherman, for the politician, ecologist, fisheries manager, or local decision-maker, the new technology can create unintended challenges. Collecting data on active fishermen has been particularly difficult for the inland fishing fleet.

Commercial and recreational fishermen are among the many beneficiaries of new technology to varying degrees. In recent years, the FAO has adopted improved tools for collecting data on fishermen and fishing gear. This has allowed for deeper and more accurate analyses, leading to a significant revision of the 1995–2022 fishing fleet data, particularly for Asian countries.



Źródło: Chris Arsenault, Philippe Le Billon, To fight illegal fishing in the Galapagos, Ecuador turns to Canadian satellite and sensing technology CBC News

Almost 5 million fishermen use satellites and ICT

In light of new data, the world fishing fleet has been estimated at 4.9 million vessels in 2022. This does not mean a significant increase in the fleet. The FAO states that the new "data indicate a downward trend from the peak of 5.3 million recorded in 2019". This is due to the fact that among many fishing countries, such as China,

Japan and the Member States of the European Union, the downward trend in the fishing fleet continues. In practice, in the EU, the fleet is systematically decreasing. This is evidenced by the recently published list of applications under the "temporary cessation of fishing activities" action, the European Funds for Fisheries (FER) program for 2021-2027. We wrote about it here.

The difficult situation is not only in the EU. Fisheries around the world are experiencing a crisis of insufficient raw materials. New technologies have improved the efficiency of fishing units, but have weakened the entire ecosystem of stock renewal. Recently, the National Marine Fisheries Service (NOAA Fisheries) published an economic review of the Alaska seafood industry.

The financial losses resulted in the loss of more than 38,000 jobs nationwide and a loss of $4.3 billion in total value of goods and services produced. The states that were hit the hardest were Alaska, Washington, Oregon, and California. According to the report, the market suffered a loss of $1.8 billion in 2022-2023 and a 50 percent decline in profitability from 2021 to 2023.

Źródło: Steven J. Cooke,Technological innovations in the recreational fishing sector, springer.com

Technological development and innovation are occurring at an ever-increasing pace, and fishermen are using new information technologies to increase catches. This is done by fishermen who fish officially and poach, inland fishermen and those who organize recreational fishing. Information systems and big data allow for more effective identification of stocks, recording of catches and sharing of information. Satellite observations help to improve the well-being of resources.

The use of new technologies affects both catch rates and losses of resources. Traditionally, fisheries management has been a reactive process, where data is collected and used to assess stocks to inform future regulations (FAO 2012). Regulation is usually part of an annual cycle of catch forecasts.

New technologies are being used extensively to manage fish stocks on a global scale. The main dimensions of commercial fisheries management are controlling fleet numbers and capacity, limiting catches or setting allowable catches. The results of data processing may of course depend on the availability and input of information. And this is the basis for determining the nominal and actual fishing capacity. So the ability to predict the size of catches and protect resources is limited.

If the degradation of fish stocks continues at an increasing pace, then in the middle of the 21st century we will only be engaged in recreational fishing, and in the search for a single fish, radars, satellites, sonar and artificial intelligence will be necessary. An angler with a smartphone, a special application and artificial intelligence will be the only fisherman using the sea.