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POLICY BRIEF

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Why Training Fishermen can Boost Sustainability

A Marine Conservation Study from Ghana

Abstract

This CEEPA study from Ghana takes an innovative look at the factors that cause artisanal fishing communities to break the law and fish illegally. Using primary data obtained through a survey of such fishermen, it finds that less skillful fishermen are more likely to violate regulation banning the use of light attraction equipment. It therefore recommends that policies should be put in place that improve the skill and efficiency of such fishermen.

Fishermen in Ghana must be given more training.

The study is the work of Wisdom Akpalu from the State University of New. The study was conducted to try and find solutions to the over fishing crisis that is affecting Ghana. Alongside improved training for fishermen, the study also recommends that steps should be taken to make illegal fishermen fear being caught breaking the law. It also suggests that young fishermen should be made to understand why the law against illegal fishing is important.

A summary of CEEPA Discussion Paper No. 9: 'Fisher skills and compliance with effort-limiting fishing regulations in a developing country', by Wisdom Akpalu, Farmingdale State College, State University of New York, 2350 Broadhollow Road, Farmingdale, NY 11735, USA

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Report Summary

The fisheries sector is a major source of people's livelihoods in coastal communities in many developing countries. It has been estimated that 10 million people are involved in fishing and related activities in Africa, with over 7 million involved in the activity in West Africa alone. One of the key environmental problems facing large stretches of Africa's marine environment is the fact that illegal fishing activities are devastating fish stocks. This is not only having a dramatic impact on marine flora and fauna, it is also making the living conditions of small-scale fishermen more precarious and vulnerable than ever before.

In Ghana, the fishery sector employs 10% of the active labor force. One of the key problems facing the country's fishing sector is the introduction of the illegal light aggregation technique into artisanal fishing communities. The light aggregation technique involves the use of artificial light to attract and aggregate fish so that more fish may be harvested. Examples of the sources of light used include fire torches, pressure kerosene lamps, gas light lamps and battery- or generator-assisted incandescent lamps.

Illegal fishing destroying fish stocks

This is just one example of the illegal fishing activities that are endangering the sustainability of the country's fisheries. Catches of small pelagic fishes increased from 450 metric tons in 1999-2000 to 7000 metric tons in 2001-2003 when the use of light attraction equipment intensified. This has worsened the over fishing problem along the country's coast and deepened poverty within fishing communities.

To save Ghana's wild fish stocks, appropriate incentives must be designed and implemented to discourage illegal fishing. In the past the focus of such policy development has been on curtailing fishery crime by increasing the risk and severity of punishment. This study assesses these issues, but also takes a broader approach to this problem to see if there are any other ways in which illegal fishing can be reduced.

Collecting information from fishing communities

The information for the study was collected through a simple random sampling survey of 258 fishermen in Elmina and Cape Coast in the Central Region, and Axim in the Western Region of Ghana. Cape Coast is the capital city of the Central Region of Ghana. It is situated 165 km west of Accra on the Gulf of Guinea. Elmina is a town in the Central Region. It is situated on a south-facing bay on the Atlantic Ocean coast about 12 km west of Cape Coast. Axim is a town in the Western Region to the west of Cape Three Points. The economies of the three places rely heavily on fishing activities.

Fishermen generally have utmost confidence in the chief fisherman within each fishing community, so approval was sought from the local chief fishermen before the questionnaire was administered. During the interview, each respondent was assured that his responses would remain strictly confidential.

Assessing the prevalence of illegal fishing

Each fisherman was asked to indicate whether he used light attraction equipment or not. He was also asked to assess the probability that he would be detected breaking the law relating to the use of such equipment (over a period of one year). Each fisherman was also asked to estimate the probability that he would be fined for breaking the law. A five-point scale was used to focus the answers for these questions. This scale ranged from 'very high' (50% or more) to 'very low' (1% or less). A five-point scale, ranging from 'strongly agree' to 'strongly disagree', was also used to measure the extent to which each skipper thought that the government had done the right thing by banning the use of light attraction equipment. Respondents were also asked to indicate the likelihood that they would continue to fish illegally if they took an oath to the sea-god never to violate any fishing regulations.

Fishermen were asked about the volumes of fish they caught. Those who fished illegally were asked to indicate the proportion of their average catch that they would lose if they did not use illegal fishing equipment. Information was also gathered about the demographic characteristics of the fishermen (e.g. age, level of education), their fishing experience and the fishing inputs they used (e.g. boat size, crew size and fishing hours).

Finally the respondents were asked to take part in a choice based experimental question to assess their attitudes to their income and the future. They were asked to choose one of two hypothetical fishery projects: project A would increase their income once by GHc100 in one month, and project B would increase it once by GHc150 in six months time. After a choice was made, each respondent was then asked to indicate the value for Project B that would make him indifferent between the two projects.

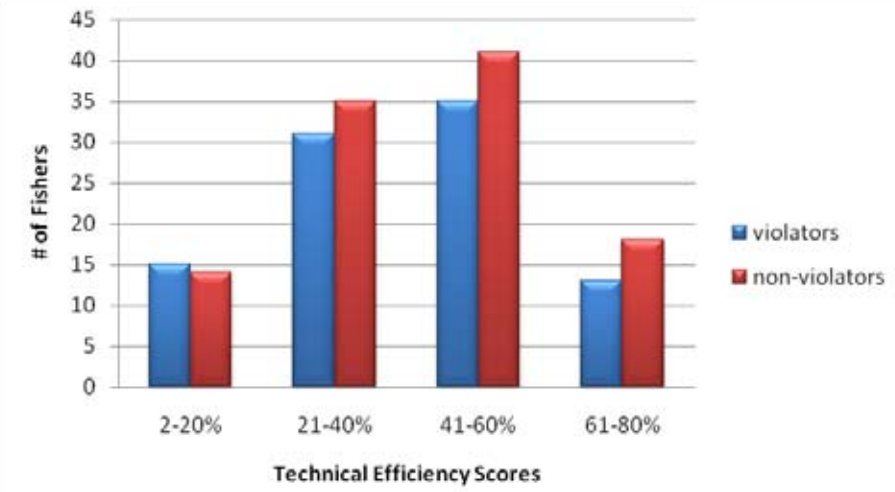
The link between skill and sustainability

The mean legal catch value amongst the fishermen who took part in the survey was GH 2,259.33 (US$1613.81) per week. The average crew size was approximately 14 men and crews fished for an average of 86 hours a week. The average boat size was approximately 45.8 ft and the average age of the fishermen was 39 years. Not surprisingly, the study found that catch sizes depended on the size of fishing boats, the size of crews and the number of hours spent fishing.

From the survey, 121 (46.9%) people admitted that they fished illegally (i.e. used the light attraction equipment). Amongst those who fished illegally, the perceived probability of being caught violating the ban on the use of light detection equipment was 0.33. The corresponding figure for the perceived probability of receiving a fine was 0.12. When the deterrence value of this fine was assessed, it was clear that the fear of getting caught had a stronger deterrence effect than the penalty itself.

It was also clear that the act of taking an oath to the sea god would reduce the number of fishers breaking the law. Indeed the probability that a fisherman would violate a fishing regulation after taking the oath was calculated to be 0.11. This is much lower than the current rate of violation (i.e. 47%).

When all the factors that could account for catch size were taken into account, it was possible to assess the skill of the fishermen. When this was done it was then possible to see whether their skill was linked to the likelihood of them breaking the law.



Technical efficiency scores of violators and non-violators of the effort-limiting regulation.

How to reduce the amount of illegal fishing

Overall, the study shows that the less efficient fishermen are more likely to violate the ban on the use of the illegal light aggregation technique. As a result, policies that are directed at improving the efficiency of fishermen are likely to curb the use of illegal fishing equipment and so make fishing more sustainable.

As the overall deterrence value of the regulations against the use of light aggregation equipment is relatively low, the study also recommends that something must be done to make them more effective. Given the findings relating to peoples' fear of being caught and their fear of being fined, it is clear that it makes more sense to focus on increasing the risk of fishermen being caught rather than increasing the fines that are given out.

Because those fishermen who are more uncertain about the future are more likely to violate the light attraction regulation, the study suggests that policies that help people be more confident about the future (i.e. make them more secure and better off) should help lower the rate of overexploitation of fish stocks.

Furthermore, as fishermen who strongly disagree with the regulation on illegal fishing equipment are, on the average, more likely to break it, the study recommends that fishermen should be properly educated about it. In addition, as younger fishermen are more likely to violate the rule, such education should target them. Another important finding is that fishermen would be less likely to break the law if they take an oath not to do so. Consequently, enforcing religious norms may decrease the rate of illegal fishing amongst Ghana's fishing communities.

> **"...policies that are directed at improving the efficiency of the fishermen are likely to curb the use of illegal fishing equipment..."**

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