

A critical review of fishing agreements with tropical developing countries

Antonius Gagern^{a,*}, Jeroen van den Bergh^{a,b,c,d}

^a Institute for Environmental Science and Technology, Edifici Cn—Campus UAB, 08193 Bellaterra, Spain

^b ICREA, Barcelona, Spain

^c Department of Economics and Economic History, Universitat Autònoma de Barcelona

^d Faculty of Economics and Business Administration and Institute for Environmental Studies, VU University Amsterdam, The Netherlands

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ABSTRACT

Many African, Caribbean and Pacific (ACP) countries sell fishing licenses to distant water fleets. Fishing agreements have the potential to improve the performance of local fishing sectors. They create income that can be reinvested into domestic industries and often go along with partnerships in management and enforcement. However, many fishing agreements run a serious risk of undermining sustainable resource management. The present study critically reviews trends in distant water fishing as well as identifies those tropical host countries most dependent on fishing agreements. It is shown that traditional, more responsible distant water fleets (DWFs) are being displaced by less responsible, low-cost DWFs and that the most vulnerable host countries are small coastal states with large exclusive economic zones that lack the ability to benefit from value adding processes associated with fishing. The results suggest that the once-promising concept of fishing agreements is gradually posing a threat to both economic development and environmental sustainability of ACP countries.

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1. Introduction

The past decades show a dramatic increase of global fishing effort. The diffusion of advanced fishing technology in developed countries and the drastic increases of fishing effort in lower latitudes (notably in Asia) have resulted in ever-growing global fishing capacity that has gradually shifted to tropical regions [1–4]. This has increased the pressure on tropical marine ecosystems, systems for which knowledge about the health of fish stocks is poor and fisheries management is weak [5,6]. In addition to a rise in local fishing efforts in African, Caribbean and Pacific (ACP) countries, fishing access agreements signed between these countries and distant water fishing nations (DWFN) have further contributed to intensify fishing pressure. It has been argued that fishing agreements have considerable potential to help developing “host” countries profit from their otherwise unutilized fisheries resources while domestic industries are being built up. Unfortunately, such agreements have mostly failed to benefit host countries in the long run. The main criticisms are that coastal states become dependent on access fees, that the wealth captured through agreements is only a fraction of the resource’s value, that value-added activities are exported to DWFNs and that stock

health suffers from the lack of control of local institutions over the exploitation of the resource [7–10].

This paper offers a critical review of international fishing agreements and some of their impacts on host countries. This involves analyzing historical trends of distant water fishing and better understanding the motives of host countries to sign agreements. Since agreements are very heterogeneous, a typology of agreements will be developed here. The resulting analysis of fishing agreements, trends and impacts can provide information about how to improve the fisheries sector of ACP countries and its management given the constraints, or opportunities, created by the fishing agreement. The formulation and implementation of fisheries management is often influenced by uncertainty about fish population dynamics [11]. This is partly due to problems of measurement and lack of adequate indicators. This issue will also receive attention here.

The remainder of the paper is structured as follows. [Section 2](#) reviews the literature with respect to fish stock health as well as trends in fisheries management and fishing pressure, all with a focus on tropical developing countries. [Section 3](#) provides a typology of international fisheries interactions and illustrates the development of distant water fishing since 1960. [Section 4](#) looks at two sets of host nations, namely countries that contribute most to DWFN landings and countries with weak domestic fisheries as compared to foreign catches. [Section 5](#) presents the major conclusions to be drawn from the analysis in this paper, including policy suggestions.

* Corresponding author.

E-mail address: antonius.gagern@gmail.com (A. Gagern).

2. Context: global fisheries, international policies and ACP countries

2.1. The health of fish stocks

Opinions of fisheries scientists on the health of the oceans seem to be diverging considerably at first sight; a closer look however reveals that they mostly agree on the trends thereof: due to a very limited number of scientifically assessed stocks, different views have emerged over the past decade about the proper interpretation of available data concerning the impact of fisheries on targeted stocks as well as on ecosystems and biodiversity.

At one extreme, extrapolation of available stock assessments suggests that most major fish stocks are either close to healthy levels of exploitation or slowly getting there [5]. However, the assessed stocks make up a mere 20–25% of global landings in weight [12] and only 0.15% of global fisheries in stock numbers.¹ In addition, all available surveys stem from waters under the jurisdiction of developed countries (with the exception of South Africa and Peru, both of which have highly productive upwelling systems and industrialized fisheries). Finally, available assessments are heavily biased towards Clupeidae and Gadidae. The first family includes anchovies, sardines and herrings and is characterized by fast-growing and resilient species. The second family includes cods, haddocks, whittings and other “white fish”. Virtually all commercially relevant catches of this family are certified by ecolabels such as the Marine Stewardship Council. This indicates a willingness to pay for sustainably fished products and hence a higher degree of caution at the supplier's end.

At the other extreme, the so-called catch-based method derives the state of a fish stock from its current landing weight as compared to maximum historic catches or similar historic reference values. Any change in landing is thus attributed to actual changes in the ecosystem, disregarding other factors that might influence catches such as a reduction in fishing effort due to management or demand fluctuations [13,14]. Although contradictory results have been produced over past years (mainly due to improvements in the methodology), catch-based analyses paint a much darker picture of global stock health than scientific stock assessments. Similar disagreement exists about the health of food chains involving commercially caught fish [15,16]. However, despite a broad range of possible interpretations of existing data, there seems to be consensus on the following statements.

At the global level, the status of fish stocks is worsening rather than improving. One clear indication is globally stagnating or even declining catch weights despite an increase in total fishing effort [1,17]. Although stock health in many developed countries of the western hemisphere is improving due to more effective fisheries management, biomass levels tend to be below BMSY² in ACP countries while fishing mortality remains above FMSY³ [18,5,19]. This trend is exacerbated in areas of high human population growth rates and by the presence of foreign fishing fleets [8,20].

2.2. Trends in global fishing pressure

The international fishing fleet has continuously grown over the past decades [22,1]. Simultaneously, case studies reveal that the technological efficiency tends to increase at an annual rate of 4–5% [23,3,4]. One way to demonstrate the potential ecological impact of these combined developments is by calculating the

primary productivity required (PPR) to sustain the catch of a given species in a given area [24]. Applying this indicator to historic catches of a wide range of species groups, [2] show that the overall increase in global fishing effort in the past 60 years was accompanied by a southward expansion of effort (catches corresponding to at least 10% of PPR) at a rate of almost 1° latitude per year. This increase in fishing effort was so significant that, by 2005, catches in most parts of the Western Central Pacific and Indian Ocean, as well as along wide stretches of Western Africa corresponded to 30% of PPR, as opposed to less than 10% of PPR only few decades earlier. As a result, by the mid-1990s only unproductive or economically unattractive fishing areas were left unexploited, an argument suggested by Sethi et al. [25] who show that changes in catch compositions between 1950 and 2004 were driven by economically motivated behavior of fishermen rather than by trophic changes. In other words, species that yielded the highest profits were caught first, after which effort shifted to catching less profitable species. Another example of expanding fishing operations to less profitable areas is given by Morato et al. [26] who demonstrate that marine fish are increasingly caught in deeper waters despite associated diminishing returns due to high operational costs of deep water fishing. Today, all major fish stocks in the world have been drawn into the scope of international fisheries and only few stocks of minor economic interest to the industry have been left unexploited. So it seems that “We are running out of new stocks by 2020” (Personal communication with Rainer Froese, senior scientist at the Leibniz Institute of Marine Sciences (IFM-GEOMAR)).

2.3. International fisheries policy and the legal basis of fishing agreements

By 1949, with the establishment of the United Nations' International Law Commission (ILC) it soon became clear that questions pertaining to high seas and territorial seas were among the topics ripe for codification [27]. This was no simple task. For centuries, the concept of the freedom of the sea, *Mare Liberum*, proposed in 1609 by the Dutch lawyer Hugo Grotius, and suggesting that all oceans should be accessible and open to exploitation, was contrasted by John Seiden's concept of *Mare Clausum* in 1635. The latter claimed that at least parts of the sea should belong to specific countries. Considering that these concepts continue to fuel debates today, it is little wonder that after the first UN conference on the law of the sea held in Geneva in 1958, it took 36 years and three conferences to fully ratify, in 1992, the United Nations Convention on the Law of the Sea (UNCLOS). Until 1992 there was not a unified legal instrument applicable globally to preclude foreign fishing vessels from exploiting coastal resources. Especially for economically weak countries in the tropical south, this implied a yet unquantified loss of potential economic benefits as their own fishing industry had hardly been developed. UNCLOS implied a complete restructuring of marine property rights. In combination with the 1995 United Nations “Fish Stocks Agreement”,⁴ UNCLOS legally assigned rights and responsibilities over all marine areas. UNCLOS established exclusive economic zones (EEZ), maritime zones stretching up to 200 nautical miles into the ocean, over which coastal states gained sovereign rights for the purpose of exploring,

¹ Fisheries are defined here as species per FAO fishing area (source: Fishstat <www.FAO.org>).

² BMSY: biomass at maximum sustainable yield.

³ FMSY: fishing mortality at maximum sustainable yield.

⁴ The “Fish Stock Agreement” (*United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (in force as from 11 December 2001)*) relates to the management of high seas areas and straddling, and of highly migratory fish stocks and assigns regional fisheries management organizations (RFMOs) the responsibility to sustainably manage these stocks.

exploiting, conserving, and managing natural resources. Although many countries had declared EEZs since the 1970s, all coastal states now received de facto sovereign rights over the utilization of the living and non-living resources in their EEZs. Today, these areas cover 40% of the ocean's surface and contribute about 85% of global catch weight [28,9] and <www.seaaroundus.com>⁵.

Despite the adoption of EEZs since the 1970s and the coming into force of UNCLOS in 1992, the expected decline of distant water fishing did not occur. Rather, the distant water fleet size increased until the late 1980s and only declined in the early 1990s due in large part to the withdrawal of the previously "subsidized" fleet of the Former Soviet Union (FSU) [29]. Fishing countries started negotiating access agreements with the new owners of their old fishing grounds to absorb their distant water fleet capacity and enable them to continue to fish in areas where they had historically done so. Later on, agreements were signed also with governments of new fishing areas [30,9,10].

2.4. Management of fish stocks in ACP countries

Although UNCLOS draws attention to countries' responsibility to sustainably manage the living resources of their EEZs, levels of accountability, and as a result enforcement, have been, and still are, extremely low. In fact, current international law makes it impossible for one state to sanction another for mismanaging its marine resources because such mismanagement primarily affects the resource owner itself. This low accountability is reflected in wide-spread deterioration of fish stocks as a result of failing fisheries management. This is especially true in low latitudes. Mora et al [6] find that practically all tropical and subtropical coastal states have highly ineffective measures in place to identify and enforce meaningful biological reference points for harvest. RFMOs do not seem to perform any better; Cullis-Suzuki and Pauly [31] find that they are structurally vulnerable and institutionally weak, and have consistently failed to manage shared stocks. It is curious to see that fisheries are mismanaged at this scale given the immense financial losses induced by mismanagement [32]. However, the open access nature of marine resources, the diversity of stakeholders, the complexity of underlying biological and ecological dynamics, and myopic economic interests do not make it an easy task to steer a given fish stock towards ecological sustainability or even towards its maximum economic yield. Depending on the type of resource, the institutional strength of the management body, the economic stimuli, and social heterogeneity of the fishing community, among others, the effectiveness of possible approaches can be very distinct [33,34].

When focusing on management weaknesses in ACP countries, two developments seem to be the most decisive, namely the collapse of traditional tenure systems and the incompatibility of tropical fisheries with western management approaches. Customary marine tenure systems included input and output controls as well as sophisticated ownership systems to exclude neighboring villages from fishing and often provided flexible mechanisms of risk-sharing among villages [35,36]. These community-based laws and regulations were often intrinsically tied with religious systems as well as village laws and family structures [37,38]. Local management regimes require a high degree of leadership, social cohesion, collective action and exclusive access to resources [39,34]. These requirements are directly or indirectly undermined by external pressure on the resource (distant water fishing),

access to formal markets, population growth, poverty, and changes in social structures. Today, hardly any purely community-based fisheries management can withstand the pressure of altered circumstances [35,40,8].

At the same time, western-type fisheries management does not take much effect in most ACP countries. Already in the late 70s it became clear that the western influence had hardly had any positive effect on resource management in tropical developing countries. Johannes [35, p. 356] writes that, if "there is an island somewhere in Oceania where marine resources are conserved more effectively today than they were before European contact, I have not heard of it." Reasons include the following: (i) the biological data required to estimate total allowable catches (TAC) are lacking and little or no capacity exists to enforce fishing regulations [41,38]; (ii) small-scale artisanal fisheries are inherently difficult to manage as vessels cast off and land along the whole stretch of the coast [42] and personal communication with Matthieu Ducrocq (Marine program coordinator, IUCN West Africa);⁶ (iii) Fisheries in ACP countries is often more than just an occupation. It is a lifestyle, an integral component of social cohesion and represents a safety net [21]. As a result, typical aspects of western-type fisheries management including catch share systems meet with resistance.

As a response to the negative effect of "westernization" on tropical fisheries management and the small effect that western, port-based fisheries management has in these areas, over the last decades, the so-called co-management regimes⁷ have been proposed as representing the most promising solutions to such areas: "The revival and rejuvenation of traditional customary systems with limited but crucial government involvement is one of the most promising policy options for upgrading and managing artisanal fisheries" [44] in [36]. Although co-management is considered the most effective management approach in small-scale coastal fisheries, its success seems to be highly correlated with species of low mobility and homogeneous resource users displaying high social cohesion and strong leadership [34].

For interactions between DWFNs and host countries, low effectiveness of fisheries management in the tropics signifies a high degree of uncertainty for both resource owners and distant water fleets about the state and trajectory of stock health. This in turn undermines alleged commitments of sustainable fishing. This is further aggravated when small-scale operators compete with industrial vessels so that the impact of distant water fleets cannot be distinguished from that of domestic fisheries.

3. Fishing agreements and trends in distant water fishing

At the broadest level, fishing agreements can be classified into three typologies. First, they can be reciprocal or unidirectional agreements; second, they may be bilateral or multilateral; and third, signatory parties may either be governments or companies. Table 1 summarizes the resulting possible types of agreements and gives examples where relevant.

For the purpose of this paper, only agreements will be considered that include host countries of tropical developing countries (or ACP countries), all of which belong to the category "unidirectional".

⁵ Since near-shore waters have significantly higher levels of nutrients and primary productivity as compared to off-shore areas, the highest densities of fish is found in waters close to the coast, i.e. along the shelf. Therefore, the geographic expansion of fishing effort since the 1950s first and foremost implied the exploitation of shelf areas.

⁶ These fisheries often involve one or few fishing methods that simultaneously target various species with different biological life traits such as growth and recruitment patterns or size at first maturity. Optimal fishing efforts of one species might hence be suboptimal for others leading to a dilemma in effort selection.

⁷ Co-management can be defined as an "arrangement where responsibility for resource management is shared between the government and user groups" [43].

Table 1
Typology of fishing agreements.

		Government–Government	Government–Private	Private–Private
Reciprocal	Bilateral	Description: Governments of two countries sign agreements that grant permission to both signatories to fish in each other's EEZs. This is usually combined with management cooperation. Examples: Reciprocal agreement between China and Japan or China and Vietnam	N.A.	N.A.
	Multilateral	Description: Governments of three or more countries sign agreements that grant permission to all signatories to fish in each other's EEZs. This is usually combined with management cooperation. Examples: Trilateral agreement between Iceland, Norway and Russia	N.A.	N.A.
	Bilateral	Description: Governments of two countries sign agreements that grant fishing permission to of the DWFN in the host countries' EEZ Examples: Fisheries partnership agreements between the EU and ACP countries.	Description: Fishing companies of DWFNs sign access agreements with governments of host countries. Examples: South Korean, Taiwanese and Chinese fishing agreements with ACP countries in Asia and Africa	Description: Joint ventures between foreign investors and fishing companies in host countries as well as reflagging of foreign vessels to local vessels. Examples: After the termination of the EU-Senegal FPA, many Spanish operators either reflagged their vessels or went into joint ventures with local operators.
Unidirectional	Multilateral	Description: Governments of one DWFN and two or more host countries sign agreements that grant fishing permission to of the DWFN in the host countries' EEZs Examples: Multilateral Treaty on Fisheries between certain governments of the Pacific Island States and the government of the United States of America	Description: Fishing companies of DWFNs sign access agreements with governments of two or more host countries. Examples: All fishing agreements with countries of the Nauru agreement are per se multilateral as the agreement requires uniform terms and conditions for the licensing of foreign vessels.	N.A.

Note: N.A. = not available.

3.1. Agreements by major DWFNs

The most important DWFNs sourcing their landings from southern fishing areas are, by catch weight, the EU, Japan, the ex-Soviet countries and Asian and South East Asian countries. This section presents the core features of the major DWFNs' fishing agreements.

3.1.1. EU agreements

Besides reciprocal “Northern” agreements with countries in the Northern Atlantic, the EU currently has, strictly bilateral, non-reciprocal Southern agreements with 15 ACP countries in place, 10 of which are in Africa (mainly Western African countries). During the past decade, the EU has put much effort into improving fishing agreements, most importantly by replacing the highly criticized old generation of fishing agreements by the new, the so-called “Fisheries partnership agreements” following the reform of the CFP in 2002. Since then, agreements have, at least on paper, increased the degree of technical support and transfer of know-how granted to the host country, as well as the amount of financial contributions to the host country. Today's fix payments of €100 ton of fish represents between 10% and 15% of landed value of the resource. What is more, access fees paid to host countries have increasingly been earmarked to specific investments pertaining to fisheries management or domestic fisheries infrastructure to help host countries develop their own fishing industry in a sustainable manner. In addition, European external fleets have started to abide by the FAO Code of Conduct for Responsible Fisheries more strictly⁸, as a result of which agreements cannot be

signed anymore if the state of the resources is beyond sustainable limits [9,10]. In their aspiration to reach these goals, two main trends could be observed. First, a trend away from problematic mixed fisheries agreements towards tuna agreements that are less ambiguous than mixed fisheries agreements as they target fewer species and biomass estimates are subject to less uncertainty. Second, an overall reduction of FPAs [45]. Possible explanations for this fact include the withdrawal of several host countries from FPAs (including Senegal and Morocco) but might furthermore be explained by stricter political constraints on the part of the EU.

However, although on paper ambitious goals have made their way into legal documents, in practice major difficulties remain unsolved: (i) The EU continues to agree on targeting stocks for which biological surplus production cannot be ascertained scientifically (ii) European regulations pertaining to technical measures (for example minimum mesh size) are not applied in foreign EEZs. Rather, less rigorous local regulations are followed (iii) The transparency of contracts is high, underlying reasoning and evaluations however, as well as detailed reporting on landings and values of landings, are not disclosed; (iv) FPAs are not coherent with their objectives to enhance fisheries management in host countries nor does the EU make sure that the money is spent as foreseen in the contract (see for example [46] (v) The partnership dimension in FPAs often is far from reaching its goals: one of several evaluations concerning FPAs summarizes that “this aspect of partnership is an illusion. Funds do not reach the intended purposes, fish stocks are decreasing and the lives of fish workers⁹ in contracting states are harder than ever [47, p. 60].

⁸ The CCRF (Code of Conduct for Responsible Fisheries) is a non-binding collection of principles, goals and elements for action, adopted by over 170 UN-members in 1995.

⁹ The term “fish workers” refers to local men and women who directly or indirectly depend on (mostly small-scale) fisheries. Declining fish stocks negatively affect their livelihoods while compensation payments by distant water fleets virtually never trickle down to the fish worker level to make up for their economic (or other) losses.

The currently developed 2012 CFP reform will most probably include a stronger alignment of EU's external policies with the internal policy of the CFP. This includes strict ex-ante assessments assuring that a biological 'surplus' is available as well as more rigorous annual joint scientific committees.

3.1.2. US agreements

Although the US foreign fishing industry is not a major DWFN in terms of catch weights, it is worth considering their agreements here as they are the only multilateral fishing treaties with ACP countries. The "Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America" or "South Pacific Tuna Treaty" (SPTT) grants access to 40 tuna purse seiners within the joint EEZs of 17 Pacific Island Countries (PIC). It was first signed in 1988 and was last renewed in 2003, for a period of 10 years. In return for access rights, the US tuna industry pays an annual fee of US\$ 3 million to the Forum Fisheries Agency (FFA). This amount can vary with tuna prices. 15% of access fees are distributed equally among the 17 PICs, while 85% are distributed on a pro rata basis depending on the weight of tuna landed in each EEZ. Besides the actual fees however, \$18 million is annually raised in form of an economic assistance agreement between the US government and the FFA, which can be freely spent on development projects unrelated to military purposes [48].

The US agreement allows for cooperation between neighboring host countries, as opposed to, for example, EU agreements. Such cooperation considerably increases the negotiating power of host countries, especially when the migratory behavior of tuna stocks can be used as leverage in negotiations by DWFNs. Despite their progressive agreements, the US agreement has also been criticized for not respecting local conservation efforts, reflagging less responsible Taiwanese vessels as US-vessels (i.e. reselling some of their unused concessions) and underpaying the PICs [49]. What is more, \$18 million of US development aid is closely tied to the agreement. William Gibbons-Fly, the chief negotiator to the current SPTT, made it abundantly clear that the whole package, including foreign aid to the PICs, is "dependent on the extension of the treaty" [50]. This has driven a wedge between the PICs. While resource poor islands see great profit in the US-development aid, resource rich parties to the Nauru agreement (PNA)¹⁰ value their fish higher than their current share of the US agreement and have established a scheme allowing them to capture relatively high payments from other DWFNs¹¹. As a response to the inflexible position of the US representatives, Papua New Guinea, which is one of the 17 PICs, in early 2011 announced to repudiate the treaty as they consider it outdated. Although the US government asserts that their access payments outcompete every other DWF in the region, local sources contend that US-payments represents at most one quarter of fees paid by Asian DWFs for tuna [49].

3.1.3. Japanese agreements

Japan was one of the very first countries to conclude fisheries agreements in the Pacific area. Japanese industry associations negotiate with ACP governments in the presence of the Japanese government. The far-stretched network of Japanese distant water fleets has been decreasing over the last three decades as a result of high fuel prices, stagnating fish prices and nationalized EEZ areas around the world. As a result, fish caught outside the

Japanese EEZs dropped from over 5 million tons in the mid-80s to less than half a million tons in the late 90s. The figure has stabilized to around 1 million tons over the last few years (Sea Around Us project).

At present, Japan has agreements with nine Pacific Island Countries for which the terms of agreements are not publically available. It is known, however, that access fees are generally fixed at 5% of the export value of captured fish, a rule that has been criticized as it creates incentives to underreport and distort landing data [51]. The once dominating DWFN in the Pacific region has become only one player among many. Similar to treaties between ACP countries and the US or EU fleets, the Japanese agreements are tied to foreign aid: While their access fees in the region amount to around US\$ 8 million per year, Japanese foreign aid programs add up to around US\$150 million per year [7]. The unquestionably high competition with other Asian, European and US-DWFs, as well as a growing self-consciousness of coastal states in the Pacific has recently made Japan agree to revise the conditions of the agreement in favor of host countries [52].

3.1.4. Russian, Chinese, Korean, Taiwanese and Philippine agreements

All remaining fishing agreements between major distant water fleets and tropical host countries are entirely opaque. A small amount of unverifiable and mainly anecdotal knowledge suggests the following:

- Prevalence of simple "pay, fish and go" agreements that merely specify the number of vessels allowed per year [9,10].
- Low payment. [53] Estimate that access fees from Taiwan and South Korea represent less than 4% of landed value for agreements in the Pacific. Based on few historic and some more recent agreements, [10] assert that EU and US-agreements yield higher pay-offs for host countries than non-EU agreements.
- No transparency. To the outsider, the details of agreements are entirely unknown. This weakens the negotiation power of other host countries since comparability is made impossible.
- High rates of illegal, unregulated and unreported (IUU) fishing. IUU fishing seems to be more prominent in East Asian and ex-Soviet fleets than it is in EU and US-fleets. As an example, the IUU black list compiled by Greenpeace [54] suggests that 60% of IUU vessels are of East Asian and Russian origin while 15% are European and no US-vessels have been blacklisted. It has to be noted of course that this does not provide a measure on the quantity of illegally landed fish.

3.2. A shift in distant water powers

In order to quantitatively and historically track the changes of distant water fishing, as well as to detect current trends in power shifts, the only viable data source are landing weights as reported by fishing nations to the Food and Agriculture Organization (FAO). In its quality as a UN-body, the FAO is not permitted to officially challenge the quality of the data, which can be imprecise, biased and often misleading. In fact, at every step in the chain of reporting, incentives to over- or underreport exist, leading to severe information failures in up to 58% of total catches See for example [55]. As opposed to the FAO, the "Sea Around Us" (SAUP) project at the University of British Columbia has been working on modifying and enhancing FAO data, adjusting them to obvious under-or over-reporting as well as increasing the precision of geographic attributes, among others. In this section, SAUP- data are used to conduct the following two assessments:

¹⁰ The PNA consists of eight PICs that hold an estimated 85% of all tuna resources within their EEZs.

¹¹ This scheme, known as the "vessel day scheme", allows vessel owners to purchase and trade days fishing at sea in places subject to the PNA (<www.ffa.int>).

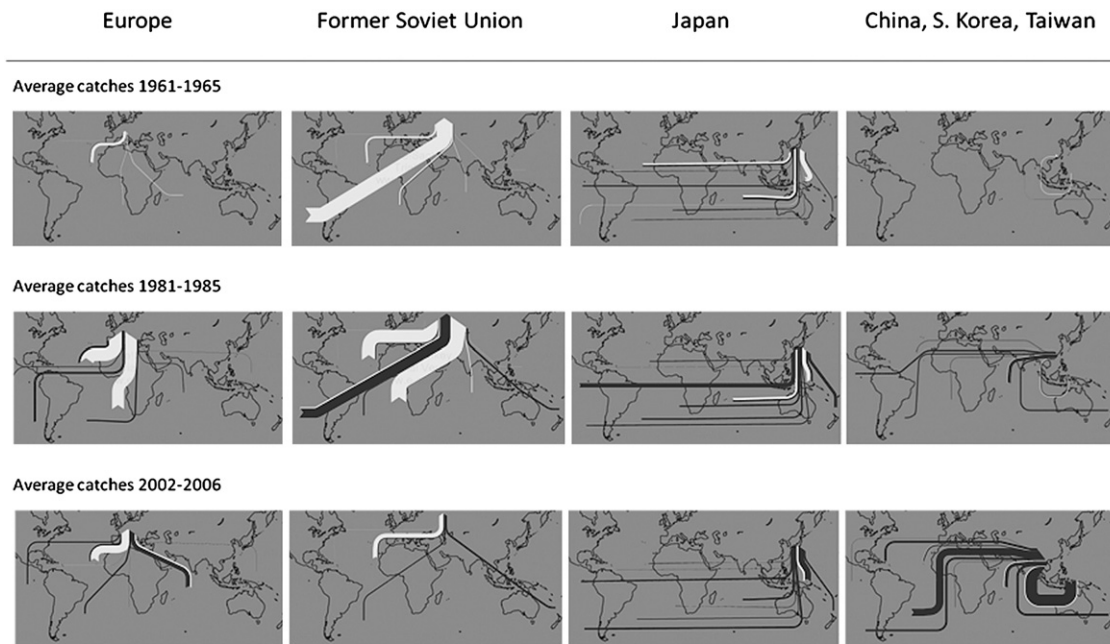


Fig. 1. Spatio-temporal development of distant water fishing fluxes between 1961 and 2006. Black fluxes indicate open ocean fisheries while white fluxes are fish caught in national EEZs.

Note: underlying data extracted from < www.seaaroundus.org >.

1. Spatio-temporal development of four major (sets of) traditional fishing countries namely EU, Japan, the ex- Soviet countries and China, Taiwan and South Korea (Fig. 1);
2. Identification of the major distant water fleets by the relative weight that each nations extract from foreign, tropical and subtropical exclusive economic zones (Table 2),

3.2.1. Spatio-temporal development of major DWFNs

Fig. 1 shows three main developments of international distant water fisheries in 'Southern' waters¹². Underlying data include catch weights per EEZ and catches per high seas region by fishing country, aggregated into corresponding FAO fishing areas. Data was extracted from the SAUP-website¹³. The following three developments are, perhaps, most noteworthy:

First, an expansion of fishing grounds and an increase in catches for all parties involved can be observed between 1961 and 1985; second, a drop of distant water landings as well as a reduction of fishing areas for Japan, EU and the former soviet countries thereafter; and third, a further increase of Chinese, Taiwanese and South Korean catches and fishing areas up until 2006. Some of the most important reasons for this development include (i) the collapse of the Soviet regime in 1990 leading to sudden reductions of subsidized distant water fleets [56], (ii) the oil crisis and stagnating fish prices in Japan in the 70s, (iii) The increased development of national fisheries as in the cases of Namibia, South Africa, Argentina, Peru and Chile (see for example [22] and (iv) higher competitiveness

of Asian fleets [50] and personal communication with Dominique Greboval, Senior Fishery Planning Officer FAO).

3.2.2. Major distant water fleets

Table 2 elaborates on Fig. 1 by identifying those countries that have contributed to over 90% of foreign fishing in tropical EEZs between 2002 and 2006. For the preparation of Table 2, landing weights of every EEZ per fishing country (as extracted from the SAUP-webpage) were divided into domestic (caught by adjacent country) and non-domestic catches (caught by others). The table shows that only very few DWFNs dominate distant water fishing in tropical regions. As opposed to Fig. 1, Table 2 does not present China, South Korea and Taiwan as major distant water nations, at least not in tropical EEZs. We assume that this discrepancy is due to inaccuracies in the SAUP-algorithms as pertaining to the importance that they attach to existing knowledge on fishing agreements.

3.3. The rise of south-East Asian fishing countries

Data on global fisheries catches show a steady rise until the late 1980s and a plateau thereafter. This however masks the underlying dynamics of global fisheries. One interesting way of looking at the data is to geographically distinguish between fishing countries. As Fig. 2 shows, this yields a very different picture. While the "traditional north" countries (Japan, EU, North America and the FSU) show dramatic declines in their fish catches since the 90s, Low-Middle income countries and emerging economies in Asia and Africa are buffering this downward trend. China, Taiwan and South Korea seem to have reached a plateau in catches, whereas Southeast Asian countries continue to increase catches.

4. The host countries' perspective

4.1. Major tropical host countries

The SAUP-data used beforehand also allowed us to distinguish between domestic and foreign catches in each EEZ. These data are

¹² 'Southern waters' are all ocean areas adjacent to Africa, South- and Central America and South East Asia, as well as the Indian Ocean. Landing data include catches made in both open oceans and EEZs.

¹³ The Sea Around Us webpage < www.saup.org > contains FAO fisheries statistics that are modified to correct for Chinese over reporting as well as to increase the geographic precision of the data. Spatial information on catches follows an algorithm based on taxonomic distributions, a fishing access database compiled by SAUP (not public) and Spatial references of landings as provided by the FAO. Also, in few cases catch weights might have been lost as SAUP only shows the 10 most prominent fishing countries per EEZ.

Table 2
Major DWFNs in ACP regions and their main fisheries.

Fishing Country	Financial compensation to host country	Source country (only ACP)	Average catch weight 2002–2006	Contribution to total DWF-catches in ACP countries (%)	Contribution of fishing country to overall distant water catches in source country (%)	Contribution of fishing country to overall catches in source country (%)	Type of fishery
Thailand	N.A.	Malaysia	763852,8	35,4	100,0	51	Mixed fishery
		Myanmar	248536	11,5	99,7	18	Mixed fishery
		Somalia	216	0,0	4,2	1	Mixed fishery
		Total	1012604,8	46,9			
European Union	€100/tonne; for most agreements this amounts to 13% of landed value	Morocco	225044,4	10,4	48,9	16	Demersal, Pelagic, Tuna
		Mauritania	60670,8	2,8	58,8	20	Crustaceans, Demersals, Pelagics, Tuna
		Senegal	19274,2	0,9	25,7	4	N.A.
		Mauritius	17539,4	0,8	59,0	44	Tuna
		Seychelles	17246,2	0,8	79,6	57	Tuna
		Madagascar	15122,6	0,7	57,9	11	Tuna
		Cape Verde	5886,4	0,3	84,9	49	Tuna
		Guinea	5251,8	0,2	86,4	5	Shrimp, Pelagic finfish, Cephalopods, Tuna
		Mozambique	4775	0,2	59,5	21	Tuna
		Kiribati	4413,8	0,2	20,0	13	Tuna
		Guinea-Bissau	4225,2	0,2	87,0	39	Shrimp, Pelagic finfish, Cephalopods, Tuna
		Cote d'Ivoire	2663	0,1	83,6	7	Tuna
		Namibia	2533,4	0,1	100,0	1	N.A.
		Angola	2435,6	0,1	18,4	1	N.A.
		Dominica	2381,6	0,1	100,0	74	N.A.
		Comoros	2247,8	0,1	84,1	48	Tuna
		Gabon	1367,6	0,1	11,8	3	Tuna
		Sao T. & Principe	1328	0,1	78,2	24	Tuna
		Total	394406,8	18,3			
Russia	N.A.	Morocco	96119,2	4,4	20,9	16	Small Pelagic species
		Senegal	27337,8	1,3	36,4	4	
		Angola	3414	0,2	25,8	1	
		Total	126871	5,9			
Philippines	N.A.	Indonesia	102062,6	4,7	99,6	3	Tuna
		Total	102062,6	4,7			
Japan	Generally 5–6% of landed value	Solomon Isl.	57415,2	2,7	88,4	74	Tuna
		Kiribati	13179	0,6	59,6	13	
		Fiji	7627	0,4	100,0	34	
		Mauritius	2833,2	0,1	9,5	44	
		Madagascar	2528,8	0,1	9,7	11	
		Morocco	545	0,0	0,1	16	
		South Africa	435,8	0,0	21,1	0	
		Cote d'Ivoire	309,4	0,0	9,7	7	
Japan (contd.)	Generally 5–6% of landed value	Sao T. & Principe	211	0,0	12,4	24	Tuna
		Gabon	198,8	0,0	1,7	3	
		Tanzania	145	0,0	10,3	1	
		Mozambique	99,6	0,0	1,2	21	
		Bahrain	58,6	0,0	0,4	0	
		Total	85586,4	4,0			
Ukraine	N.A.	Morocco	63239,4	2,9	13,7	1	Small Pelagic species
		Senegal	2404	0,1	3,2	4	
		Total	65643,4	3,0			
Sri Lanka	N.A.	India	51362,4	2,4	95,6	1	Tuna, Crustaceans
		Total	51362,4	2,4			
Nigeria	N.A.	Cameroon	27637	1,3	100,0	30	Pelagic finfish, small pelagic species, Shrimps
		Gabon	9784,4	0,5	84,8	3	
		Total	37421,4	1,7			

Table 2 (continued)

Fishing Country	Financial compensation to host country	Source country (only ACP)	Average catch weight 2002–2006	Contribution to total DWF-catches in ACP countries (%)	Contribution of fishing country to overall distant water catches in source country (%)	Contribution of fishing country to overall catches in source country (%)	Type of fishery
Taiwan	Literature disagrees, fees vary between 2% and 6% of landed value	Nauru	6141,8	0,3	77,0	77	Tuna
		Mauritius	5660,4	0,3	19,0	44	
		Madagascar	5226,8	0,2	20,0	11	
		Maldives	3306,6	0,2	58,0	2	
		Somalia	2907,8	0,1	56,8	1	
		Brazil	2211,8	0,1	91,5	1	
		Mozambique	1820,2	0,1	22,7	21	
		Tanzania	761,2	0,0	54,3	1	
		Myanmar	695,8	0,0	0,3	18	
		Bahrain	193,6	0,0	1,4	0	
		Total	28926	1,3			
Marshall Isl.	N.A.	Micronesia	9433,8	0,4	56,1	42	Tuna
		Papua New Guinea	7654	0,4	44,5	3	
		Solomon Isl.	4855,8	0,2	7,5	74	
		Palau	2047,4	0,1	43,3	41	
		Kiribati	1340,2	0,1	6,1	13	
		Nauru	756,2	0,0	9,5	77	
		Tuvalu	549,8	0,0	31,2	25	
		Total	26637,2	1,2			
		Senegal	13550,4	0,6	18,1	4	
Korea South	Literature disagrees, fees vary between 3 and 6% of landed value	Angola	7367,6	0,3	55,7	1	Tuna and pelagic finfish
		Morocco	477,4	0,0	0,1	16	
		Bahrain	432,2	0,0	3,2	0	
		Jordan	6,2	0,0	41,3	4	
		Total	21833,8	1,0			
Total general (including all DWF countries)	2160636,4	90,4					

Notes: Underlying landing data extracted from <www.seaaroundus.org>; compensation payments from [7,9,10]; “Type of fishery” from fishstat+ (<www.fao.org>) and [10]. N.A.= not available.

presented in two forms. In Fig. 3, it is shown which tropical EEZs contribute to the majority (96%) of global distant water landings. Table 3 lists all host countries in whose EEZs domestic fishing accounts for less landings than fishing by DWFNs. It is interesting to note that the highest foreign catches are taken from host countries that mostly fall into one of the three categories: (i) highly productive waters (Western Africa, PIC countries), (ii) large EEZs (Islands of the Western Indian Ocean, PICs) and (iii) proximity to rising, Asian fishing nations (Malaysia, Myanmar, PICs). Table 3 on the other hand shows that almost all host countries whose domestic catches contribute to less than half of their EEZ's catches are economically weak, small island states for which fishing represents a significant contribution to national GDP.

4.2. The logic behind Host countries' contracting strategies

From a social welfare perspective it would seem rational if host countries were to sign agreements with DWFNs whose fishing agreements would be likely to result in socially desirable, ecological sustainable and the most economically profitable outcomes. At first sight, characteristics of agreements leading to these outcomes seem to include (i) Sharing fisheries' technical information in order to appraise population dynamics and set appropriate TACs [57,9]; (ii) Assistance of DWFNs in fisheries

management of host countries to offset capacity constraints [10]; (iii) Collaboration in the development of national fisheries infrastructure in order to help host countries undergo a transition from external exploitation of national resources to capturing the full wealth of resources themselves, including the integration of EEZ fisheries as well as developing value-adding processes in national economies. [10] report that over 90% of profits for developing host countries can be derived from value-added processes such as canning, smoking and packing, as the examples of the Seychelles and Côte d'Ivoire (the Ivory Coast) show. Similar results are presented in [58] who note that developing countries control a relatively small share of the overall value chain in fisheries compared to developed countries. As an example, Tanzanian and Moroccan companies control less than 50% of the entire value chain of Nile perch and anchovy respectively (as compared to over 70% in Iceland for example); (iv) Facilitating market access. Foreign markets allow higher profits for both raw and processed seafood but higher hygiene standards as well as import tariffs impede access to such markets for small entrepreneurs in developing countries [59]. Any investment into domestic fisheries and fisheries infrastructure thus needs to be preceded by meaningful trade partnerships facilitating the access to profitable markets; and above all (v) payment of high access fees.

Despite the difficult access to attractive markets, which remains a serious obstacle for many tropical countries, the characteristics described above are best represented by the agreements from European and US-governments [30,10]. Nonetheless, these are among the DWFNs that are losing most ground in distant water fishing. Meanwhile, Asian DWFNs – which have received most criticism from environmentalist organizations concerning IUU fishing and noncompliance with the CCRF – are quickly growing their share in international fisheries. This could be for one of three reasons.

First, characteristics that we assumed to be beneficial to host countries in the long run might not entirely overlap with the short-term imperatives that these countries face. As a result, the patronizing character of EU agreements (and to some extent US and Japanese agreements), as exemplified by earmarked access fees, potentially conflicts with the necessity of economically weak host countries to flexibly spend concession payments as gaps arise in the public budget. Such flexible spending is facilitated in the case of other DWFNs, that “pay, fish and go” and see

access agreements more as a business than as a development partnership.

Second, negotiators and decision makers in developing countries might abuse fishing agreements for personal, political or financial ends. As an example, it has been reported that in contrast to Western interests of poverty-reduction, negotiators representing Asian distant water fleets tend to accommodate decision makers of African host countries with financing “grand and prestigious buildings [...] that African leaders highly appreciate for their own political reasons” [60, P.467].

Third, in many cases it seems to be the case that host countries indiscriminately sell licenses to all potential buyers. Due to the little biological information on the stocks and due to a general lack of fisheries technical- and economic data, fishing rights are handed out at least as long as no striking signs of collapsing stocks are observed.

In general, decision-making in tropical developing countries often is governed by high uncertainty of market development and severe budgetary deficits, as well as structural debilities of the national economy. Given high discount rates and political priorities that need immediate attention, the primary interest is often plug immediate deficits today rather than hoping for some fish stock to pay-off tomorrow. This rent-seeking behavior with resulting low GDP growth is a typical symptom of resource-rich countries and generally referred to as “the resource curse” (see for example [61]). Although the resource curse tends to be more obvious for non-renewable point resources such as minerals and oil, four factors influencing the magnitude of the “curse” suggest that fisheries in general and fishing agreements in specific can be characterized as a case of a resource curse: weak property rights, unstable institutions and the capital-intensive nature of resource extraction [62], as well as the foreign aid character of government fees [63].

The tendency to sell off natural resources is exacerbated by high uncertainty about the stock biomass: Both the migratory behavior of many fish stocks and the open access nature of fisheries in coastal developing countries discourage efforts of precautionary fisheries conduct: Neither on the fishermen level nor on the country level does the investment into non-fishing promise to render secure payoffs to the “investors”. On a regional level it has long been suggested (and is legally binding since 2001 through the UN “Fish Stocks Agreement”) that the problematic management of shared resources be addressed via cooperative management between countries and DWFNs sharing access to straddling and highly migratory fish stocks [64]. In a situation of uncertain amortization, “investing” into the fish stock by

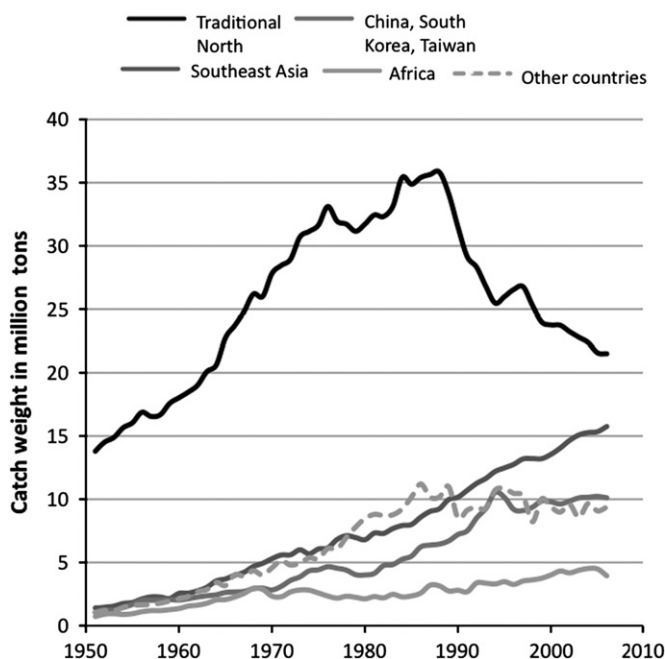


Fig. 2. Landings of marine fisheries for five clusters of countries. (“other countries” excludes Peru)

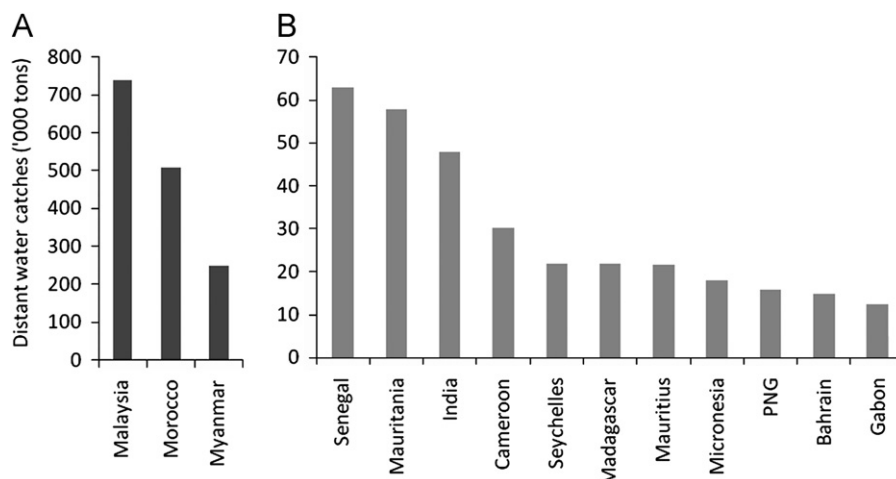


Fig. 3. Highest distant water fishing in ACP countries (2006). Note: A includes countries with considerably higher catches than those under B.

Table 3

Tropical developing countries with the lowest proportion of domestic fisheries (sorted by column 3).

ACP host countries with lowest share in catch of own EEZ	Average annual catch (2002–2006, in metric tons) made in EEZ	Percentage of EEZ catch taken by host country (%)	Contribution of fisheries sector to GDP (%)	Access fees as percentage of total government revenues	GDP/capita ('000 US \$)
Guinea-Bissau	10.875	55	4	N.A.	0,137
Malaysia	1.492.694	49	2	N.A.	6,29
Bahrain	26.805	49	0	N.A.	6,915
Comoros	4.682	43	15	2	0,214
Cape Verde	12.002	42	1	N.A.	3,18
Kiribati	35.258	37	22	41	1,35
Seychelles	30.022	28	30	N.A.	7,678
Dominica	3.221	26	2	N.A.	3,655
Mauritius	39.714	25	1	N.A.	4,804
Micronesia	22.490	25	10	10	2,308
Tuvalu	2.169	19	8	13	1,909
Solomon Isl.	77.328	16	6	4	0,879
American Samoa	1.495	13	0	0	8,0
Palau	4.965	5	6	3	7,473
Nauru	7.981	0	10	17	2,263

Sources: underlying landing weights data: < www.seaaroundus.org >; column 4: data courtesy Kieran Kelleher, The World Bank; column 5: < www.fao.org >; column 6: < www.cia.gov >.

decreasing fishing effort often is politically unfeasible. This is exacerbated by the ecological dynamics of fish stocks that often allow consistent landing weights while masking weakening fish populations. In fact, landing weights can long cover dramatic biomass declines; [65] estimate that 21% of global stock collapses can be defined as 'plateau-shaped' collapses, denoting sudden falls of persistently high levels of catches.

5. Conclusions

Whilst the limits of productivity in our oceans are becoming more clear-cut every year, meaningful plans to ensure high, sustainable yields continue to lack vigor. This is especially true in tropical developing countries where poor fisheries technical data and the resulting uncertainty about stock biomass cannot "compete" against the daily imperative of generating income and resulting myopic decision making. Next to the uncontrollable nature of open access in local small-sale fisheries, many coastal ACP countries therefore grant foreign fleets access to national EEZs, a fast and secure source of foreign exchange earnings. Meanwhile, the rent seeking strategy of selling fishing rights rather than domesticating its inherent wealth through own exploitation and value-added mechanisms has isolated developing countries in the lowest levels of the value chain, where they capture far less of overall wealth than would be possible if processing, wholesale and possibly even retailing was integrated into the national economy. In addition to potential economic losses, this strategy deprives host countries from valuable data that are required for sustainable fisheries management and for improving negotiation power in signing agreements in the first place.

Given the common negative impacts of foreign fishing on local ecosystems and communities, the clear "shift of powers" in distant water fishing is alarming. While European, US- and Japanese distant water operations have contributed to overfishing in many occasions, their distant-water politics are gradually moving towards more responsible fishing. This, however, is not yet the case for the rising Asian distant water fleets. It is important to note that the positive trend especially in the EU and US has been significantly driven by civil society. In contrast, NGOs in the respective Asian countries "typically are poorly funded, have little access to information, and often lack a visible presence or audible voice in international governance processes"

[66, p. 16–17]. The commitment of "Western" fishing powers towards improved standards of security and comfort on board, proper wages and insurances, compliance with port measures as well as with UN-agreements and conventions has lead to a significant decrease in their distant water operations. This is clearing the space (both in terms of fishing capacity and supply) for rising fishing powers many of which lead the lists of IUU infringements [67] and are characterized by non-transparent fishing agreements as well as high growth rates of distant water operations.

The threat of distant water fishing and the state of dependence that developing countries are caught in is not easily reverted. They might make a transition to domestic fisheries or invest into local value-added infrastructure, but it is not certain that this will increase the control over, and wealth gained from, national fisheries resources. Such a transition deserves, however, more attention than it currently receives. Promising policy adjustments to realize a transition would aim at the following changes:

- (i) A higher involvement in the value chains of key fish commodities originating from domestic EEZs in order to increase local employment. This requires a good understanding of the dynamics of supply of and demand for such goods. Whether or not, for example, the establishment of processing plants will be profitable, might depend on a variety of factors, including the degree of vertical integration in respective supply chains, the volatility of prices, the distance to markets, or the scale of production that is possible in a given ACP country.
- (ii) A stepwise reduction of foreign fishing effort in exchange of well-controlled increases in domestic harvest. Ending fishing agreements, paired with effective fisheries management plans, can result in a higher intensity of domestic harvest. This has the potential to increase the control over marine fisheries resources, among others, as data collection procedures can be better controlled and standardized. This, in turn, is the basis for an ecologically more sustainable exploitation and thus promises higher payoffs in the long run. Whether or not making a transition to domestic harvest is generally desirable has to be decided on a case-by case basis. Of course, such transition will often be limited by the lack of investment funds in the host country.
- (iii) An increase in negotiation power in order to gain higher payments for resources harvested by distant water fleets.

One of the main reasons for a meager financial compensation in fishing agreements is the small negotiation power of many developing countries. Intensified cooperation between ACP countries, through coordinated or even joint negotiations, and a higher degree of transparency concerning contracts of similar host countries (with respect to volume of harvest, species composition and state of stocks) will help these countries to strengthen their position in negotiations. In addition, this requires a good knowledge about the state of stocks, which can benefit from a higher involvement of domestic fisheries.

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