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## **THE PLIGHT OF THE FISHERS AND THE MANAGEMENT OF IUU FISHING**

### **Abstract**

It is now four decades since the conclusion of the Law of the Sea Convention, which came into force in 1994, and an appropriate point to review the human dimension of the development of global fisheries during this period, with special reference to the widespread exploitation especially of migrant fishers. The scale of global fisheries activity is reviewed with reference to statistics on the catch of wild fisheries, followed by a focus on the small-scale fisheries characteristic of the developing world on the one hand, and the industrial distant water fisheries operated largely by regions within the developed world on the other. The plight of the fishers is then considered in terms of both their living and working conditions and the management system which applies to their circumstances. The legal basis provided by the Law of the Sea Convention and related legal enactments are noted, including the several agreements concluded under the aegis of United Nations agencies. Finally, the world of enforcement in the context of emerging polycentric management is discussed, underlining the long-term nature of the extreme difficulties which must be faced to mitigate the plight of the fishers.

### **Keywords:**

Migrant fishers  
Exploitation  
UNCLOS  
IUU fishing

## **1 Introduction**

The fortieth anniversary of the signing of the Law of the Sea Convention (LOSC) is an appropriate time to take the long view on the state of the world ocean encompassing both the marine environment on the one hand and its use by humankind on the other. Within this broad theme this review focuses on the global fisheries with reference to the fishers, beginning with an overview of the development of the fisheries since the conclusion of the LOSC negotiations in 1982, highlighting the regional patterns involved, especially the contrast between coastal fisheries on the one hand, and distant water fisheries which characterise the deep ocean on the other. This review then considers the status of the fishers, including living and working conditions; and the impacts on the fishers which can be traced back to both the workings of the global industry and the management by both state and non-state actors. The role of the legal underpinnings and related enforcement issues are then reviewed before concluding with a discussion of the emerging polycentric system of ocean management in relation to its implications for the fishers.

It is worth noting that the “fishers” are predominantly fishermen. In the long-term development of fisheries from traditional bases to various forms of industrial organisation have been characterised by a gender-based division of labour, in which the men went to sea, and the women played a dominant role in the shore industry, especially in fish processing and to a lesser extent marketing also. This remains especially true in the contemporary small-scale fisheries (SSFs) of the developing world as well as remaining notable in many developed world fishing industries.

## **2 Global fisheries and the Law of the Sea**

A useful starting point for understanding the plight of the fishers in early 2023 (the time of writing of this review) is to consider the current state of global economic development, which is in the process of transitioning from the long stage which commenced around the end of World War II and witnessed the enormous post-war development of the global economy, to a new and apparently long stage characterized among other things by extreme pressure exerted by human activities on the global environment and corresponding pressure on humankind [1]. One outcome of these circumstances is wildlife decline and social conflict [2] evidenced in fisheries by decline of fish stocks and concurrent damage to marine ecosystems, as well as widespread poverty and labour malpractices among the fishers – in short, the plight of the fishers. A symptom of this is the process of ocean grabbing [3], involving appropriation of marine resources with scant regard to related environmental and social impacts.

Assessment of these impacts begins with consideration of data relating to both fish stocks and economic and social implications of fishing. As far as fish stocks are concerned, the dominant pattern since the middle of the twentieth century has been the inexorable rise of catches, levelling off towards the end of the century and into the twenty-first (Fig 1). The primary source for global data is FAO [4,5], which has faced a long-term mammoth task to create the statistical infrastructure needed, bearing in mind the vast differences between the developed states on the one hand, and developing states on the other in their abilities to provide the national bases of these statistics [6]. The difficulties encountered have been highlighted by the *Sea Around Us* project based in the University of British Columbia [7-9]. The outcome has been an estimated higher level of catches than that recorded on the original FAO database (Fig.1) [10]. The true regional complexities involved are amply illustrated in *The Global Atlas of Marine Fisheries* [11]. Further, the pressure exerted by global fisheries in the twentieth century overall is graphically illustrated by the long-term decline of fish biomass in the world ocean [12].

(FIG 1 ABOUT HERE)

The impacts of fisheries on both subsistence and commercial fish stocks and corresponding ecosystem impacts in turn focuses attention on the implications for the fishing industry and fishers. Of particular concern is the likely scale of activity and impacts of fisheries which do not comply with national (within Exclusive Economic Zones (EEZs)) and international (beyond EEZs) management measures. At the top of the agenda since the closing decades of the twentieth century has been Illegal, Unreported and Unregulated (IUU) fishing especially in the open ocean beyond state jurisdiction, and marked increases in fisheries conflicts among states. The first detailed research on IUU fishing at a global scale was published in 2009 [13] and revealed large-scale IUU fishing worldwide characterised by substantial regional variations in activity, with developing countries being most at risk, together with marine ecosystems. By 2020, FAO has estimated that one in five fish in the global ocean were being caught illegally [14], while the 2021 IUU Fishing Index records only a very small reduction since its launch in 2019 [15].

A key circumstance encouraging overfishing is global fisheries subsidies designed to enhance fishing capacity, concentrated in the major fishing market regions, including China, the European Union, USA, the Republic of Korea, Japan and Taiwan [16]. Although the level of subsidies has declined between 2009 and 2018, it is still substantial [17]. These subsidies “are not effective at competing with large fishing nations and worsen poverty in the long-term” [18]. On 17<sup>th</sup> June 2022, the World Trade Organization (WTO) agreed a set of rules prohibiting IUU fishing, fishing of overfished stocks, and fishing beyond the control of Regional Fisheries Management Organizations (RFMOs) [19].

It is instructive to consider the expansion of global fisheries in the context of the emerging law of the sea applicable to fisheries over the same timescale (Fig 1). The Convention of 1958 and the UNCLOS II negotiations in 1960 marked the beginning of a process of development of state practice, culminating in the UNCLOS III negotiations which commenced in 1973 and ended with the completion of the LOSC in 1982 [20]. The 1982 Convention is primarily an economic treaty, concerned with the division of ocean space among states and corresponding division and sharing of natural resources, thus reflecting the continuing emphasis on the theme of economic development characteristic of the second half of the twentieth century and already illustrated for fisheries by the discussion above. The negotiation of the Convention was a mammoth and complex undertaking, a reflection of the complexity of the global fisheries [21,22].

The signing of the Convention in 1982 marked the beginning of a process of framing a series of conventions and agreements specific to fisheries under the auspices of UN agencies – primarily FAO and ILO. Taken together, these cover comprehensively every major aspect of fishing operations applicable to the fisheries resources and marine environment on the one hand, and the human dimensions on the other. The overall outcome is a legal and organisational seascape of considerable complexity covering the global ocean both within and beyond national jurisdiction which is nonetheless to a significant degree uncoordinated and lacking in proper integration of management measures [23]. Optimistically this can be regarded as the gradual emergence of a polycentric system of fisheries management needed to deal with overall sustainability of fisheries resources, and the related environmental and social issues involved [24].

### **3 Fishing communities and distant water fishing**

The history of development of coastal fishing communities worldwide extends over many centuries, whereas the history of development of distant water fishing is measurable for the most part in only a few hundred years, with much if not most distant water fisheries having evolved from the fishing communities, especially since the expansion of the European economy from the sixteenth century onwards. Meanwhile the pattern of long wave expansion and contraction of the global economy already noted above has been superimposed upon both fishing communities and distant water fishing, spanning both the developed and developing worlds. At the current juncture of global economic development, both types of fisheries have responded to varying degrees in both developed and developing worlds [25,26]. However, in the present context of the plight of the fishers, emphasis is very much upon the situation in the developing world.

For the traditional fisheries, now frequently termed small-scale fisheries (SSFs), current issues include overcapacity exacerbated among other things by increasing populations and poverty, thereby simultaneously increasing pressures on local fish stocks, and encouraging migration, including migration to work in distant water fisheries. Although there are widespread subsistence economies, there is also a need to secure markets and aim for secure and resilient communities [27,28]. For distant water fisheries, there is also the issue of overcapacity, the need to drive down costs – especially labour, leading to debt bondage and slavery, and associated with the use of substandard vessels and the destruction of offshore stocks and marine ecosystems to supply ever expanding markets located for the most part in the more developed parts of the world [29].

A significant aspect of fisheries development has been direct conflict between the fishing communities and distant water fishing, which became increasingly important with the advent of steam trawling in the first instance, especially from the 1890s onwards. Important examples include the creation of exclusive fishing zones in the Moray Firth [30]; the conflict between the United States on the one hand and the coastal states of the South East Pacific on the other [31]; the Icelandic cod wars [32]; and the now widespread conflicts, for example off the coasts of West Africa [33]. All this

intensifies the plight of the fishers in both types of fisheries. However, there have also been significant cases of cooperation between fishing communities on the one hand, and distant water fisheries on the other, most notably among the Small Island Developing States (SIDS) in the Pacific Ocean, where certain states have in effect leased their EEZ fish stocks to distant water fishing operations. Unfortunately, a significant number of these agreements, variously covering licensing, access, monitoring and inspection have been associated with substantial levels of corruption [34].

Overall, the situation for both types of fisheries is now one in which there remains widespread overfishing – destruction of fish stocks and damage to marine ecosystems on the one hand; and social conflict on the other, the latter including trafficking of fishers from poor developing regions – including their coastal fishing communities – to work often under appalling conditions on distant water fishing vessels operating out of major fishing ports worldwide, particularly across tropical and sub-tropical regions of the world ocean.

#### **4 The experience of the fishers**

The nature of the fishers' experience in a world of relentless economic development with its contrast between developed regions and commercial fisheries on the one hand and developing regions with small-scale fisheries on the other is characterised especially by poverty in many fishing communities in the developing world coupled with the need for migration of fishers to seek better opportunities elsewhere. Many of the migrants aim to enter the distant water fisheries which, although global in scope, are largely owned and managed from the four major market regions of North America, Western Europe, East and South East Asia and Japan from whence most of the insatiable demand for fish originates.

In contrast to the science-based and highly organised system for data acquisition on fish catches and dispositions, the data relating to both SSF and IUU fishing operations is opaque at best, and relies on numerous press reports, at sea field studies by non-governmental organisations (NGOs), and official studies and inquiries conducted by national and international state organisations, together with academic studies. Academic papers, NGO and official inquiries sometimes contain extensive and valuable references gleaned from media sources in both print and internet formats. Publications rich in media bibliographical material include, for example, Couper et.al. [35]; the work of the Environmental Justice Foundation (EJF) [36]; the United Nations Office for Drugs and Crime [37]; the International Transport Workers Federation (ITF) [38]; and the University of Nottingham Rights Lab [39]. A substantial number of academic papers have been published relatively recently, some of which are referenced in the discussion which follows. Overall, it is useful to consider the experience of the fishers in two broad categories: living and working conditions at sea on the one hand, and the plight of the fishers engendered by these conditions on the fishers at both individual level and as a specialised group of workers on the other.

##### ***Living and working conditions***

As regards living and working conditions, the risks of working at sea are shared by all fishers, in both small-scale fisheries close to the land and distant water fisheries offshore; as well as in both developed and developing regions [40]. These risks include those arising from working the fishing gear at sea and changing weather and sea conditions including storms at sea and large waves. [41]. The logistics of handing and landing catches exert economic pressures which may be associated with inadequate maintenance of vessels and gear and corresponding increased danger of accidents. Small-scale fisheries are characterised by small, often traditional craft and small crews operating as individual units which are often family-owned and thus especially vulnerable to the risks noted above. Distant water fisheries are often associated with substandard ships, increasing the physical risks

involved in fishing operations. Coverage of risk remains low – FAO estimates that only 16 per cent of motorized fishing vessels had adequate insurance cover in 2022, for example [42]. Because of all these circumstances and despite there being no reliable statistics, mortality in the fishing industry renders it the most dangerous of all industries [43].

The establishment of EEZs by coastal states during the UNCLOS III negotiations in the 1970s focused increased effort by distant water fleets of a handful of countries on the high seas in the Areas Beyond National Jurisdiction (ABNJ). Between 1950 and 2014 Taiwan, South Korea, Spain and China increased their mean distance to fishing grounds to between 2000 and 4000 km. Many of these distant water fishing fleets are crewed by migrant workers from less developed countries who are often trafficked and enslaved in these fishing vessels. An example of how they are trafficked through Thailand, from neighbouring countries, is illustrated in Fig. 2 [44]. Since 1950 distant water fleets have increased the total fished area from 60 per cent to over 90 per cent of the global ocean [45]. The result has been the emergence of extended periods at sea (Fig. 3), ranging from many months to years as far as migrant fishing crews are concerned, as individual fishers often may not even come ashore during the very limited periods when these ships are in port, not least because many of the ships are engaged in transshipment of cargoes at sea. The example of the voyage of the *MV Hatsukari* is illustrated in Fig.3 [46].

(FIG 2 ABOUT HERE)

(FIG 3 ABOUT HERE)

### ***The plight of migrant fishers***

The experience of hazardous working conditions and long uninterrupted periods at sea (Fig.3) inevitably often leads to severe physical and mental stress for the fishers. The outcome is poor occupational health presentations related to long hours of heavy physical work, including disturbed sleeping patterns, extreme fatigue, and poor diet leading to prevalence of cardio-vascular, respiratory, and gastrointestinal diseases. Sexually transmitted diseases including acquired immunodeficiency syndrome (AIDS) are also present in some regions, notably in South East Asia. In the realm of mental health, long hours, long voyages, and lack of time ashore lead to personal isolation and loneliness compounded by the absence of family and friends, which may lead to alcohol and drug-related problems. In extreme situations fishers may be exposed to bullying and harassment [47], violence and even murder. Outcomes may include depression, addictive behaviour and suicide. Job security for migrant fishers is frequently absent, thus increasing their vulnerability to poor mental health.

The lack of job security in working conditions in turn focuses attention on the overall management system applied to both individuals and groups of migrant fishers, beginning with trafficking including recruitment of under-age workers and progressing through forced labour and debt bondage to outright slavery. Beyond their work at sea may arise abandonment, desertion, detention and arrests and problems of repatriation. Much of the literature on trafficking is focused upon major fisheries regions such as Thailand, Taiwan, and Philippines among others [48-50] and sometimes offshore regions in which trafficked fishers are working, such as New Zealand [51]. The overall geographical patterns of trafficking are into the more developed fishing regions from poorer, more peripheral regions. Underlying the mechanisms of trafficking are often dubious contracting arrangements, ultimately resulting in the next stages of progress for the individual fisher – forced labour, debt bondage and slavery.

The reality of dubious contracting arrangements may end up as forced labour once migrant fishers are at sea [52-55], may be associated with child labour [56], and which may lead to debt bondage and

slavery. The prevalence of slavery has been graphically illustrated through the research underpinning the *Global Slavery Index – Fishing* [57]. In the top group of countries identified as high risk of labour abuses, seven were responsible for 39 per cent of the global catch, with predominance of distant water fishing, high levels of unreported catch and higher than average levels of fishing subsidies. A second group of smaller developing countries with mainly domestic and geographically local fisheries responsible for 31 per cent of the global catch were notably vulnerable to slavery aboard foreign-flagged vessels fishing within their waters. The circumstances surrounding fishing countries with high levels of slavery and debt bondage are complex [58].

Migrant fishers are at considerable risk of arrest by coastal state authorities when fishing within EEZs, for example, even though these fishers are working for employers who take the decisions of where to fish. Arrests almost inevitably lead to detention and may end in abandonment of the fishers by the fishing vessel owners. The complexities of fishing vessel ownership may make it difficult or impossible to trace the owners of such vessels who, although theoretically responsible for repatriation of fishers to their home countries, in practice do not assist with repatriation. Fishers are thus liable to be marooned in foreign countries with little or no resources to look after their interests. In situations such as this, or if fishers are being subjected to bullying and harassment at sea they may desert or “jump ship” at the first opportunity, and similarly end up unable to look after their interests [59].

Although by far the greatest illegal and otherwise dubious activities are associated with IUU fisheries in the open ocean and impact mainly on fishers from developing countries, there are significant cases of labour exploitation in fisheries in the developed world as well. One of the best documented examples concerns in the United Kingdom (UK). A key event was the deaths of 23 young Chinese cockle pickers caught by the incoming tide in Morecambe Bay in 2004. These migrants some who were smuggled to England, came to the UK from China in search of better economic opportunities. They were paid £5 for a 25kg bag of cockles. The primary cause of this disaster has been ascribed to inadequate application of the regulations applicable to the gangmasters in charge of the cockle-pickers concerned [60]. More recently, in the UK transit visas designed for seafarers in international shipping are being used to employ migrant fishers from the Philippines, Indonesia and Ghana on low wages associated with poor accommodation conditions, with those working in the scallop industry identified as being at particular risk [61-63].

### **The legal basis.**

The starting point for discussion of the legal basis is frequently the international conventions, especially the LOSC of 1982; and the Conventions framed by the United Nations agencies – principally FAO and ILO (Table 1). As already noted above, the LOSC is primarily an economic treaty. In the case of fisheries, the key sections are those relating to the geographical regions assigned to States, to fisheries, and to dispute settlement. The initial foci in the Conventions mainly deal with the allocation of resources among States Parties and the effective management of fisheries resources, taking account of both environmental and human factors to those ends. The Conventions of the UN agencies did not really come into being until the LOSC itself came into force in the mid-1990s, and the importance of the human dimension in fisheries management did not receive proper coverage until well into the 2000s, with the advent of the *Work in Fishing* Convention. From an overall management point of view, it is important to recognise that it takes a long time for most of these conventions to enter into force, as this depends on the coastal states signing up to these and a few conventions have not yet done so. It may be that individual states will adopt certain provisions of specific conventions into their national legal frameworks, even at the negotiation stage. This happened in many cases during the UNCLOS III negotiations between 1973 and 1982, when the provisions for declaration of EEZs took place.

(TABLE 1 ABOUT HERE)

From the standpoint of the plight of the fishers, a fundamental starting point is the division of the world ocean between coastal states on the one hand, and the open ocean beyond state jurisdiction on the other. Between 40 and 50 per cent of the world ocean is located within the jurisdiction of coastal states following the implementation of the EEZ. Here distinction must be made between the most developed states where a comprehensive legal basis and effective fisheries management measures are in existence; and developing states where there may be insufficient management infrastructure to ensure the implementation of legal measures and, more widely, effective management measures on the other. Even in developed states with strong legal and management frameworks, exploitation of fishers can take place, as evidenced above in the UK case: the UK acceded to the *Work in Fishing* convention in 2020 and has a Modern Slavery Act already on the statute book.

Under these circumstances it is hardly surprising the attention to the plight of the fishers is largely focused on the ABNJ – an area comprising geographically over half of the world ocean. At a global scale, the fisheries conducted in the ABNJ are less important than those governed by coastal states, which have fisheries management responsibilities extending over nearly all the continental shelves. However, the ABNJ does have some important fisheries, of which the tuna fisheries are most important. At a conceptual level, there is a need to further conceptualise transnational organised crime at sea [64,65]. At a practical level the emergence of agreements to prevent IUU fishing in the High Seas is exemplified by the first of its kind, the 2018 Agreement dealing with the Central Arctic Ocean [66]. However, there is notable interstate hostility related to maritime crime, where contested boundaries may act as sanctuaries for illegal activities such as IUU fishing [67]. The ABNJ is also attractive for transshipment of fish catch at sea [68], and there is substantial evidence of non-compliance in fisheries in certain cases, such as the tuna fisheries of the Indian Ocean [69].

From a management standpoint the significance of the legal basis is the application of existing legal frameworks in a practical sense [70], such as combating human trafficking and forced labour in fisheries [71], where individual states are now in the process of strengthening the legal basis necessary for the protection of fishers [72-76], especially in coastal state enforcement of legislation aimed at curbing IUU fishing. Spain as a leading distant water fishing state is an important example of progress being made [77-80]. Also important is the application of the law to the logistics chain for both trade and port state roles [81-83]. In the field of small-scale fisheries there is also evidence of some provision of a global safety net [84] through the work of FAO.

### **Enforcement and polycentric management**

The traditional view of enforcement of fisheries regulation is that of at sea arrest of vessels caught while engaged in illegal fishing operations. Most of this considerable activity is located within the waters of coastal states and falls within the purview of the fisheries protection services of those states. In the developed world most states have a substantial investment in fisheries protection of this kind. In many developing states there may be a lack of government resources to fund a fishery protection service.

One of the most spectacular instances of such an arrest occurred in Australian territorial waters in the vicinity of Heard Island on 7<sup>th</sup> August 2003. A fishing vessel, the *Viarsa 1* suspected of illegal fishing for toothfish was intercepted by an Australian Customs and Fisheries patrol vessel and ordered to stop. The crew of the *Viarsa 1* did not comply and a chase began which ended on 28<sup>th</sup> August some 2,000 nautical miles south-west of Cape Town after covering 3,900 nautical miles, when the *Viarsa 1* was surrounded by the patrol vessel which by this time had been joined by three further vessels. The



*Viarsa 1* was escorted to Fremantle, arriving on 3<sup>rd</sup> October. The representatives of the owners secured an acquittal by Jury in November 2005 after two trials and the fishers were free to return to their home countries [85] [86].

Such a straightforward approach to enforcement is very important and remains a primary objective of fisheries protection services worldwide. However, the management of the global fishing industry has now embarked upon a long road which takes account of the logistics chain beginning with the fish still in the sea and tracing these through the logistics chain, taking account of monitoring the fishing vessels at sea, the roles of the fishers and transshipping fish at sea, the parts played by national government fisheries departments within national waters, the role of RFMOs in the open ocean, landing fish at a fishing port, subsequent trading of the catch, fish processing, wholesale and retail distribution to eventually arriving at the consumer, be it an institutional or individual buyer [87].

It is now possible to monitor fish stocks at sea and passing through the logistics chain using DNA sampling [88] which in turn provides a contribution to management measures designed to improve traceability of fish entering the market [89]. Vessel monitoring systems (VMS) are now compulsory for much of the world's commercial fisheries and can be greatly strengthened using Automatic Identification System (AIS) technology [90] although problems are created in IUU fishing by vessels having their AIS switched off. This has now been developed into a near real time tracking system for vessels at sea [91]. The considerable potential of AIS in monitoring fishing activity is now being increasingly applied not only to tracking the location of fishing vessels at sea [92], but also for tracing the transshipment of fish catches at sea [93]. VMS technology can now also be used to monitor inshore fisheries, for example in relation to Marine Protected Areas [94].

At sea, the principal management organisations are the national government departments overseeing the fisheries within national waters, and the Regional Fisheries Management Organisations (RFMOs) operating across the ABNJ. Also important are the fishers themselves, who take the decisions on where to fish and which species to target. There are proposals to develop fisher-based management systems [95,96] and a recent Scottish-based initiative for fishers to assume direct responsibility for commissioning fisheries research covering the whole of the North Sea, rather than relying on the present top-down system of fisheries governance in the region [97]. In waters beyond national jurisdiction the RFMOs play the key role in management and are faced not only with the difficult task of monitoring fisheries activities, but also the imperative to coordinate diverse and often conflicting interests [98-101]. Meanwhile, transshipment of fish at sea remains a serious issue [102].

The management of the logistics chain from the point of landing is associated with complex patterns of trade and quality control. For example, in two of the three major seafood markets, the United States and Japan, there are substantial quantities of illegal and unreported fish entering the markets [103,104]. It has recently emerged that of the top 10 companies involved in IUU fishing, 8 are from China, one from Colombia, and one from Spain, with the largest proportion of IUU fishing located offshore West Africa [105,106]. The response to this is partly to establish certification systems, of which there are now several, notably including the Marine Stewardship Council (MSC). Initially aimed at the conservation of commercial fish stocks, these can also be used to mitigate the plight of the fishers [107,108]. Recently, supply chains have also been impacted by Covid 19 [109-112].

At the global level, FAO is currently engaged in a drive to encourage sustainability [113], while the United Nations Committee on Fisheries (COFI) has endorsed a campaign against IUU fishing [114]. Meanwhile, as already noted, in June 2022 WTO concluded an *Agreement on Fisheries* prohibiting subsidies to IUU fishing, to the fishing of overfished stocks, and to fishing on the high seas outside the control of Regional Fisheries Management Organisations [115]. In the medium term this should be an important measure to complement the measures associated with traceability. Even at the individual

level there are important influences on the efforts to end IUU fishing. A striking example is the life and work of the fisheries scientist Daniel Pauly [116].

Finally, the significant developments discussed above may be seen as the gradual emergence of an overall approach to fisheries governance at a global scale, although improving governance will remain only part of the solution to IUU fishing [117]. The security implications of fisheries within the wider context of ocean governance are considerable [118] which should encourage a global oceans governance approach [119]. However, such an approach would have to take account of the wildly varying abilities of coastal states to progress bearing in mind variations in the scale of administrative and financial resources relative to the tasks in hand. It is worth noting, for example, the very limited resources of (SIDS) in this regard, where cooperation among such states will be essential [120]. Approaching the governance dimension requires both a wide-ranging policy reform [121] as well as an eye for the practical measures needed [122].

## **Conclusion**

The starting point for understanding the plight of the fishers is an awareness of timescales for dealing with the problems involved, which are measurable in decades – perhaps at least two if not more decades. A second circumstance is that projected increases in global population envisages stability in numbers not being reached until at least the mid-twenty-first century. Following from this the demand for fish, both wild and farmed will increase not only because of the pressure of absolute numbers of people to be fed, but also because there will be pressure to increase standards of living and improve diets.

Meanwhile the statistical basis on the catching side of global fisheries indicates that wild fisheries remain to a substantial degree unsustainable, although there are wide regional variations in both absolute catches and species distributions of these. On the development side there is no comparable level of sophistication in statistics to act as a basis for either policy or practical management measures, which must therefore rely on other means as detailed above, including legal and enforcement measures aimed at both at sea activities and the logistics chain stretching from the fishing grounds on the one hand to the ultimate consumers on the other.

The results of the conflict between diminishing resources and inexorable development pressures are manifested in several ways, ranging from at sea conflicts between small-scale fisheries on the one hand and distant water fisheries on the other, through environmental degradation and overfishing, to the often desperate working conditions and management measures applied to the fishers as well as continuing widespread IUU fishing which so far has shown little sign in the past decade of being effectively reduced, all of which contribute to the plight of the fishers. Fundamental to this situation is the strong attraction for individuals from poor fishing communities and regions to take advantage of perceived opportunities in highly organised industrialised fisheries which are in part operating illegally. It will be extremely difficult to break the links involved.

From a legal and administrative point of view the measures encapsulated in the international conventions are both wide ranging and comprehensive, as are those in at least the more developed states. Enforcement of these measures in practice now have a substantial array of tools at the disposal of organisations responsible for enforcement, but this is a process which is only just beginning. Fundamentally it indeed depends on a human mindset encapsulating “where will we choose to go” [123].

The economic transition between the mid-twentieth century stage and the emerging twenty-first century has already been noted at the beginning of this chapter. At the time of writing this pattern is

being disturbed by two factors. The first is the COVID-19 pandemic, which has already impacted the fisheries to a measurable extent. The second is the war in Ukraine which has introduced substantial uncertainty in global economic and political affairs: the conflict between authoritarian states on the one hand and non-authoritarian states on the other is exerting a depressing effect on the global economy to an extent likely not experienced since the late 1930s and the outbreak of the Second World War as the global political system moves towards a new balance of political and strategic interests [124]. Already, this is being manifested in the increase in the price of fuel, a major cost in the fishing industry, to an extent which is calling into question the economic viability of at least some fisheries, especially when vessel, fuel and other associated costs are subsidised in some countries [125].

## References

- [1] V. Korotayev, S.V. Tsirel, A spectral analysis of world GDP dynamics: Kondratieff waves, Kuznets swings, Juglar and Kitchin cycles in global economic development, and the 2008-2009 economic crisis, *Struct. Dyn.* 4 (2010) 1-57. <https://doi.org/10.5070/SD941003306>
- [2] J.S. Brashares, B. Adams, K.J. Fiorella, C.D. Golden, C. Hojnowski, R.A. Marsh, D.J. McCauley, T.A. Nunez, C. Seto, L. Witney, Wildlife decline and social conflict, *Science* 345 (6195) (2014) 346-348. <https://doi.org/10.1126/science.1256734>
- [3] N.J. Bennett, H. Govan, T. Satterfield, Ocean grabbing, *Mar. Policy* 57 (2015) 61-68. <https://doi.org/10.1016/j.marpol.2015.03.026>
- [4] FAO Fishery and aquaculture statistics. [https://www.fao.org/fishery/static/Yearbook/YB2019\\_USBcard/booklet/web\\_cb7874t.pdf](https://www.fao.org/fishery/static/Yearbook/YB2019_USBcard/booklet/web_cb7874t.pdf), 2019 (Accessed 7 Mar 2022).
- [5] R. Van Anrooy, F.C. Espinoza, D. Japp, D. Valderrama, K.G. Karmakar, P. Lengyel, S. Parappurathu, S. Upare, U. Teitze, T. Cosetelloe, Z. Zhang, World review of capture fisheries and aquaculture insurance 2022. FAO Fisheries and Aquaculture Technical Paper No. 682. Rome, FAO. 2022.
- [6] L. Garibaldi, The FAO global capture production database: a six-decade effort to catch the trend, *Mar. Policy* 36 (3) (2012) 760-768. <https://doi.org/10.1016/j.marpol.2011.10.024>
- [7] D. Pauly, D. Zeller, The best catch data that can possibly be? Rejoinder to Ye et.al. "FAO's statistic data and sustainability of fisheries and aquaculture", *Mar. Policy* 81 (2017) 406-410. <https://doi.org/10.1016/j.marpol.2017.03.013>
- [8] Y. Ye, M. Barange, M. Beveridge, L. Garibaldi, N. Gutierrez, A. Anganuzzi, M. Taconet, FAO's statistic data and sustainability of fisheries and aquaculture: comments on Pauly and Zeller (2017), *Mar. Policy* 81 (2017) 401-405. <https://doi.org/10.1016/j.marpol.2017.03.012>
- [9] D. Pauly, D. Zeller, Agreeing with FAO: comments on SOFIA 2018, *Mar. Policy* 100 (2019) 332-333. <https://doi.org/10.1016/j.marpol.2018.12.009>
- [10] D. Zeller, D. Pauly, 2019. Viewpoint: back to the future for fisheries, where will we choose to go? *Glob. Sus.* 2, e11.
- [11] D. Pauly, D. Zeller, *Global atlas of marine fisheries: A critical appraisal of catches and ecosystem impacts*, Island Press, Washington DC, 2016.
- [12] W. Christensen, M. Coll, C. Piroddi, J. Steenbek, J. Buszowski, D. Pauly, A century of fish biomass decline in the ocean, *Mar. Ecol. Prog. Ser.* 512 (2014) 155-166.

- [13] D. J. Agnew, J. Pearce, G. Pramod, T. Peatman, R. Watson, J.R. Beddington, T.J. Pitcher, 2009. Estimating the worldwide extent of illegal fishing, *PLoS ONE*. 4(2), e4570. <https://doi.org/10.1371/journal.pone.0004570>
- [14] FAO, *The State of World Fisheries and Aquaculture*, FAO, Rome, 2020.
- [15] 2021 IUU fishing index update. <https://www.globalinitiative.net/analysis/iuu-fishing-index-2021/> (Accessed 27 June 2022).
- [16] J.X. Morris, *The Dirty Secret of Taiwan's Fishing Industry*. Taiwan's systemic inertia has created the perfect environment for the continued exploitation of migrant fishermen. <https://thediplomat.com/2018/05/the-dirty-secret-of-taiwans-fishing-industry/>, 2018 (Accessed 01 Feb 2023)
- [17] U.R. Sumaila, N. Ebrahim, A. Schuhbauer, D. Skerritt, Y. Lim, H.S. Kim, T.G. Mallory, V.W.L. Lam, D. Pauly, Updated estimates and analysis of global fisheries subsidies, *Mar. Policy* 109 (2019) 103695. <https://doi.org/10.1016/j.marpol.2019.103695>
- [18] A.M. Cisneros-Montemayor, U.R. Sumaila, Busting myths that hinder an agreement to end Harmful fisheries subsidies, *Mar. Policy* 109 (2019) 103699. <https://doi.org/10.1016/j.marpol.2019.103699>
- [19] WTO, <https://www.wto.org/>, 2022 (Accessed 27 June 2022).
- [20] H. Tuerk, G. Hafner, *The United Nations Convention on the Law of the Sea*, 1982, *Ocean Yearbook* 36 (2022) 3-47.
- [21] T. Koh, *Building a new legal order for the oceans*. Singapore, University of Singapore Press, 2020.
- [22] S.N. Nandan, K.E Dalaker, *Reflections on the making of the modern Law of the Sea*, University of Singapore Press, Singapore, 2021.
- [23] C. Blanchard, Fragmentation in high seas fisheries: preliminary reflections on a global oceans governance approach, *Mar. Policy* 84 (2017) 327-332. <https://doi.org/10.1016/j.marpol.2017.06.017>
- [24] D. Bosco, *The Poseidon Project: the struggle to govern the world's oceans*, Oxford University Press, New York, 2022.
- [25] E. Pinkerton, R. Davis, Neoliberalism and the politics of enclosure in North American small-scale fisheries, *Mar. Policy* 61 (2015) 303-312. <https://doi.org/10.1016/j.marpol.2015.03.025>
- [26] E. Pinkerton, Hegemony and resistance: disturbing patterns and hopeful signs in the impact of neoliberal policies on small-scale fisheries around the world, *Mar. Policy* 80 (2017) 1-9. <https://doi.org/10.1016/j.marpol.2016.11.012>
- [27] I. Smith, *A research framework for traditional fisheries*. ICLARM Studies and Reviews 2. Manila, International Center for Living Aquatic Resources Management, 1979.
- [28] R. Pomeroy, *A research framework for traditional fisheries: revisited*, *Mar. Policy* 70 (2016) 153-163. <https://doi.org/10.1016/j.marpol.2016.05.012>
- [29] A. Couper, H.D. Smith, B. Ciceri, *Fishers and Plunderers: theft, slavery and violence at sea*, Pluto Books, London, 2015.
- [30] H.J. Crowe, The closure of the Moray Firth to trawling. A historical account of the problem and a general survey of the fisheries of the Firth. *Rapp P-V Reun Cons Int Explor Mer*, 52, (1928) 1-38.
- [31] D.C. Loring, The United States-Peruvian "Fisheries" dispute, *Stanford Law Rev.* 23(3) (1971) 391-453.
- [32] A. Gilchrist, *Cod wars and how to lose them*, Q Books, Edinburgh, 1980.
- [33]. Alastair Couper et.al. op.cit 28 above.

- [34] Q. Hanich, M. Tsamenyi, Managing fisheries and corruption in the Pacific Islands region, *Mar. Policy* 33(2) (2009) 386-392.
- [35] A. Couper et.al. op.cit. 28 above.
- [36] Environmental Justice Foundation (EJF) (2010) *All at Sea: the abuse of human rights aboard illegal fishing vessels*. London, EJF; see also EJF (2020) *Impact Report 2019*. London, EJF.
- [37] United Nations Office for Drugs and Crime, *Transnational Organized Crime in the Fishing Industry*, UNDOC, Vienna, 2011.
- [38] International Transport Workers Federation (ITF) (2006) *Out of sight, out of mind: seafarers, fishers and human rights*. London, ITF; see also ITF (2022) *A One Way Ticket to Labour Exploitation: how transit visa loopholes are being used to exploit migrant fishers on UK fishing vessels*. ITF Briefing Paper. London, ITF.
- [39] University of Nottingham Rights Lab, *Letting Exploitation off the Hook? Evidencing labour abuses in UK fishing*, University of Nottingham, Nottingham, 2022.
- [40] H.D. Smith, The risks of working at sea, in: A. Couper, H.D. Smith, B. Ciceri, *Fishers and Plunderers: theft, slavery and violence at sea*, Pluto Books, London, 2015.
- [41] J. Finnis, E.R. Musson, Managing weather & fishing safety: marine meteorology and fishing decision-making from a governance and safety perspective, *Mar. Policy* 142 (2022) 105120. <https://doi.org/10.1016/j.marpol.2022.105120>
- [42] R. Van Anrooy, F. Cordova Espinoza, D. Japp, D. Valderrama, K. Gopal Karmakar, P. Lengyel, S. Parappurathu, S. Upare, U. Tietze, T. Costello, Z. Zhang (2022) *World review of capture fisheries and aquaculture insurance 2022*. *FAO Fisheries and Aquaculture Technical Paper No. 682*. Rome, FAO.
- [43] S. Willis, D.A. Bygvraa, M.S. Hoque, E.S. Klein, C. Kucukyildiz, J. Westwood-Booth, E. Holliday, The human cost of global fishing, *Mar. Policy*, 148 (2023) 105440. <https://doi.org/10.1016/j.marpol.2022.105440>
- [44] A. Couper et.al. op.cit. 28 above.
- [45] D. Tickler, J.J. Meeuwig, M.L. Palomares, D. Pauly, D. Zeller, Far from home: distance patterns of global fishing fleets, *Sci. Adv.*, 4(8) (2018).
- [46] ITF, WWF, The changing nature of high seas fishing: how flags of convenience provide cover for illegal, unreported and unregulated fishing. [https://assets.wwf.org.uk/downloads.flags of convenience.pdf](https://assets.wwf.org.uk/downloads.flags%20of%20convenience.pdf), 2005 (Accessed 2 July 2022). For Fig 2 see Couper et.al., note 28 above.
- [47] C. Osterman, M. Bostrom, Workplace bullying and harassment at sea: a structured literature review, *Mar. Policy* 136 (2022) 104910. <https://doi.org/10.1016/j.marpol.2021.104910>
- [48] M. Brennan, *Out of sight, out of mind: human trafficking and exploitation of migrant fishing boat workers in Thailand*, American Center of International Labour Solidarity, Washington DC, 2009.
- [49] P. Robertson, *Trafficking of fishermen in Thailand*, IOM, Geneva, 2011.
- [50] J.P. Mileski, C.B. Galvao, Z.D. Forester, Human trafficking in the commercial fishing industry: a multiple case study analysis, *Mar. Policy* 116 (2020) 103616. <https://doi.org/10.1016/j.marpol.2019.103616>
- [51] C. Stringer, T. Harre, Human trafficking as a fisheries crime? An application of the concept to the New Zealand context, *Mar. Policy* 105 (2019) 169-176. <https://doi.org/10.1016/j.marpol.2018.12.024>
- [52] G. Simmons, C. Stringer, New Zealand's fisheries management system: forced labour an ignored or overlooked dimension? *Mar. Policy* 50(1) (2014) 74-80. <https://doi.org/10.1016/j.marpol.2014.05.013>

- [53] S. Yea, C. Stringer, Caught in a vicious cycle: connecting forced labour and environmental exploitation through a case study of Asia-Pacific, *Mar. Policy* 134 (2021) 104825. <https://doi.org/10.1016/j.marpol.2021.104825>
- [54] S. Chantavanich, S. Laodumrongchai, C. Stringer, Under the shadow: forced labour among sea fishers in Thailand, *Mar. Policy* 68, (2016) 1-7. <https://doi.org/10.1016/j.marpol.2015.12.015>
- [55] International Labour Office, Caught at Sea: forced labour and trafficking in fisheries, Governance and Tripartism Department Special Action Programme to Combat Forced Labour, ILO Sectoral Activities Department, Geneva, 2013.
- [56] C. Tindall, O. Oloruntuyi, S. Lees, C.S. Longo, D. Schley, R.J.C. Currey, Illuminating the mechanisms to mitigated forced and child labour risks within Marine Stewardship Council certified fisheries, *Mar. Policy* 143, (2022) 105140. <https://doi.org/10.1016/j.marpol.2022.105140>
- [57] Global Slavery Index, <https://www.globallslaveryindex.org/2018/findings/importing-risk/fishing/>, 2018 (Accessed 2 July 2022).
- [58] P. Vandergeest, M. Marschke, Beyond slavery scandals: explaining working conditions among fish workers in Taiwan and Thailand, *Mar. Policy* 132 (2021) 104685. <https://doi.org/10.1016/j.marpol.2021.104685>
- [59] A. Couper et.al. op.cit. 28 above.
- [60] J. Meadowcroft, J. Blundell, The Morecambe Bay cockle pickers: market failure or government disaster? *Econ. Aff.* 24(3) (2004) 69-71.
- [61] International Transport Workers Federation, A One Way Ticket to Labour Exploitation: how transit visa loopholes are being used to exploit migrant fishers on UK fishing vessels. ITF, London, 2022.
- [62] University of Nottingham Rights Lab, Letting exploitation off the hook? Evidencing labour abuses in UK fishing. University of Nottingham, Nottingham, 2022.
- [63] N. Djohari, C.aWhite, How the socio-cultural practices of fishing obscure micro-disciplinary, verbal and psychological abuse of migrant fishers in North East Scotland, *Maritime Studies* 21(1) (2021) 19-34.
- [64] C. Bueger, T. Edmunds, Blue crime: conceptualising transnational organised crime at sea, *Mar. Policy* 119 (2020) 104067. <https://doi.org/10.1016/j.marpol.2020.104067>
- [65] G. Stolsvik, The development of the fisheries crime concept and processes to address it in the international arena, *Mar. Policy* 105 (2019) 123-128. <https://doi.org/10.1016/j.marpol.2018.12.027>
- [66] V.J. Schatz, A. Proelss, N. Liu, The 2018 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean: a critical analysis, *Int. J. Mar. Coast. Law* 34(2) (2019) 195-244.
- [67] A. Phayal, A. Gold, B. Prins, Interstate hostility and maritime crime: evidence from South East Asia, *Mar. Policy* 143 (2022) 105134. <https://doi.org/10.1016/j.marpol.2022.105134>
- [68] K. Boerder, N.A. Miller, B. Work, Global hotspots of transshipment of fish catch at sea, *Sci. Adv.* 4(7) (2018).
- [69] J. Rattle, G. Duncan-Jones, Fishing Outside the Lines: widespread noncompliance in Indian Ocean tuna fisheries, Blue Marine Foundation, London, 2022.
- [70] K. Nakamura, Y. Ota, F. Blaha, A practical take on the duty to uphold human rights in seafood workplaces, *Mar. Policy* 135 (2022) 104844. <https://doi.org/10.1016/j.marpol.2021.104844>
- [71] V. Becker-Weinberg, Time to get serious about combating forced labour and human trafficking in fisheries, *Int. J. Mar. Coast. Law* 36(1) (2020) 59-87.

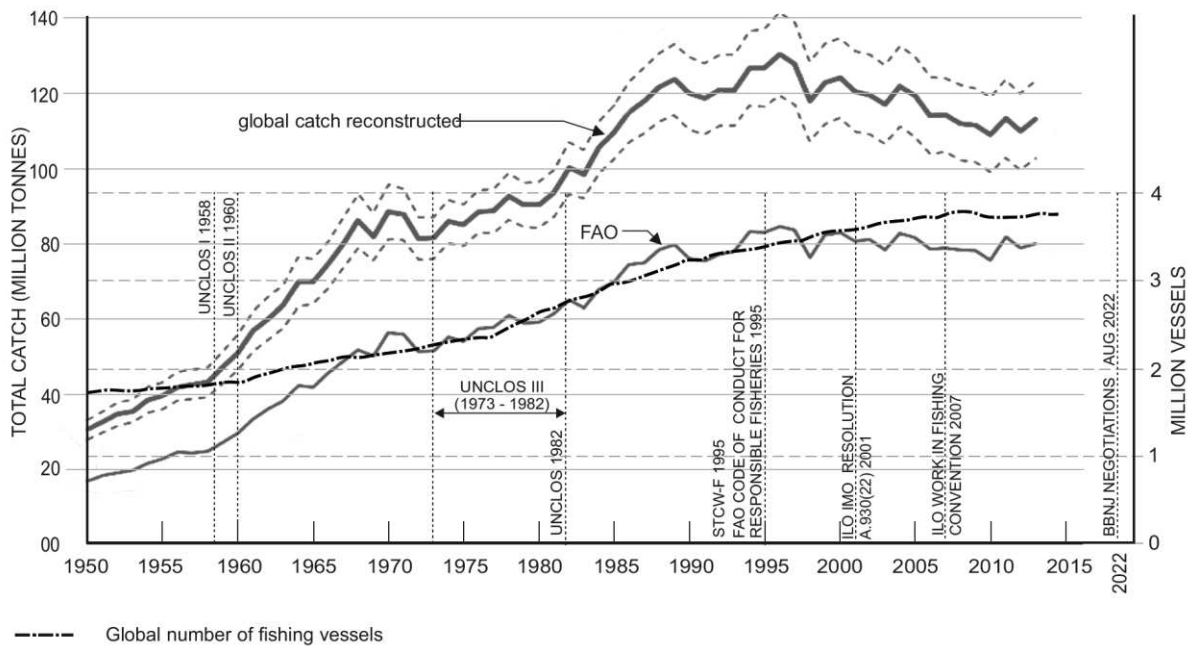
- [72] K.W. Yen, L.C. Liuhuang, A review of migrant labour rights protection in distant water fishing in Taiwan: from laissez-faire to regulation and challenges behind, *Mar. Policy* 134 (2021) 104805. <https://doi.org/10.1016/j.marpol.2021.104805>
- [73] G.Oanta, Spain's action to control and suppress illegal, unreported and unregulated fishing: current status and future prospects, *Int. J. Mar. Coast. Law* 34(4) (2019) 662-697.
- [74] N. Liu, China's regulation of its distant water fishing fleets, *Int. J. Mar. Coast. Law* 36(1) (2020) 165-175.
- [75] J.J. Urbina, Towards an international legal definition of the notion of fisheries crime, *Mar. Policy* 144 (2022) 105214.
- [76] T. Fajardo, To criminalise or not to criminalise IUU fishing: the EU's choice, *Mar. Policy* 144 (2022) 105212. <https://doi.org/10.1016/j.marpol.2022.105212>
- [77] J.M.S. Patron, The criminal prosecution of illegal fishing and the jurisdiction of Spanish courts, *Mar. Policy* 144 (2022) 105209. <https://doi.org/10.1016/j.marpol.2022.105209>
- [78] M. Rosello, Regional fishery management organisation measures and the imposition of criminal and administrative sanctions in respect of high seas fishing, *Mar. Policy* 144 (2022) 105213. <https://doi.org/10.1016/j.marpol.2022.105213>
- [79] G.A. Oanta, The application of administrative sanctions in the fight against IUU fishing: an assessment of Spanish practice, *Mar. Policy* 144 (2022) 105211. <https://doi.org/10.1016/j.marpol.2022.105211>
- [80] I.A. Garcia, Spain: a pioneering country in the fight against the infringement of the international legal regime for fisheries, *Mar. Policy* 144 (2022) 105230.
- [81] J. He, International trade disputes related to fishery products: time to engage a Chinese perspective? *Int. J. Mar. Coast. Law* 31(1) (2016) 32-59.
- [82] A. Serdy, The shaky foundations of the FAO Port State Measures Agreement: how watertight is the legal seal against access for foreign fishing vessels? *Int. J. Mar. Coast. Law* 31(3) (2016) 422-441.
- [83] L.C. Pineiro, Port State jurisdiction of labour conditions: a private international law perspective on extra-territoriality, *Int. J. Mar. Coast. Law* 31(3), (2016) 531-551.
- [84] J.N. Nakamura, Legal reflections on the Small-Scale Fisheries Guidelines: building a global safety net for small-scale fisheries, *Int. J. Mar. Coast. Law* 37(1) (2022) 31-72.
- [85] Wikipedia, last updated November 2022 [https://en.wikipedia.org/wiki/Viarsa\\_1](https://en.wikipedia.org/wiki/Viarsa_1) (Accessed 12 July 2022)
- [86] 9 News, Viarsa captain praises justice system <https://web.archive.org/web/20110605162248/http://news.ninemsn.com.au/article.aspx?id=70618>, 2011 (Accessed 27 January 2023).
- [87] C. Carter, The transformation of Scottish fisheries: sustainable interdependence from 'net to plate', *Mar. Policy* 44 (2014) 131-138. <https://doi.org/10.1016/j.marpol.2013.08.014>
- [88] J. Gilbey, G. Carvalho, R. Castilho, I. Coscia, M.W. Coulson, G. Dahle, S. Derycke, S.M. Francisco, S.J. Helyar, T. Johansen, C. Junge, K.K.S. Layton, J. Martinsohn, I. Matejusova, J.I. Robalo, N. Rodriguez-Ezpeleta, G. Silva, I. Strmmer, F.A.M. Volkaert, Life in a drop: sampling environmental DNA for marine fishery management and ecosystem monitoring, *Mar. Policy* 124 (2021) 104331. <https://doi.org/10.1016/j.marpol.2020.104331>
- [89] A. Thorpe, O. Hermansen, I. Pollard, J. Isaksen, P. Failler, G. Touron-Gardic, Unpacking the tuna traceability Mosaic – EU SFPAs and the tuna value chain, *Mar. Policy* 139 (2021) 105037. <https://doi.org/10.1016/j.marpol.2022.105037>

- [90] M. Svanberg, V. Santen, A. Horteborn, H. Holm, C. Finnsgard, AIS in maritime research, *Mar. Policy* 106 (2019) 103520. <https://doi.org/10.1016/j.marpol.2019.103520>
- [91] Oceana, Oceana puts IUU-Listed vessels on the map: new tool, IUU vessel tracker, displays locations of illegal vessels. <https://usa.oceana.org/IUUVesselTracker>, 2021 (Accessed 2 July 2022).
- [92] H. Welch, T. Clavelle, T.D. White, M.A. Cimino, J. van Osdel, T. Hochberg, D. Kroodsmas, E.L Hazen, Hot spots of unseen fishing vessels, *Sci. Adv.* 8(44) (2022).
- [93] K. Boerder, et.al., op.cit. 68 above.
- [94] S.E. Birchenough, P.A. Cooper, A.C. Jensen, Vessel monitoring systems as a tool for mapping fishing effort for a small inshore fishery operating within a marine protected area, *Mar. Policy* 124 (2021) 104325. <https://doi.org/10.1016/j.marpol.2020.104325>
- [95] A.D. Couper, H.D. Smith, The development of fishermen-based policies, *Mar. Policy* 21(2) (1997) 111-119. [https://doi.org/10.1016/S0308-597X\(96\)00049-8](https://doi.org/10.1016/S0308-597X(96)00049-8)
- [96] P.J.B. Hart, Stewards of the sea: giving power to fishers, *Mar. Policy* 126 (2021) 104421. <https://doi.org/10.1016/j.marpol.2021.104421>
- [97] Shetland Fishermen's Association, Angry fishermen to fund proper scientific studies of North Sea stocks. <https://www.shetlandfishermen.com/news/>, 2022 (Accessed 11 July 2022).
- [98] C. Ewell, J. Hocevar, E. Mitchell, S. Snowden, J. Jacquet, An evaluation of Regional Fisheries Management Organization at-sea compliance monitoring and observer programs, *Mar. Policy* 115, (2020) 103842. <https://doi.org/10.1016/j.marpol.2020.103842>
- [99] B. Haas, J. McGee, A. Fleming, M. Haward, Factors influencing the performance of regional fisheries management organizations, *Mar. Policy* 113 (2020) 103787. <https://doi.org/10.1016/j.marpol.2019.103787>
- [100] J. Fischer, How transparent are RFMOs? Achievements and challenges, *Mar. Policy* 136 (2022) 104106. <https://doi.org/10.1016/j.marpol.2020.104106>
- [101] H. Sinan, M. Bailey, W. Swartz, Disentangling politics in the Indian Ocean Tuna Commission, *Mar. Policy* 133 (2021) 104781. <https://doi.org/10.1016/j.marpol.2021.104781>
- [102] Greenpeace, Fishy Business: how transshipment at sea facilitates illegal, unreported and unregulated fishing that devastates our oceans. <https://www.greenpeace.org/international>, 2020 (Accessed 10 July 2022).
- [103] P. Ganapathirajau, K. Nakamura, T.J. Pitcher, L. Delagran, Estimates of illegal and unreported fish in seafood imports to the USA, *Mar. Policy* 48 (2014) 102-113. <https://doi.org/10.1016/j.marpol.2014.03.019>
- [104] P. Ganapathirajau, T.J. Pitcher, G. Mantha, Estimates of illegal and unreported seafood imports to Japan, *Mar. Policy* 108 (2019) 103439. <https://doi.org/10.1016/j.marpol.2019.02.011>
- [105] Financial Transparency Coalition, "Fishy networks": uncovering the companies and individuals behind illegal fishing globally. <https://financialtransparency.org/wp-content/uploads/2022/10/FTC-fishy-Network-OCT-2022-Final.pdf>, 2022 (Accessed 27 January 2023).
- [106] D. Belhabib, P. Le Billon, Adjacency and domestication and enablers of fish crimes. *Frontiers in Marine Science*. <https://doi.org/10.3389/fmars.2022.936174>, 2022 (Accessed 23rd January 2023).
- [107] C. Tindall, O. Oloruntuyi, S. Lees, C.S. Longo, D. Schley, R.J.C. Currey, Illuminating the mechanisms to mitigate forced and child labour within Marine Stewardship Council certified fisheries, *Mar. Policy* 143 (2022) 105140. <https://doi.org/10.1016/j.marpol.2022.105140>



- [108] J.L. Decker-Sparks, L.K. Hasche, Complex linkages between forced labor slavery and environmental decline in marine fisheries, *J. Hum. Rights* 18(2) (2019) 230-245. <https://doi.org/10.1080/14754835.2019.1602824>
- [109] S. Villasante, C. Pita, J. Pascual, K. Roubledakis, P. Pita, G. Ainsworth, Impacts of COVID-19 on the fisheries sector and value chains, *Marine Policy Special Section*, (2022).
- [110] H.R. Bassett, S. Sharan, S.K. Sujri, S. Advani, C. Giordano, A comparative study of small-scale fishery supply chains' vulnerability and resilience to COVID-19, *Marit. Stud.* 21(2) (2022).
- [111] M.E. Lam, Ethical reflections on the COVID-19 pandemic in the global seafood industry: navigating diverse scales and contexts of marine values and identities. *Marit. Stud.* 20 (2021) 501-516.
- [112] C.V. Meija, G. Rodriguez, M.K. Tanner, J. Ramirez-Gonzalez, N. Moity, S. Andrade, M.J.B. Paladines, R. Caceres, M. Castrejon, J. Pittman, Fishing during the "new normality": social and economic changes in Galapagos small-scale fisheries due to the COVID -19 pandemic. *Marit. Stud.* 21 (2022) 193-208.
- [113] FAO, *The State of World Fisheries and Aquaculture 2020*, FAO, Rome, 2022.
- [114] United Nations, International Day on the fight against IUU fishing 5 June. <https://www.un.org/observances/end-illegal-fishing>, 2022 (Accessed 10 July 2022).
- [115] World Trade Organisation, Negotiations on fisheries subsidies. <https://www.wto.org/>, 2022 (Accessed 10 July 2022).
- [116] D. Gremillet, *The Ocean's Whistleblower: the remarkable life and work of Daniel Pauly*, Greystone Books, Vancouver, 2021. Originally published in French by Editions Wildproject in 2019.
- [117] G. Hosch, G. Macfayden, Killing Nemo: three world regions fail to mainstream combatting of IUU fishing, *Mar. Policy* 140 (2022) 105073. <https://doi.org/10.1016/j.marpol.2022.105073>
- [118] E. De Sombre, The security implications of fisheries, *Int. Aff.* 95(5) (2019) 1019-1035.
- [119] C. Blanchard, *op.cit.* 23 above.
- [120] K. Hassanali, Participating in negotiation of a new ocean treaty under the Law of the Sea Convention – experiences of and lessons from a group of Small-Island Developing States. *Front. Mar. Sci.* (2022) <https://doi.org/10.3389/fmars.2022.902747/>
- [121] B.D. Ratner, B. Asgard, E.H. Allison, Fishing for justice: human rights, development, and fisheries sector reform, *Global Environ. Chang.* 27 (2014) 120-130. <https://doi.org/10.1016/j.gloenvcha.2014.05.006>
- [122] A.J.G. Lozano, J.L. Dekker-Sparks, D.P. Durgana, C.M. Farthing, J. Fitzpatrick, B. Krough-Poulsen, G. McDonald, S. McDonald, Y. Ota, N. Sarto, A.M. Cisneros-Montemayor, G. Lout, E. Finkbeiner, J. N. Kittinger, Decent work in fisheries: current trends and key considerations for future research and policy, *Mar. Policy* 136 1(2022) 04922. <https://doi.org/10.1016/j.marpol.2021.104922>
- [123] D. Zeller, D. Pauly (2019) *op.cit.* 10 above.
- [124] H. Kissinger, *World Order: reflections on the character of nations and the course of history*, Penguin, New York, 2015.
- [125] Shetland Fishermen's Association, Call for fuel support to ensure food security. <https://www.shetlandfishermen.com/news/call-for-fuel-support-to-ensure-food-security>, 2022 (Accessed 10 July 2022).

FIG. 1 Global capture fisheries and fishing vessels



All data represent wild capture fisheries (no aquaculture production) and excludes plants, corals, sponges, reptiles and marine mammals

Source:

Fishing vessels:

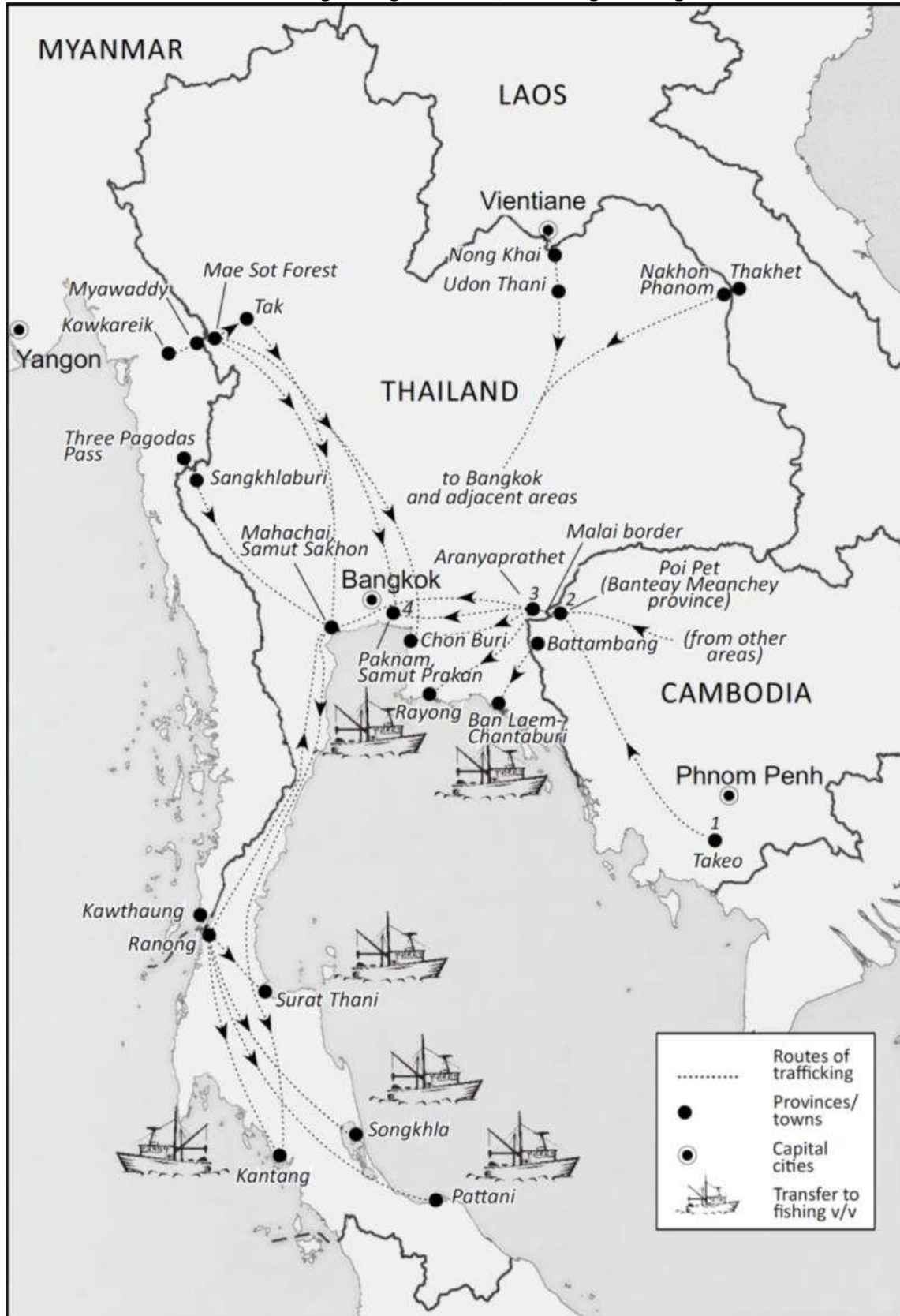
Yannick Rousseau, Julia L. Blanchard, and Elizabeth A. Fulton (2019) Evolution of global marine fishing fleets and the response of fished resources

<https://doi.org/10.1073/pnas.1820344116>

Note: IMO figures show current fishing fleet as around 4.6 million

Global total catch reconstructed by: Zeller D, Pauly D (2019). Viewpoint: Back to the future for fisheries, where will we choose to go? *Global Sustainability* 2, e11, 1–8. <https://doi.org/10.1017/sus.2019.8>

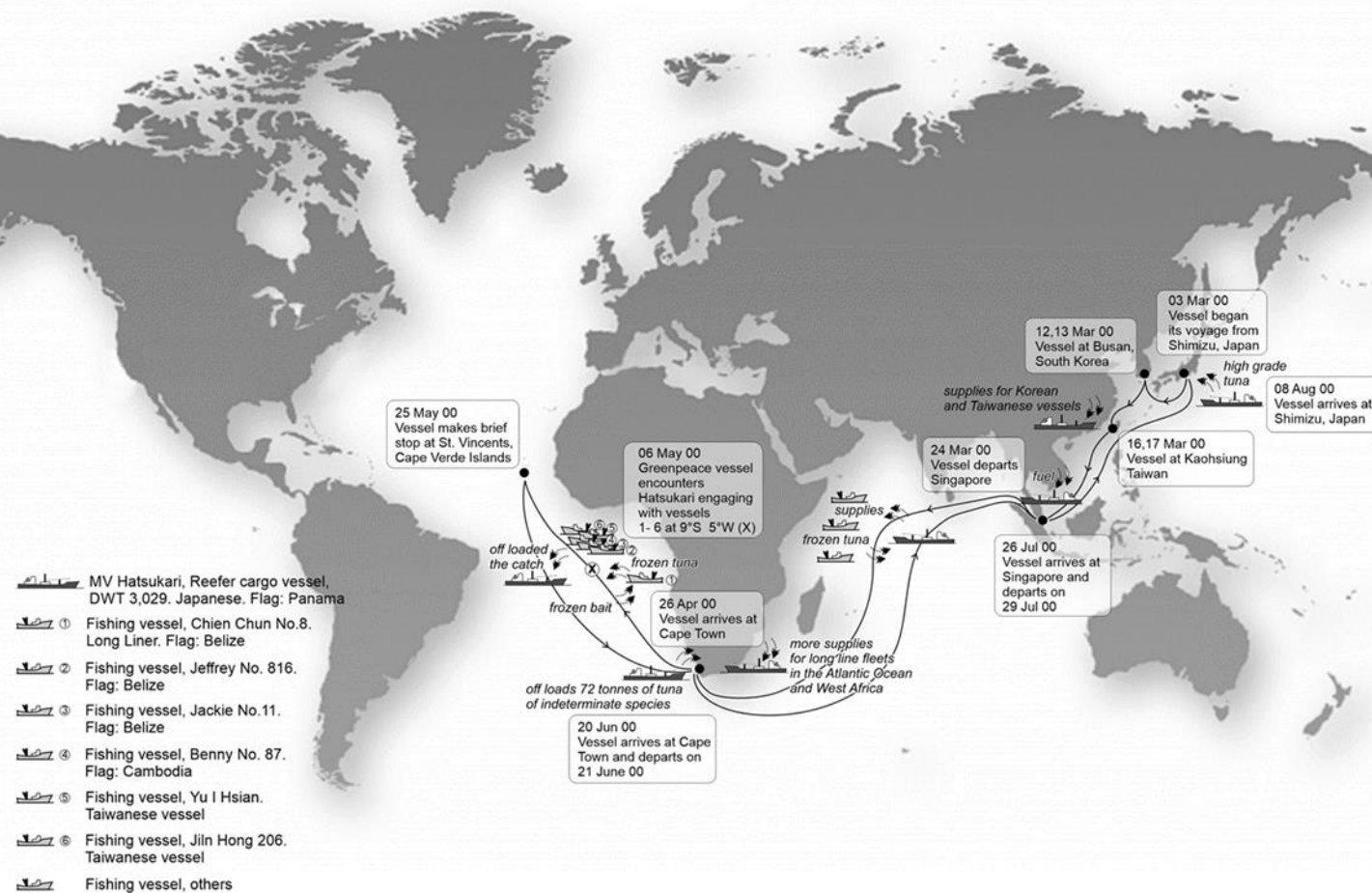
FIG 2. Routes of human trafficking through Thailand, from neighbouring countries



Source: Alastair Couper, Hance D. Smith, Bruno Ciceri (2015) Fishers and Plunderers: Theft, Slavery and Violence at Sea. Pluto Press

FIG. 3 Tuna transshipment activities of MV Hatsukari

TUNA TRANSHIPMENT ACTIVITIES OF ' MV HATSUKARI' IN 2000



Source: Alastair Couper, Hance D. Smith, Bruno Ciceri (2015) Fishers and Plunderers: Theft, Slavery and Violence at Sea. Pluto Press

TABLE 1. International conventions/guidelines relating to fisheries

	ENTRY INTO FORCE
UNCLOS 1982	16 November 1994
FAO COMPLIANCE AGREEMENT 1993	24 April 2003
STCW-F 1995	29 September 2012
UNITED NATIONS FISHSTOCKS AGREEMENT 1995	11 December 2001
FAO CODE OF CONDUCT FOR RESPONSIBLE FISHERIES 1995	
ILO IMO RESOLUTION A.930(22) 2001	
ILO WORK IN FISHING CONVENTION 2007	16 Nov 2017
PORT STATE MANAGEMENT AGREEMENT (PSMA) 2009	June 2016
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