




## Shining a Light on Illegal Fishing

An Environmental Policy Study from Ghana

### Abstract

This CEEPA study from Ghana finds that fishermen will be discouraged from using illegal light attraction equipment if enforcement efforts and penalties are increased. This action will also decrease the severity of fishing regulation violations. The study also finds that middle-aged fishermen and those with the largest boats are the worst offenders. It therefore recommends that these categories of fishermen should be targeted as surveillance is improved, enforcement is tightened and penalties for using light attraction equipment are made more severe. In addition, the study finds that fishermen who place the most value on the short-term benefits they can get from fishing are more likely to fish illegally.

The study is the work of Wisdom Akpalu, from the Department of History, Economics and Politics at Farmingdale State College, State University of New York. It looks at the reasons why Ghana's artisanal fishermen are flouting regulations that ban them from using 'light attraction' equipment. This illegal fishing is one of the reasons behind Ghana's over-fishing crisis. In recent years artisanal and semi-industrial fishing has expanded and fishing techniques have evolved so that fishermen now use highly destructive fishing gear. Fishing levels in the country are no longer sustainable and it is likely that Ghana's inshore fisheries may eventually collapse. This poses a serious threat to food security and sustainable livelihoods throughout the country. 



A summary of CEEPA Discussion Paper No. 40: 'Determinants Of Non-Compliance With Light Attraction Regulation Among Inshore Fishers In Ghana' by Wisdom Akpalu, Department of History, Economics and Politics, State University of New York.

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## Report Summary

In many developing coastal countries, wild fish stocks have been overexploited and have collapsed or are in danger of doing so. This overexploitation is being driven by rising demand and exacerbated by the development and use of new fishing techniques that have dramatically increased catch sizes. Ghana is one African country that is facing this problem. Here, inshore artisanal fishermen use illegal 'light attraction' equipment to improve their catches. This has led to concerns about the sustainability of fishing in the country and has prompted calls for better implementation of legislation designed to stop over fishing.

To help develop an effective response to this marine conservation challenge a new CEEPA study highlights the factors that make artisanal fishermen flout fishing regulations and use illegal fishing equipment. The study is the work of Wisdom Akpalu, from the Department of History, Economics and Politics at Farmingdale State College, State University of New York. It finds that poor enforcement and low penalties for law-breakers are two of the major problems. The study also finds that middle-aged fishermen and those with the largest boats are the worst offenders. It therefore recommends that these categories of fishermen should be targeted as surveillance is improved, enforcement is tightened and penalties for using light attraction equipment are made more severe.

## The Over Fishing Challenge

Artisanal fishing is a vitally important part of Ghana's economy. It is estimated, for example, that the artisanal fishery sub-sector supports about 1.5 million people. It is also thought that between 70 and 80 percent of the total annual marine fish catch comes from the artisanal fishery sector, with the rest coming from semi-industrial and industrial fishing vessels.

In recent years artisanal and semi-industrial fishing has expanded and fishing techniques have evolved so that fishermen now use highly destructive fishing gear. The use of light attraction equipment has also expanded. This equipment is mainly used by inshore and semi-industrial vessels and involves the use of artificial light to attract fish so that they can be more easily harvested. Fire torches, kerosene lamps, gas lamps, and battery or generator assisted incandescent lamps are all used to attract fish in this way.

Since there is generally open access to the marine fish resource in Ghana, these developments have resulted in over-harvesting of the nation's inshore wild fish stocks. Fishing levels are no longer sustainable and it is likely that Ghana's inshore fisheries may eventually collapse. This poses a serious threat to food security and sustainable livelihoods throughout the country.

## How to Tackle Illegal Fishing

To try and address the over fishing challenge, regulations have been brought in to ban the use of light attraction equipment. However, these regulations are widely ignored. To see what can be done to tackle this problem Akpalu investigated the factors that make fishermen violate the law.

The information for his analysis was collected through a survey of fishermen in three places: Elmina in the Central Region, Axim and Sekondi in the Western Region, and Tema in the Greater Accra Region of Ghana. A random sample of 118 skippers were interviewed using a questionnaire. Akpalu was careful to ensure that interviewees were guaranteed anonymity and that they understood why the interviews were being carried out.

The interviews included questions about the skippers' demographic characteristics (their age, marital status, number of dependents, etc); the types of fishing nets they used and the length of their fishing boats. They were also asked whether they used any light attraction equipment; if they did, they were asked how much it would cost to replace. This cost was used as a measure of how severely the skippers broke fishing regulations - it was assumed that more expensive lighting gear would have a greater impact on fish stocks.

## How Effective is Legislation?

To see how effectively legislation is being implemented, skippers were asked whether they thought it was likely that they would be caught breaking the law and what level of fine they would expect to receive if they were. A five-point scale, ranging from 'strongly agree' to 'strongly disagree', was used to find out whether the skippers thought that the regulations relating to light attraction equipment were unfair. They were also asked whether they thought that the legislation had been put in place to protect fish stocks or for other reasons.

One other factor was assessed: the way in which skippers make economic decisions relating to the future. This factor is key since, for crimes such as the acquisition and use of light attraction equipment, potential offenders will consider the future benefits that they will gain from breaking the law. It is therefore important to know to what extent they are willing to trade off present benefits for those in the future (this is known as their individual discount rate). To compute the discount rate, skippers were asked to discuss two projects, one that would increase their income in the short term and one which would increase their income over a longer period of time. Skippers were asked to state how much more the long-term project would have to pay to make them choose it over the short-term project (which, they were told, would pay US\$100).



“ Fishermen will be discouraged from using illegal light attraction equipment if enforcement efforts and penalties are increased. ”

## How Many Fishermen are Breaking the Law?

Out of the 115 respondents, 43% said that they do use light attraction equipment and the rest reported that they do not. The average replacement cost of the equipment used was US\$1,001. This level of use was mirrored in the skippers' own perception of how many fishermen are breaking the law. About 70% estimated that over half of all fishermen violate the relevant regulations.

Not surprisingly, it is clear that skippers who think that most other fishermen are breaking the law, are more likely to do so themselves. Those fishermen who do violate the law also feel that they are less likely to be caught than those who do not. Also, the perceived probability of being fined if caught is much higher for non-violators than violators of the regulation.

There is also a positive link between skippers' decisions to break the law and their individual discount rates. Overall skippers have a relatively high individual discount rate. This high rate indicates that fishermen do not have much economic confidence in the future; it may result from the high rate of default in Ghana's economy and its high rate of inflation. It could also indicate that fishermen may be constrained by problems in the credit market.

## Are Regulations Unfair?

When asked about their perception of fishing regulations, about 36% of skippers strongly felt that the regulations are unfair. At the same time over 50% thought that the regulations were not principally related to the protection of fish stocks. Not surprisingly, those fishers who feel strongly that the light attraction regulations are unfair are more likely to break the law. It is also clear that a skipper will break the regulations more severely if he believes that the regulations are intended to protect fish stocks. This implies that fishermen who are aware that fish stocks are declining and need to be protected by regulations are rushing to catch what they can, before fish stocks in the region disappear totally.


Age has a significant impact on whether skippers flout regulations: While younger fishers are more likely to violate the regulations, it is clear that the older fishermen violate the regulations more severely. Overall, it is the middle-aged fishermen who appear to do the most damage. It is also clear that fishermen with more dependents and with bigger boats are more likely to break the law more often and to do this more seriously.

In terms of the factors that will stop fishermen breaking the law, it is apparent that an increased risk of punishment (i.e. probability of detection) and severity of punishment (i.e. size of penalty) will decrease the rate and severity of violations. It is also apparent that the more often fishermen see an enforcement officer, the less likely they are to violate regulations. Moreover, it is clear that an increased risk of punishment will have a greater deterrent effect than an increase in penalties. Indeed a 10% increase in the probability of detection will discourage about 13% of the violators, while a corresponding increase in penalties will decrease violation by only about 2%.

## How to Stop Illegal Fishing

According to Akpalu, the policy implications of his research are as follows: First, fishermen will be discouraged from violating regulations if enforcement effort and penalties are increased. This will also decrease the severity of violations. Given the greater impact of improving deterrent efforts (such as enforcement and surveillance), it could be argued that this should be the preferred approach. However, setting higher fines costs nothing, while increasing deterrent efforts is costly; therefore both options should be considered.

Given the fishermen's perception of the role of regulations in the protection of fish stocks, providing information about the importance of the regulation could be counterproductive. Fishermen also appear to be constrained by problems in the credit market. As a result, any policies that address this issue and improve the economic outlook for fishermen, such as poverty eradication programs, are likely to lead to a decrease in the violation of regulations and an improvement in the sustainable management of fish stocks.

Lastly, it is clear that the fishery department should target middle-aged fishermen and bigger boats in order to maximise the effectiveness of their surveillance efforts. 

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