
Review of Impacts of Illegal, Unreported and Unregulated Fishing on Developing Countries

SYNTHESIS REPORT

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Abbreviations and Acronyms

BDM	Beche-de-mer
BIOT	British Indian Ocean Territory
bn	Billion
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
DfID	Department for International Development
DWFN	Distant Water Fishing Nation
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agricultural Organisation of the United Nations
FCMZ	(BIOT) Fisheries Conservation and Management Zone
FFA	Forum Fisheries Agency
FMC	Fisheries monitoring centre
FOC	Flag of Convenience
GDP	Gross Domestic Product
ICCAT	International Commission for the Conservation of Atlantic Tuna
IOTC	Indian Ocean Tuna Commission
IPOA	International Plan of Action
ITF	International Transport Workers Federation
IUU	Illegal, Unreported and Unregulated Fishing
m	Million
MCS	Monitoring, Control and Surveillance
MFMR	Ministry of Fisheries and Marine Resources (Namibia)
MOU	Memorandum of understanding
MRAG	Marine Resources Assessment Group
NAFO	North Atlantic Fisheries Organisation
NFA	National Fisheries Association (Papua New Guinea)
OECD	Organisation for Economic Co-operation and Development
OR	Open Register
PNG	Papua New-Guinea
RFMO	Regional Fisheries Management Organisation
SADC	Southern African Development Community
SEAFO	South East Atlantic Fisheries Organisation
SOCU	Surveillance Operations Co-ordinating Unit
SWIOFC	Southwest Indian Ocean Fisheries Commission
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	The UN Fish Stocks (Straddling Stocks and Highly Migratory Species) Agreement
VMS	Vessel monitoring system
WCPTC	Western and Central Pacific Tuna Commission

1. The High Seas Task Force and our Study

Illegal, unreported and unregulated (IUU) fishing is a global problem affecting both Exclusive Economic Zones (EEZs) and the high seas. A number of initiatives have been taken to quantify and combat it, notably the 2001 FAO International Plan of Action on IUU Fishing. In 2003 following a meeting of the Round Table on Sustainable Development at the OECD, a number of Ministers decided to form a High Seas Task Force with the objective of defining practical solutions to the problem. The UK is directly supporting the work of the High Seas Task Force. Part of this support covers work commissioned by the Department for International Development (DfID) to examine the *economic impacts of IUU fishing on developing countries*.

Although there are quite a lot of studies of IUU fishing in high seas waters, there is currently a dearth of information on the economic and other impacts of IUU fishing on developing countries. This study set out to address this, as far as possible, using empirical information available from the literature and by examining case studies of 10 developing countries around Africa and in Oceania that are currently suffering from differing levels of IUU fishing. The objective was an impact analysis of IUU fishing on developing countries (including economic, social, environmental, ecological, biological, health and nutritional impacts). The study was undertaken by MRAG Ltd between January and June 2005.

A preliminary version of this report was discussed at a DFID/NORAD funded workshop, held as part of the project process on the 16th and 17th June, 2005 in London. Comments generated from the discussion were incorporated into the final version. An additional report summarising the outputs of the workshop has been produced by DFID¹.

2. Defining IUU

There are many types of IUU fishing (Figure 1). Those we consider in this study are primarily illegal fishing (poaching) in EEZ waters, unregulated fishing in areas of Regional Fisheries Management Organisations (RFMOs) either by parties to those RFMOs or by non-parties to them, and all fishing in high seas areas not subject to RFMOs. The first of these includes vessels licensed in another country moving over the border; vessels fishing in closed areas; vessels fishing in high seas waters moving over the 200nm boundary into EEZ waters; and mis- or under- reporting of catches by licensed vessels.

¹ DFID/NORAD, 2005. International Workshop on Impacts of Illegal Unreported and Unregulated Fishing on Developing Countries, 16th to 17th June 2005, DFID, London. Workshop Proceedings. 16 pp.

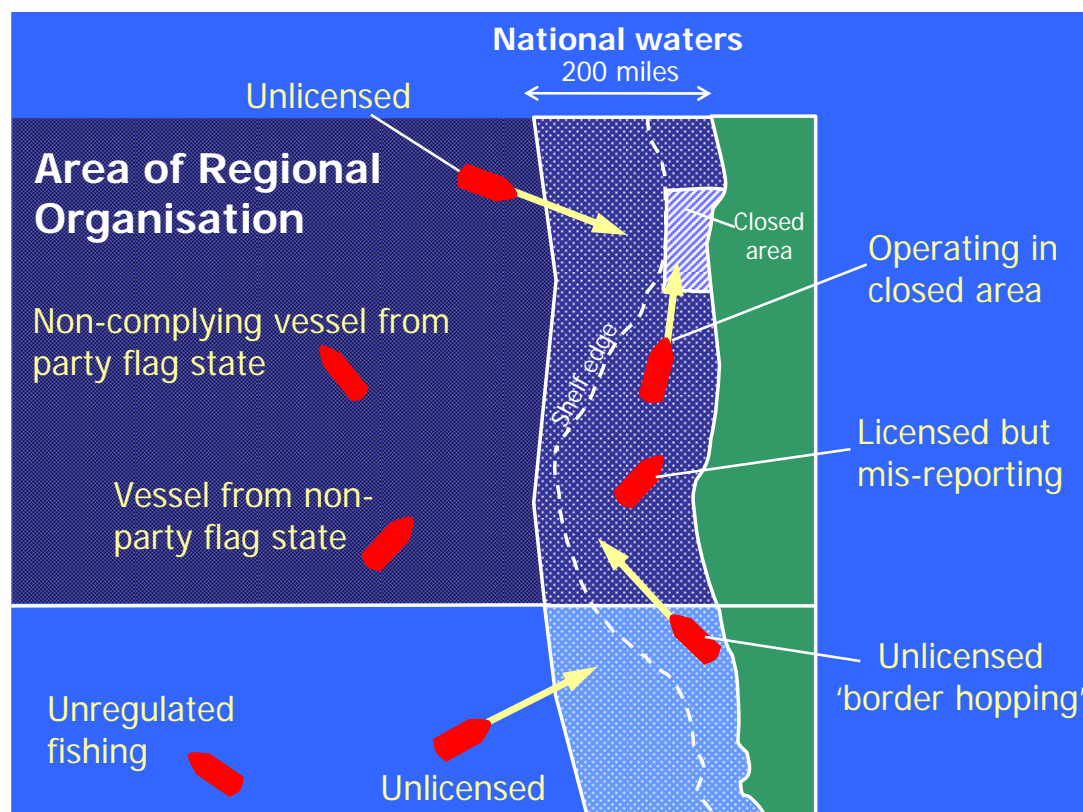


Figure 1 Illustration of types of IUU fishing. Within an EEZ there may be unlicensed fishing (poaching), under- or non-reporting, or unauthorised fishing by area, seasonal, gear, quota or species. Outside EEZs there may be non-compliance with an RFMO, or there may be unregulated fishing outside the area of an RFMO. Note that many RFMOs also cover adjoining EEZ waters, but the primary jurisdiction in these cases remains that of the coastal state so we have drawn the RFMO as bounding on EEZ waters.

3. How IUU affects developing countries

Two complementary methods were used to obtain a full picture of the levels of IUU fishing. In the first, literature search provided a “big issue” view of IUU fishing worldwide. In the second, detailed examination of the 10 case studies (Guinea, Sierra Leone, Liberia, Angola, Namibia, Mozambique, Kenya, Seychelles and Papua New Guinea) allowed us to explore the types and level of IUU fishing that they experience.

Within our case studies, we identified two principal categories of fisheries that were affected by IUU fishing:

1. Tuna

- This was seen to be a particular problem for east coast & island states, such as Kenya, Tanzania, Somalia and Seychelles as well as across the Pacific as exemplified by Papua New Guinea. Vessels involved in IUU activities are largely from distant water fishing nations, some of which may be registered with open register countries. Their environmental impacts include shark bycatch and in some areas also

turtle catches, associated with purse seine fishing using Fish Aggregating Devices (FADs) or with longlines. The major problem faced by developing countries is the provision of MCS (Monitoring, Control and Surveillance, an acronym used extensively in this report referring to the enforcement activities of the fisheries management system) directed to the distant water fleets.

2. Mixed Fisheries (Shrimp/Demersal)

- This is a particular problem with west coast & southern east coast African states. Nominally legitimate vessels take most of the illegal catch. The major infringements are zone violations, with foreign and domestic fleets fishing in prohibited areas, especially encroaching into the zone which all African states reserve for their vital artisanal fisheries and poaching their fish either directly or as bycatch, and consequently there are often serious conflicts between industrial and artisanal fishermen, including loss of gear and life. The environmental problems are high levels of demersal fish discarding with shrimp fishing and bycatch of turtles. In turn, these high levels of extraction are likely to lead to over-exploitation of the resources and consequent depression of yields.

The most obvious economic impact of IUU fishing on developing countries is direct loss of the value of the catches that could be taken by the coastal state if the IUU fishing was not taking place. Aside from the loss to GNP, actual revenue can accrue to the coastal state in the form of landings fees, licence fees, taxes and other levies which are payable by legal fishing operators. In addition to direct macro-economic impacts, there are indirect and induced impacts. These include the impacts resulting from loss of income and employment in other industries and activities in the supply chain upstream and downstream from the fishing operation itself. On the upstream side, IUU fishing depresses the demand for fishing gear, boats and equipment, and other inputs that otherwise might be present. Downstream from fishing there is fish processing and packaging, marketing and transport that may be negatively impacted. Any associated reduction in fishing incomes will also have impacts on the demand for consumption goods by fishing families.

IUU fishing itself is largely driven by economic considerations. IUU fishing vessels have lower costs and fewer social responsibilities than licensed fishing vessels, which drives them to exploit resources irresponsibly. The current overcapacity of the world fishing fleet, both in terms of numbers of vessels and technological power, which was created largely through subsidies to the fishing sector in developed countries, has contributed to the problem. Many vessels have no fishing opportunities within regulated fisheries.

IUU fishing usually contributes to unsustainable impacts on both target species and the ecosystem. Fishing in general has the capacity to damage fragile marine ecosystems and vulnerable species such as coral reefs, turtles and seabirds. Regulation of legitimate fisheries aims to mitigate such impacts, but IUU fishers seldom comply with such requirements. This is likely to reduce productivity, biodiversity and ecosystem resilience. This in turn is likely to lead to a reduction in food security for artisanal fishers, and to a reduction of future catching opportunities. This is particularly important in those communities which are heavily dependent on fish as a source on animal protein. Conflicts between IUU industrial and artisanal or semi-artisanal fishers are particularly prevalent in shrimp fisheries around Africa (Guinea; Sierra Leone; Liberia; Angola; Mozambique; Somalia) as well as in the inshore fisheries of Mauritania and Senegal. Conflicts may be direct (vessels running

others down) or indirect (removing all available fish or shrimp), the former often leading to accidents, death and injury amongst artisanal and other local inshore fishers which in itself will have economic and social consequences (lower catches through injury, loss of earnings) for fishers and their families.

4. Putting a value on IUU

IUU fishing is common across the region of our study (Figure 2).

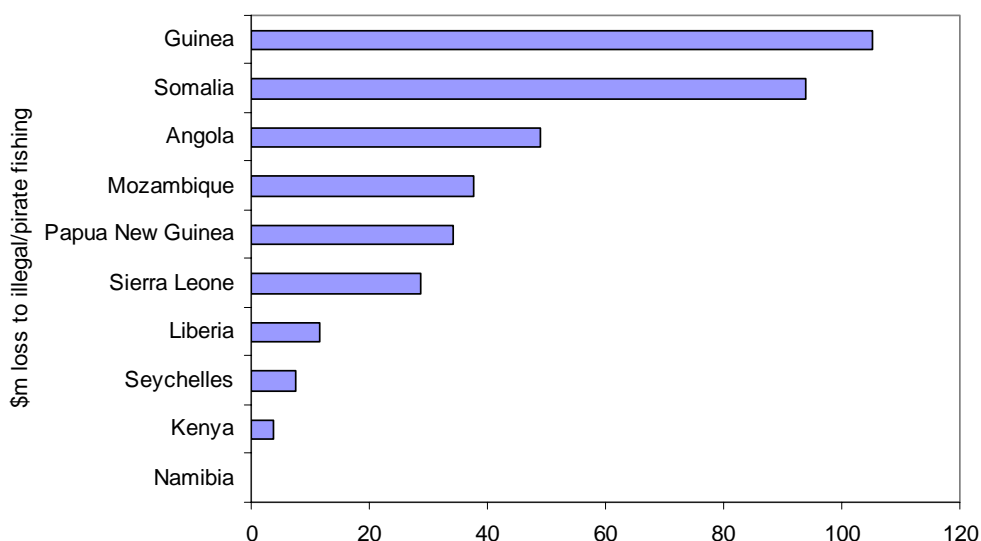


Figure 2 Estimated annual value of illegal/pirate fishing in the EEZs of our case study countries, nominally for 2003 – 2004.

As an example, the situation in Guinea is described in the following box.

Guinea has extensive and valuable shrimp, octopus and pelagic fisheries. There have been a number of surveillance exercises in Guinea waters, which indicate that between 20% and 60% of fishing vessels are unlicensed. In 2001 Guinea observer data showed 34 of 92 vessels (34%) seen were fishing in an prohibited zone, largely taking catch from the area designated for artisanal fishes and therefore illegal. This suggests that up to one third of legal vessels are taking their catch from illegal areas plus there is an additional 33% of unlicensed illegal fishing. From this we estimate a probable loss of \$27m in shrimp catches. However, shrimp are a relatively minor part of the catch of these vessels, sometimes less than 10% of the catch, the rest being demersal fish, which is counted as bycatch and discarded. The potential value of this fish is \$8m. Similar calculations have been made for illegal octopus catch (\$49m). Guinea does have some MCS capacity, including inshore patrol vessels and inspectors, but is severely restricted by budget. It suffers from the activities of fishing vessels licensed in neighbouring countries moving over the border into its waters, and especially into prohibited areas close to the shore where conflicts with artisanal fishermen arise.

Overall, we estimated that the total loss to IUU fishing in the case studies was \$372M: 19% of the total value of the catch; or 23% of the declared value of the catch.

Our analysis next examined the situation of the case study countries in an attempt to understand which factors influenced their vulnerability to IUU fishing. We examined the quality of their MCS, the area of their continental shelf and fishing grounds, the proximity of major tuna fishing areas, the value of their resources, their participation in international organisations such as regional fisheries management bodies, and their level of governance (according to World Bank statistics²).

Normally, one would expect there to be a logistic relationship between the level of MCS activity (for instance the number of inspections, number of patrol vessel days, number of surveillance flights etc) and the amount of compliance shown by the fleet. The left hand graph of Figure 3 shows that we obtained this relationship with our arbitrary scaled MCS “score”. In other words, compliance increases with increasing MCS activity, but at a decreasing level as we approach full compliance.

The only other factor that was of major significance in explaining the level of IUU fishing was governance. We discovered a very significant inverse linear relationship between the % of total catch value lost due to IUU fishing and **governance level** of a country (the right hand graph in Figure 3). There were some suggestions that the level of IUU fishing was also inversely related to the number of international agreements and the size of the EEZ, but the strength of the governance relationship, explaining 81% of the variance in IUU activity, was such that no additional factors contributed to a significant increase in explained variance.

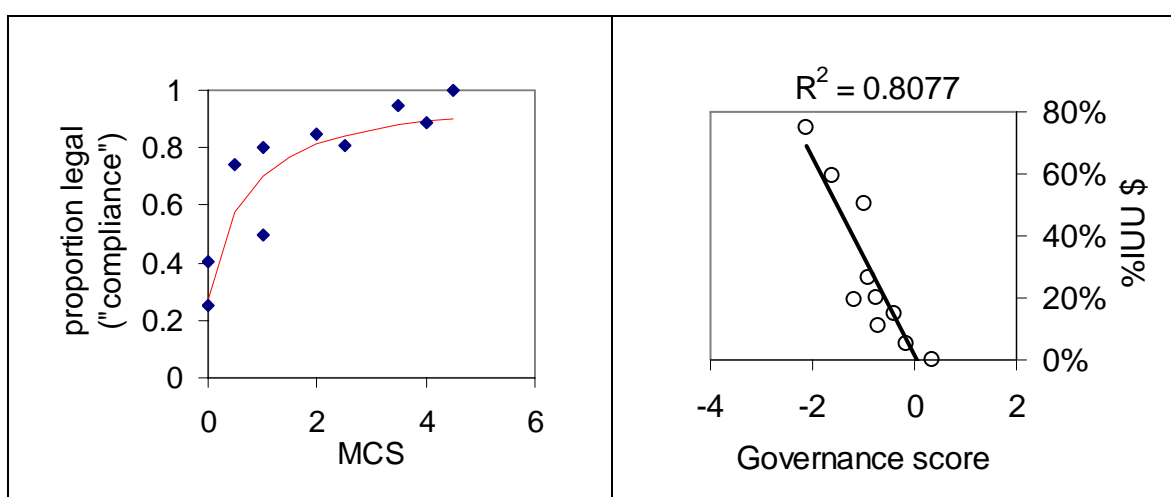


Figure 3 Relationship between compliance (100 - % IUU) and MCS capacity (left) and % IUU and governance. MCS capacity is an arbitrary ranked scale.

Using this relationship and published figures on governance and declared catch across the whole region, we estimated that the average annual value of IUU catch across sub-Saharan Africa is 16% of current total catch value (which is equal to 19% of current landed value). We estimated that the total value of all IUU across sub-Saharan Africa is about \$0.9bn. Clearly, investments in MCS may generate significant returns for developing countries, especially if their current MCS capability is low.

² Kaufmann D., A. Kraay and M. Mastruzzi (2004). “Governance Matter III: Governance Indicators for 1996, 1998, 2000 and 2002”. World Bank Economic Review 18:253-287.

To get some idea of the total value of IUU in the world we need to bear in mind that there are other areas in which IUU may be expected to take place. One of these is in high seas waters, whether subject to RFMOs or not. A detailed review of the literature suggests that the value of high seas IUU, including fishing on tuna, billfish, sharks, deep-water species such as redfish, orange roughy and alfonsino, toothfish and squid is likely to be in the order of \$1.2bn (Table 1). There are some special poaching issues in EEZ waters that receive specific attention, such as abalone, cod and sturgeon, which we estimate to be worth \$0.25bn (Table 2). Many of these issues involve a degree of organised crime rather than straight poaching.

Table 1 Estimates of annual value of High Seas IUU catches

	Species group	annual value (\$m estimated)
Tunas and tuna-like fish	Bluefin	33
	yellowfin, albacore, bigeye	548
	Chilean Jack Mackerel	45
Sharks	Sharks	192
	Toothfish	36
Groundfish	cod high seas	220
	Redfish	30
	roughy/alfonsino	32
Cephalopods	Squid	108
Total		1244

Table 2 Estimated annual values for four major targets of IUU fishing in EEZs.

EEZs	annual value (\$m estimated)	
cod	66	
sturgeon	48	
holothurians	12	
abalone	129	
Total		255

Added together these three estimates sum to a minimum world estimate of \$2.4bn (**Table 3**).

Table 3 Estimate of total world IUU catch value calculated as a total of our big issue estimates of high seas and EEZ special issues and the estimate for sub Saharan Africa

Type of IUU	Annual value (\$m)	
High Seas	1,244	
EEZ special issues	255	
Sub-Saharan Africa EEZs	937	
Total		2,436

In estimating the total value of IUU catch in the world we need to bear in mind that there are areas outside the case study region in which IUU is also likely to be occurring. Ideally, the case studies analysis undertaken in this project needs to be repeated from these other areas. In the absence of such studies, it is possible to speculate about an overall level, however, extrapolating from our case study region

to the rest of the world would require some very large and potentially invalid assumptions about the distribution and nature of IUU fishing across the globe. We have been able to extrapolate from our case studies to the whole of sub-Saharan Africa only because we have case studies in all representative areas and for all fishery and country governance types in this region. The same is not true for other parts of the world. Any global IUU catch value estimate that includes extrapolation of our case study results to regions outside of sub-Saharan Africa must therefore be accompanied by a very strong caution about its potential inaccuracy. Such estimates should be used for illustrative purposes only and in no way lessen the need to undertake more case studies to develop a more defensible global estimate.

Nevertheless, we can offer the following illustration of how an extrapolation might be made. We might, for instance, take the estimate for sub-Saharan Africa and use this as a first approximation of an estimate of the IUU catch value for two other regions of similar size and geopolitical make-up: South and Central America and Southeast Asia. Under this assumption we would multiply the figure in Table 3 for sub-Saharan Africa by three. This would result in a global estimate (including our estimates of special EEZ situations and high seas IUU value) of \$4.2bn.

As an alternative, using the “top down” approach, we can apply our estimate of average %IUU from the case studies to the whole world catch. For sub-Saharan Africa we estimate that 19% of current landed value is being caught by IUU fishing. In terms of value, FAO reports that in 2002, the estimated first sale value of fisheries was about US\$78bn, 64% of which was from marine capture fisheries. We can apply our estimated IUU proportion of 19% to this figure, arriving at an estimate of US\$9.5bn for total value of IUU catch.

5. Potential Impacts of Technical Assistance

Our analysis has identified several critical regions in which aid should be targeted to have the greatest benefit (Figure 4, Figure 5, Figure 6), These are

- West Africa (Guinea, Sierra Leone, Liberia and Cote d’Ivoire);
- Mozambique Channel (Mozambique, Comoros);
- Somalia; and
- Central Africa (Nigeria to Congo).

Benefit has been assessed in terms of government income (contribution to GNP), sustainable livelihoods (contribution to food security and per capita consumption of fish protein) and in terms of cost-benefit. These indicators are not equally applicable to all countries. For instance, almost all IUU fish in Seychelles waters is tuna, and were this to be eliminated the fish would be sold and exported rather than contribute to consumption in the Seychelles itself. On the other hand, in areas such as west Africa where a considerable proportion of the IUU is inshore shrimp and demersal fish, elimination of IUU would contribute to food security of artisanal fishermen.

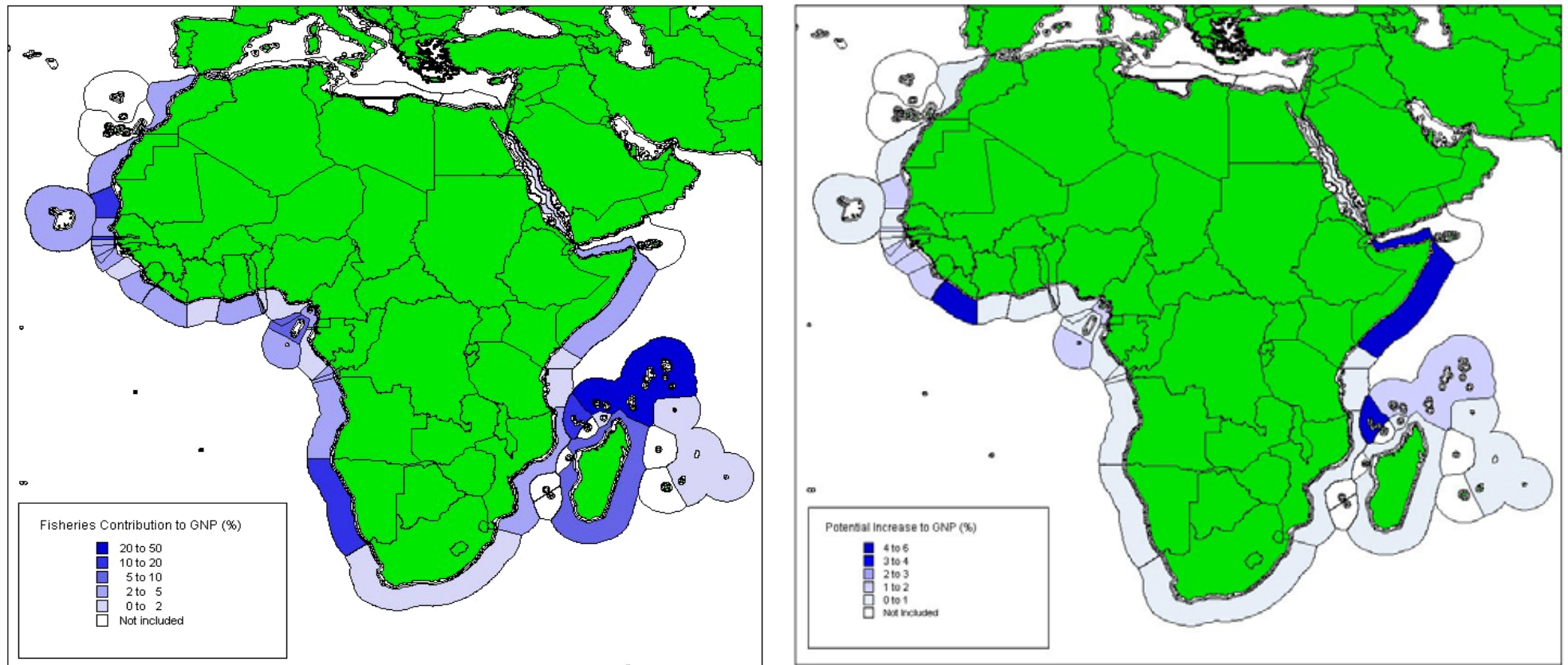


Figure 4 Fisheries as a % of GNP (left) and potential increase in GNP that might accrue to countries with elimination of IUU fishing (right)

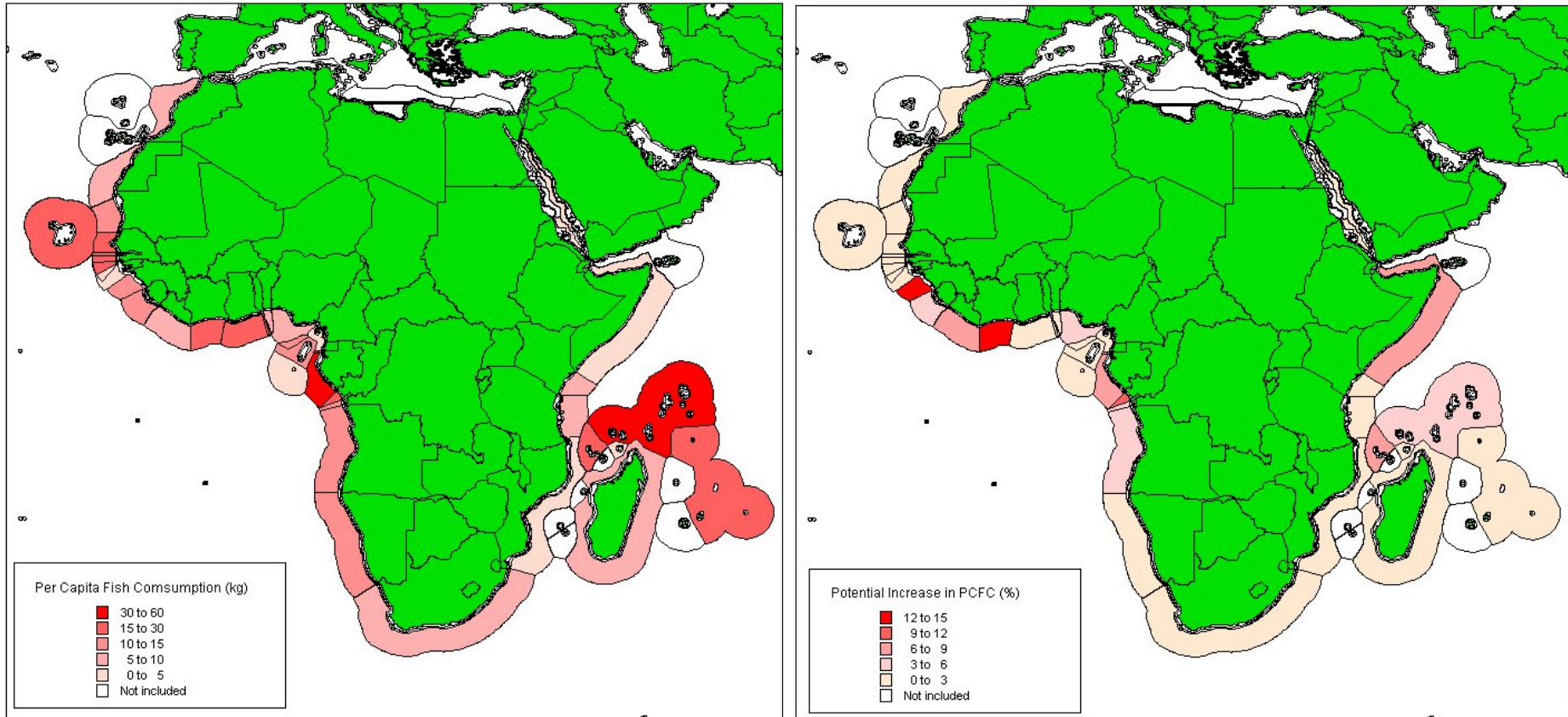


Figure 5 Per capita consumption of fish (kg/yr) (left) and potential increase in per capita consumption that might accrue to countries with elimination of IUU fishing (right)

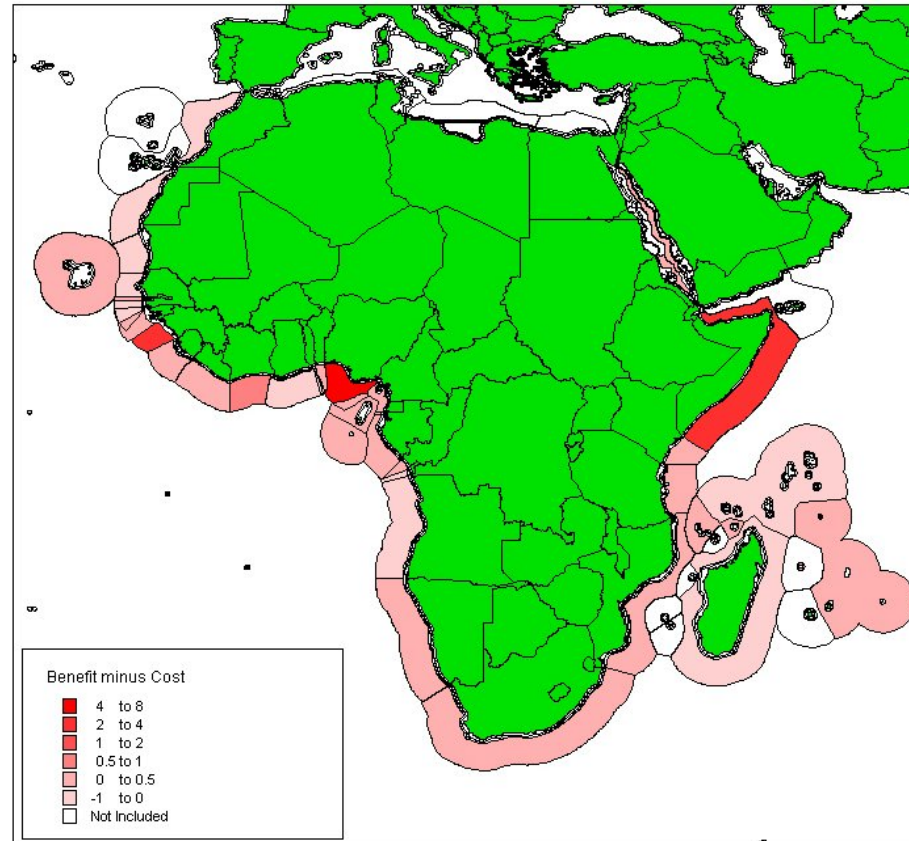


Figure 6 Cost-benefit of eliminating IUU fishing, assuming a linear relationship between governance and compliance, and that only 5% of the first sale value of IUU fishing accrues to the country after it has been eliminated. Dark red is a high benefit minus cost.

6. Governance as a driving force

Our analysis uncovered a striking relationship between the level of governance of a country and its vulnerability to IUU. Good governance appears to go hand in hand with good MCS systems and procedures, the political will to enforce regulations, cooperation with neighbours on surveillance, the elimination of possibilities for IUU activity, and active participation in regional and sub-regional fisheries agreements. The consequences are removal of threats to food security and especially to artisanal fishers' livelihoods, but unless aid is targeted at improving both governance and MCS it is unlikely to have a lasting effect on IUU.

There was evidence from our case studies that countries having EU-ACP or other agreements had better MCS and were more capable of controlling IUU than those that have never had agreements. However, there is also evidence vessels operating under access agreements do not necessarily declare all their catches under these agreements. This is less of a problem in the Indian Ocean, where most of the vessels (purse seine tuna) land and are inspected in Mauritius or Seychelles, than in the Atlantic where a number of vessels either tranship to reefers which land at Las Palmas or land there themselves, and may not be thoroughly inspected. We recommend that all agreements be strengthened to enforce electronic catch reporting and to allow joint inspections by DWFN and coastal state inspectors at the port of landing, to ensure that all data from catches caught within the EEZ of a developing country are reported directly and in near-real time to that country, irrespective of whether there are observers on the vessel or not.

Governance is also a particular problem for high seas fisheries, including high seas fisheries that developing countries are or could be participating in. Although there are RFMOs for tuna and billfish species covering most of the world's high seas ocean areas, there are very few RFMOs that are capable of dealing with all other species. Only in the North Atlantic (NEAFC, NAFO), the southeast Atlantic (SEAFO) and the Antarctic (CCAMLR) do they currently exist, although we are also aware of current negotiations for Southwest Indian Ocean and Southern Pacific agreements. Of particular concern are deepwater demersal species such as orange roughy and pelagic species not covered by the tuna organisations such as squid and sharks (although Resolutions are now in place to restrict shark bycatch during tuna fishing within some of the tuna RFMOs).

We consider all fishing on high seas outside the area of a particular RFMO to be unregulated. There is an urgent need to negotiate agreements in all these areas for all species, but this is likely to take considerable time. An obvious solution is negotiation of an implementing agreement under an operational international instrument such as the UNFSA which would deal with all high seas species unless they were subject to more specific consideration by an RFMO.

A significant problem for IUU fishing generally is the use of open registers. We estimate that the countries operating open registers derive only minimal benefit from that operation, whereas there is a huge economic benefit to vessels from not having to meet the standards expected of registering in responsible flag states. Vessels are tempted to register with open registers because of the economic benefits that accrue, or if they are unable to register with a responsible flag state, for instance if that state has a limit on the number of high seas licenses it will issue.

7. Recommendations

1. Strengthen local capacity to manage fisheries and combat IUU

As a strategy to combat IUU in developing country waters aid funds should be directed at the following:

- a) Creating the institutional, management and technical MCS capacity for developing countries to effectively control their own vessels throughout the world and foreign fishing vessels fishing in their waters, including in specific cases of targeted offshore patrol facility and effective licensing schemes;
- b) Funding and encouraging cooperative activities between licensed industry and artisanal fishermen to identify and target IUU fishing operations;
- c) Funding observers on foreign vessels, and ensuring that access agreements include real-time submission of catch and effort data from these vessels;
- d) Funding training programmes for observers and inspectors and providing training and support to negotiators and legislators;
- e) Development of satellite based survey activities, including support for VMS particularly on shrimp and offshore vessels;
- f) Assistance with science and stock assessments to assist licensing process followed by more sustained capacity building.

2. Create more effective regional management and enforcement bodies

Development aid can also be directed at encouraging active and effective participation of developing countries in international fisheries governance through:

- a) Fostering the active cooperation of developing countries with regional management and surveillance organisations at the same time as addressing specific country issues to avoid simply pushing the IUU problem elsewhere;
- b) Encouraging membership of international fisheries management agreements, including consideration of providing funding and assistance for membership of RFMOs,
- c) Requiring ratification and effective implementation of UNFSA and the Compliance Agreement and introduction of real enforcement of control on high seas vessels (linked to item 1(a) above) so as to eliminate the open register status of developing countries

3. Do not fund improvements in MCS in isolation from wider governance issues

It is clear from our analysis that if there is one single most important solution to the IUU problem for developing countries it is in increasing their general level of governance. From this will flow greater stability, wealth, investment in fisheries management including MCS, greater control of flag and foreign vessels and more active participation in regional management and surveillance sharing arrangements.

It would undoubtedly be difficult, costly and time consuming to attempt to solve IUU fishing problems by attempting to improve a country's overall governance. Rather, we suggest that the link between governance and IUU needs to be borne in mind when designing effective solutions. It is important to understand that providing support for improved MCS resources may not necessarily deliver the result that is anticipated – ie. a reduction in IUU – unless some attention is paid to the associated governance factors, such as the level of corruption within the administrative system and the ability of the legal system to successfully prosecute illegal actions. In other words, the wider fisheries management system (including science, reporting, licensing etc), and its governance, must also receive attention. In the same way, encouraging cooperative MCS activities – within a country and with other countries in a region – will support the local MCS system and its governance.

Assuming that these two activities can go hand in hand with development of MCS systems, we anticipate that real progress in combating IUU fishing can result from investments primarily directed at MCS systems, even if the overall level of governance of the country, and therefore the indices used in our analysis, are relatively unaffected in the short term, because of course these indices include many aspects of governance that are not directly linked to fisheries management and MCS.

In the worst affected countries, relatively modest inputs of aid could make significant contributions, with the possibility of getting more “bang for buck” in countries that have very poor MCS systems compared to those currently having moderate or good systems. Significant long-term resource, ecosystem and economic benefit will only derive from investment in the whole fisheries management system, including assessment as well as MCS.

4. Take a regional approach

Our analysis has identified several critical regions in which aid should be targeted to have the greatest benefit in terms of government income (contribution to GDP), sustainable livelihoods (contribution to food security and per capita consumption of fish protein) and in terms of benefit for cost. These are:

- West Africa (Guinea, Sierra Leone, Liberia and Cote d'Ivoire),
- Mozambique Channel (Mozambique, Comoros),
- Somalia, and
- Central Africa (Nigeria to Congo).

The type of benefits that would accrue from elimination of IUU fishing are not the same in all countries. For instance, almost all IUU fish in Seychelles waters is tuna, and were tuna IUU to be eliminated the fish would be sold and exported rather than contribute to consumption in the Seychelles itself. On the other hand, in areas such as west Africa, where a considerable proportion of the IUU is inshore shrimp with an associated bycatch of demersal fish, elimination of IUU would increase the share of the catch going to artisanal fishermen and thereby contribute to national food

security. Therefore we recommend that DFID looks at these areas in more depth before committing funds.

5. Consider additional trade-based measures

Additional trade-based measures could be used to support developing country attempts to eliminate IUU. These should not act to exclude developing countries from markets if there is significant IUU activity in their waters, but to exclude specifically all IUU product that originates in their waters. Regionally developed species based documentation/traceability schemes would be the most effective vehicle for these actions, supported by suitable import legislation in developed countries.

An investigation of the potential for enacting US Lacey-style legislation in all developed countries could also be initiated, together with an analysis of the support required by developing countries to enable them to cooperate with developed countries to bring successful prosecutions for attempted import of illegally caught fisheries products.