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Envisioning a smart resolution to fishing disputes between India and Sri Lanka

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ABSTRACT

Poaching activities in the territorial waters off the coast of the Northern Province of Sri Lanka by the fishing communities from the state of Tamil Nadu in India, especially in the wake of the end of Sri Lanka's civil war in 2009, have seriously strained the historic kinship, as also the bilateral international relations between Sri Lanka and India. The objectives of this policy paper are to first, make an informed assessment of the magnitude of these fishing disputes that occur between Sri Lanka and India in terms of both monetary, and livelihood losses incurred by Sri Lanka and the people who are directly affected by the same; and second, to explore scientific or technical solutions to this long running dispute to counter the ineffectiveness of law enforcement and the presumed absence of political solutions.



KEYWORDS

Dispute resolution; fishing;
India; IUU; Sri Lanka

Introduction

Sri Lanka's northern provincial economy has been rising from the ashes of the civil war since 2010, and has, as per the latest data available, recorded the highest provincial economic growth rate annually from 2011 till 2015, amongst the nine provinces in the country.¹ However, the growth of the fishing sub-sector has been stifled due to poaching (which is, by definition, illegal), by fisherpersons from India, (particularly from the state of Tamil Nadu) off the northern coast of Sri Lanka, (largely off the districts of Jaffna and Mannar).

The fisherpersons of Sri Lanka and India have been fishing in the Gulf of Mannar, Palk Bay, Palk Strait (the latter two together is also commonly known as the Sethusamudram), and elsewhere harmoniously from time immemorial using traditional equipment and methods of fishing.² (See [Map 1](#)). However, due to technological advancements (modern fishing vessels including multi-day boats and trawlers, modern fishing nets, etc.), the marine resources on the Indian side of the Palk Bay and elsewhere have been aggressively harvested and overexploited.³ The fisherpersons of Northern Sri Lanka have not been able to avail of such technological advancements owing to the onset of the civil war in 1983 and the resultant severity of restrictions imposed on fishing by the security forces of Sri Lanka.⁴

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both monetary, and livelihood losses incurred by the country (Sri Lanka), and the people who are directly affected by the same; and **second**, to explore scientific or technical solutions to this long running dispute to counter the ineffectiveness of law enforcement and the presumed absence of political solutions.

The foregoing objectives are fulfilled using existing data that has been drawn from other researchers, as well as from existing scientific knowledge. Secondary data and knowledge, targeted primarily at the policy communities both in Sri Lanka and India, form the base of this policy paper. The discussion is also targeted at the fishing communities involved in this dispute in order to sensitise them to the alternative dispute resolution mechanisms available, with specific focus on the scientific and technical solutions that are already available.

Comparative overview

While fishing in Tamil Nadu has increasingly become commercialised through the use of large trawlers, fishing in eastern and northern Sri Lanka has, by and large, retained the traditional mode of small-scale fishing (mainly due to the involvement of these regions in Sri Lanka's long drawn civil war).⁸ Thus, while poaching (especially the illegal bottom trawling) causes a loss of livelihood to the bulk of small-scale fisherpersons in northern Sri Lanka, it enriches the activities and livelihood of large-scale commercial fishing communities in Tamil Nadu, thus creating the unequal impact of poaching between the fisherpersons of Sri Lanka and India.

While trawlers are not illegal in India, they cannot be used for fishing activities within 2.5 kilometres from the shore. The price of the average 60 foot fishing trawler ranges from about 5 million Indian Rupees (7,722 US dollars) (<30 feet length) to 6 million Indian Rupees (92,644 US dollars) depending on the size, specifications, and equipment of the trawlers.⁹ Reports in the media in both the countries appear to indicate that many Indian commercial fishing trawlers are owned by powerful regional and local politicians of the state of Tamil Nadu. Commercial illegal fishing, by way of bottom trawling, has also negatively impacted those Indian fisherpersons who continue to employ traditional modes of fishing. India and Pakistan also have similar fishing disputes along the coasts of the Indian states of Gujarat and Maharashtra, and the Sindh province of Pakistan. (See Map 2).

There are relatively smaller trawlers owned by a few northern fisherpersons as well. These mostly operate from the Gurunagar (Jaffna peninsula), Pesalai (Mannar district), and the Valvettithurai (Jaffna peninsula) coasts, and have a negative impact on the livelihoods of a substantial proportion of fisherpersons in northern Sri Lanka.¹⁰ Further, it needs to be acknowledged that trawlers from the southern and western parts of Sri Lanka frequently engage in illegal deep sea fishing in the Indian waters around the Andaman and Nicobar Islands, Lakshadweep Islands, and other Indian maritime zones.¹¹ Moreover, some fisherpersons from the southern and western coasts of Sri Lanka are involved in other illegal fishing practices as well, such as the use of dynamite along the coasts of Mannar and Mullaithivu districts.

According to Kasim, there are eleven mechanised trawler fishing centres and 2,300 mechanised trawlers on the Indian side of the Palk Bay in Tamil Nadu.¹² Trawlers that are more than fifty feet in length, which cross the International Maritime Boundary



Map 2. India and Pakistan. Source: <http://www.mapsofindia.com/neighbouring-countries-maps/india-pakistan-map.html#>.

Line (IMBL), account for 25–30% or 575–690 vessels.¹³ This statistic stands in sharp contrast to Vivekanandan's, who claimed that almost two-thirds of the total number of trawlers in Tamil Nadu crossover to Sri Lankan waters.¹⁴ According to Vivekanandan, out of the total trawler population of 4,000 in 2004, around 2,500 trawlers crossed over to Sri Lankan waters and were involved in poaching.¹⁵ According to Jagath Ranasinghe, an even higher number of trawlers are involved in poaching in Sri Lankan waters.¹⁶ Scholtens claimed that about fifty per cent of the total trawlers owned in Tamil Nadu are involved in poaching in Sri Lankan waters.¹⁷ Hence, the proportion of the total number of trawlers in Tamil Nadu involved in poaching in Sri Lanka, according to different authors, ranges from 25% to 75%, denoting large variations in the estimates.

There are economic, environmental, legal, and political effects of poaching by fisherpersons from Tamil Nadu. There is a gradual decline of marine resources throughout the world including in the Palk Bay due to aggressive harvesting through technologically advanced fishing methods, illegal fishing practices, *inter alia*. However, huge potential remains in the Indian Ocean Rim Association (IORA) countries.¹⁸

Legal issues

India and Sri Lanka have signed two agreements, one in 1974¹⁹ (covering the Palk Bay and Palk Strait), and the other in 1976²⁰ (covering the Bay of Bengal and the Gulf of Mannar), to demarcate the international maritime boundary between the two countries. Accordingly, Sri Lanka enacted the Fisheries (Regulation of Foreign Fishing Boats) Act in 1979 (as amended in 1982) to regulate the operation of foreign vessels in her waters.²¹ This author's surmise is that the imperative for the 1974 and 1976 maritime boundary agreements between India and Sri Lanka was the political instability caused by the 1971 insurgency in Sri Lanka, which necessitated the policing of this porous maritime border, rather than the regulation of fishing activities in the two countries.

Hence, as per the existing laws, it is illegal for trawlers or any other fishing boats from Tamil Nadu (and other states in India or from any other country), to fish in Sri Lankan waters without a license from the Ministry of Fisheries of Sri Lanka. However, the Sri Lankan law enforcement authorities (Coastguard, Ministry of Fisheries, Navy, et al) and the judiciary have been reluctant to take adequate, appropriate, or optimal actions to stop this illegal practice due to geopolitical sensitivities between Sri Lanka and India.

The two maritime border agreements of 1974 and 1976 have been overshadowed by the Indo-Lanka Peace Accord of July 1987²², which pertains to the ethnic conflict in Sri Lanka, and to the subsequent Thirteenth Amendment to the Constitution of Sri Lanka. The aforesaid two maritime border agreements were preceded by the Srimavo-Shastri Pact of 1964²³, that covered the repatriation of part of the population of labourers from Tamil Nadu that was brought in by the British colonial government in the late nineteenth and early twentieth centuries, to work in the rubber and tea plantations in the hill country of Sri Lanka. Whilst the implementation of the 1964 pact has been fairly thorough, the implementation of the agreements of 1974 and 1976, and the accord of 1987 have not been complete due to a variety of practical and political reasons.

Interestingly, the Indian fisherpersons caught by the Sri Lanka Navy in Sri Lankan waters are legally charged on the grounds of violation of the Immigration and Emigration Act, rather than being charged on the grounds of violation of the Fisheries (Regulation of Foreign Fishing Boats) Act of 1979 as amended in 1982. This is an indication of the soft approach that is currently prevalent on this dispute amongst the law enforcement authorities and the judiciary in Sri Lanka. On the other hand, the Indian judiciary has taken much firmer action against encroachment of Indian fisherpersons into Sri Lankan waters.²⁴

Therefore, it appears that, for the Union Government of India (GoI), the State Government of Tamil Nadu, and indeed for the National Government of Sri Lanka (GoSL) as well as the provincial government of the Northern Province, the implementation of the Indo-Lanka peace accord of 1987 (as reflected in the Thirteenth Amendment to the Constitution of Sri Lanka), takes precedence over the implementation of the maritime boundary agreements of 1974 and 1976. The fishing dispute between the two countries, and the enduring sufferings of fisherpersons of the Northern Province of Sri Lanka, is the result of the failure of the Indian and Sri Lankan governments to fully implement the 1974 and 1976 maritime border agreements, as also, the failure of the Sri Lankan government to fully implement the Thirteenth Amendment to the Constitution.

The enforcement of law on the Indo-Lanka fishing dispute has limitations because of the involvement of hundreds, if not thousands, of trawlers from India. The total number

of trawlers in the fishing districts of Tamil Nadu has increased exponentially since the 1980s.²⁵ Neither the Sri Lanka Coastguard nor its navy has the capacity to detect and arrest ALL the encroaching vessels. Even in the case of a small number of arrests, the judiciary in Sri Lanka is influenced by the geopolitical imperatives rather than the letter of the law. Hence, the Attorney General's Department or the justices of the courts of law in Sri Lanka are unlikely to go against the interests of the Indo-Lanka bilateral foreign relations of the government(s) in power in both the countries.

Political issues

The arrest of Indian fisherpersons and vessels on the high seas are mostly portrayed by the Tamil Nadu mass media and the state's politicians as assaults on "innocent Tamil fishermen" by the "Sinhala Navy". Thus, this indisputable illegal practice has been politicised and couched in the Sinhala-Tamil binary of the enduring ethnic conflict in Sri Lanka.

Due to such ethnic sensitivities, the GoI, the GoSL, and the provincial government of the Northern Province of Sri Lanka have mostly pursued a hands-off position on this dispute and want the fisherpersons of the two countries/provinces to resolve the dispute through negotiations.

Sri Lanka and India growingly export fresh fish and processed fish products to the European Union (EU) countries, which has stringent set of rules and regulations pertaining to fishing methods/practices in order to stamp out illegal fishing methods/practices such as bottom trawling and poaching. Therefore, the exports of fresh fish and fish products to the EU member countries undergo scrutiny for outlawed fishing methods/practices and poaching.

For example, on 17 October 2015, the *Daily Mirror* newspaper reported that the cabinet spokesperson, Minister Rajitha Senarathne, had said that "the government will not make any complaint to the European Union (EU) about the alleged poaching by Indian fishermen in Sri Lankan waters' because India is a *friendly neighbour*".²⁶ However, on the very next day, the *Sunday Times* quoted the Fisheries Minister, Mahinda Amaraweera, as having said that "we have already raised the issue with the EU and we hope it will take action".²⁷

In a contradictory statement, in March 2015, the Prime Minister of Sri Lanka, Mr. Ranil Wickremasinghe, had publicly said that Sri Lanka reserved the right to shoot the poachers. However, in September 2015, the joint statement issued after the meeting of the Sri Lankan Prime Minister and the Indian Prime Minister, Mr. Narendra Modi, in New Delhi, called for direct negotiations between the representatives of the fisher communities in both the countries to resolve the recurring dispute.

It is important to note that three such meetings between the fisherpersons of the two countries in the past (in 2004, 2010 and 2013) have not resolved the dispute because of the non-adherence to the agreement reached between the two parties (that is, representatives of the fisherpersons of both the countries) for resolving the dispute by the Tamil Nadu fisherpersons, and the non-endorsement of such agreement by the respective national or provincial governments. Therefore, the northern fisherpersons in Sri Lanka have expressed no interest in meeting their counterparts of Tamil Nadu again in the foreseeable future.

The Tamil National Alliance (TNA), (which dominates the local and provincial governments in the Northern Province and held the Opposition Leader position in the national

legislature since August 2015 until December 2018), is reluctant to push the fishing dispute to the forefront mainly due to the larger political interests of the eastern and northern Tamils in Sri Lanka, as well as the personal interests of some of its senior members and parliamentarians. Many Tamil politicians and their families sought refuge in Tamil Nadu in 1983 after the ethnic riots in Sri Lanka and continue to live there in a legal limbo. Technically, many such political families continue to stay in Tamil Nadu in violation of India's immigration law/s. Under these circumstances, the TNA is circumscribed to agitate for the stricter enforcement of the law, (in letter and spirit), with regard to the fishing dispute in Sri Lanka for fear that the Tamil Nadu government might retaliate by requesting the GoI to deport these families of the TNA members and parliamentarians from Tamil Nadu.

Every time Indian fisherpersons were arrested by the Sri Lankan law enforcement authorities, the former Chief Minister of Tamil Nadu, the late Jayalalitha Jayaram, had immediately written to the Indian Prime Minister, Mr. Manmohan Singh and subsequently Mr. Narendra Modi, seeking the intervention of the GoI to secure the release of the allegedly innocent Tamil Nadu fisherpersons. In contrast, neither the former Chief Minister of the Northern Province of Sri Lanka, Canagasabapathy Viswalingam Wigneswaran, nor the Northern Provincial Council has ever raised the issue of poaching or the occasional arrests of Sri Lankan fisherpersons trespassing into Indian waters by the Indian Coast Guard with the President or the Prime Minister of Sri Lanka. The former Fisheries Minister of the Northern Provincial Council has called for direct negotiations between the fisherpersons from the two countries "with an open mind and in a spirit of give-and-take" because India, in general, and Tamil Nadu in particular have supported the Sri Lankan Tamils against oppression by the Sri Lankan state.²⁸

Even academics attached to the University of Jaffna are reluctant to complain in public about the poaching by the Tamil Nadu fisherpersons due to the pan-Tamil solidarity between the peoples of the Northern Province of Sri Lanka and the Tamil Nadu state in India. In short, the wider interest of ethnic solidarity and pan-Tamil nationalism appears to trump that of the livelihoods of the fishing communities in the Northern Province of Sri Lanka.

Furthermore, the fisherpersons of northern Sri Lanka do not usually vote for the national political parties of Sri Lanka; instead, they usually vote for the regional ethnic party such as the TNA. Therefore, the northern Sri Lankan fisherpersons do not have political capital/clout as do Tamil Nadu fisherpersons or the fisherpersons from southern Sri Lanka. Had this fishing dispute been occurring off the southern coast of Sri Lanka, the response of the Sri Lankan government and the judiciary is likely to have been rather different and much harsher.

Post-war development of fishing in northern Sri Lanka

According to the latest available data, in 2015, there were 48,380 active fisherpersons in the entire Northern Province accounting for 22% of the total fisherpersons in the country (i.e. 48,380 out of 221,560). The Jaffna district accounted for almost half of this total (23,480 or 49%) followed by Mannar district (with 17,540 or 36%). In total, 183,480 persons made up this community's total household population in the Northern Province; of these households, 54% (98,230) were in the Jaffna district and 32% in the Mannar district (59,530) (see [Table 1](#)).

After the civil war, the total “fish-catch” in the Northern Province has doubled (increased by 116%) between 2010 (33,600 metric tons) and 2015 (72,560 metric tons)(see [Table 2](#)). However, the total catch in the Northern Province has not yet recovered to the level of 1980 when 88,452 metric tons of fish were caught. In 1980, the Northern Province accounted for 47% of the total fish catch in the country, which had declined to just 16% by 2015 (see [Table 2](#), one before the last row parentheses).

As can be seen from [Table 2](#), the growth in the fish catch in the Northern Province in the aftermath of the civil war has not been linear. For example:

- The Jaffna district experienced a significant drop (34%) in fish catch between 2012 (32,400 metric tons) and 2013 (21,380 metric tons);
- Similarly, the fish catch in the Kilinochchi district declined by 13% between 2014 (15,780 metric tons) and 2015 (13,800);
- The fish catch in Mannar also declined by 17% between 2012 (13,450) and 2013 (11,110) and by another 12% between 2014 (22,130) and 2015 (19,390).

The plausible cause of this non-linear growth in fish catch in Jaffna, Kilinochchi, and Mannar districts could be the increase in poaching by Indian trawlers. Such considerable fluctuations are an indication of the extra-territorial restrictions imposed on the fisherpersons and the fishing industry in the post-civil war Northern Province.

The fishing sub-sector contributed only 1.7% to the national economy of Sri Lanka in 2010 which decreased to 1.4% in 2015. In contrast, the fishing sub-sector contributed 3.7% to the northern provincial economy in 2010, which significantly increased to 5.6% in 2015 (the latest year for which provincial GDP data is available) (see [Table 3](#)). If not for poaching, the fishing sub-sector’s contribution to the northern provincial economy might have been even greater.

De-development of fishing in northern Sri Lanka

The estimation of the economic and livelihood losses caused by poaching by Indian trawlers is difficult to calculate. The fish are not bound in any way by the maritime boundaries between different countries. Further, it is very difficult to physically count the number of trawlers crossing over into the territorial waters of Sri Lanka as these tend to vary from day to day, and information on the types of fish caught by the poachers is impossible to verify. Moreover, the retail and wholesale prices of different varieties of fish change constantly, thus making it impossible to impute values for different varieties of fish affected by poaching.

In addition to today’s losses incurred due to poaching, the fishing by bottom trawling kills future streams of income due to mass killings of under-grown fish (“by-catch”) as trawlers shovel the bottom of the seabed indiscriminately. It is claimed that about 75% of fish and residues (“by catch”) caught by trawl nets are non-marketable.²⁹ The trawlers also irreparably damage or destroy fishing nets used by fisherpersons in Sri Lanka, thereby causing the latter to avoid fishing on the days that Indian trawlers are expected to poach in Sri Lankan waters, consequently incurring a livelihood opportunity cost.

In addition to the direct monetary losses incurred by the fishing communities in the Northern Province, there are indirect losses incurred by the entire supply chain of the

Table 1. Fisher population and distribution (2015).

	Total active fisherpersons in 2015	Fishing household population in 2015
Jaffna	23,480	98,230
Kilinochchi	3,900	15,010
Mannar	17,540	59,530
Mullaithivu	3,460	10,710
Total Northern Province	48,380	183,480
Total Sri Lanka	221,560	830,560

Source: Ministry of Fisheries and Aquatic Resources Development, cited in *Statistical Abstract 2016*, Department of Census and Statistics, Sri Lanka. <http://www.statistics.gov.lk/Abstract2016/CHAP5/5.32.pdf>.

Table 2. Total marine fish catch in 1980 and 2010–2015(metric tons).

	1980 metric tons	2010 metric tons	2011 metric tons	2012 metric tons	2013 metric tons	2014 metric tons	2015 metric tons
Jaffna	54,253	20,890	25,670	32,400	21,380	25,890	29,290
Kilinochchi	12,050	560	5,260	6,700	14,670	15,780	13,800
Mannar	11,604	10,790	12,860	13,450	11,110	22,130	19,390
Mullaithivu	10,545	1,360	2,580	6,790	8,480	8,930	10,080
Total Northern Province	88,452 (47.13%)	33,600 (10.11%)	46,370 (12.04%)	59,340 (14.22%)	55,640 (12.48%)	72,730 (15.83%)	72,560 (16.02%)
Total Sri Lanka	187,678	332,260	385,270	417,220	445,930	459,300	452,890

Source: Ministry of Fisheries and Aquatic Resources Development, cited in *Statistical Abstract 2016*, Department of Census and Statistics, Sri Lanka. <http://www.statistics.gov.lk/Abstract2016/CHAP5/5.34.pdf>.

Table 3. Fisheries sector's contribution to the provincial and national economies 2010 and 2015.

	2010		2015 (provisional)	
	Monetary Value million rupees(LKR)	Percentage of the provincial/national GDP	Monetary Value million rupees (LKR)	Percentage of the provincial/national GDP
Northern Province	6,930	3.7	21,902	5.6
Sri Lanka	93,777	1.7	162,017	1.4

Source: Central Bank of Sri Lanka, Economic and Social Statistics of Sri Lanka 2017, pages 39–40, Colombo. http://www.cbsl.gov.lk/pics_n_docs/10_pub/_docs/statistics/other/econ_&_ss_2017_e.pdf.

fisheries sub-sector, ranging from processors of fresh fish (drying, canning, etc.) to wholesalers, retailers, and the exporters of fresh and value-added fish.

There have been a few estimates of the economic value of poaching made by Dutch, Indian, and Sri Lankan fisheries experts/researchers in the last decade. These estimates are conjectural and indicative at best. The different methodologies adopted by different researchers/authors are outlined in [Table 4](#). For more details please refer to the individual publications.

Some of these guesstimates are relatively better than the others. According to this author, Oscar Amarasinghe has undertaken the most systematic loss estimation to-date using “scenario analyses”, and “sensitivity analyses”, over a three year period (2006–2008).³⁰ The estimates made by five different experts/researchers range from 16 million dollars (lowest) to 56 million dollars (highest) per annum (see [Table 4](#)). Interestingly, the foregoing two extreme guesstimates are by persons from Tamil Nadu.³¹ The in-between guesstimates are by Dutch and Sri Lankan researchers. The average of these five different estimates is 41 million USD or 5,293 million Sri Lankan rupees per annum.

Accordingly, the annual direct monetary loss to each member of the fishing households in the Northern Province is 28,848 Lankan rupees (LKR) ([Table 5](#)). This amount is derived by dividing the annual total direct losses due to poaching (5,293 million rupees) by the population of the total number of fishing household population (183,480 – refer [Table 1](#)). Furthermore, the annual direct monetary loss due to poaching (5,293 million LKR) was equivalent to 1.4% of the Northern Provincial Gross Domestic Product in 2015, which was 390,689 million LKR (see [Table 5](#)).

The indirect losses in terms of value addition (processing, canning, drying, etc.), wholesale and retail mark-ups, and losses in seafood exports due to poaching by Indian trawlers are estimated by this author to be 50% of the direct losses. Hence, the indirect losses amount to USD 20.5 million or LKR 2,646.5 million ([Table 5](#)). The annual direct and indirect losses incurred due to poaching by Indian trawlers (LKR 7,939.5 million or USD 61.5 million) amounts to 2.0% of the provincial GDP of the Northern Province in 2015 (390,689 million rupees). ([Table 5](#)).

The summary of losses are as follows:

- The annual direct losses incurred by Sri Lanka due to poaching is LKR 5,293 million (USD 40.5 million).
- The annual direct loss is equivalent to 1.4% of the Northern Provincial GDP in 2015.
- The annual indirect loss is estimated to be LKR 2,647 million (USD 20.3 million)
- The annual direct as well as indirect loss is equivalent to 2.0% of the Northern Provincial GDP in 2015.

A micro level study in selected coastal areas in the Mannar district has been undertaken during 2014–2015 towards an undergraduate dissertation in Sri Lanka, which reveals valuable insights on the impact of illegal fishing on local fishing communities.³²

Envisioning a smart dispute resolution

The chances of stopping poaching by way of intensive and effective law enforcement and/or through bipartite (between the GoI and the GoSL or between the leaders of the fishing

Table 4. Annual monetary loss to Sri Lanka caused by poaching of trawlers from India.

	Oscar Amarasinghe (2011) (particularly pages 23–30)	JoeriScholtens (2015b)	Mohamad Kasim (2015b)	FF Mission (cited in Scholtens2015b)	Soosai Ananthan (citedinScholtens2015b)	Average
Loss per annum Indian rupees (INR)	not available	2 billion	1 billion	not available	not available	–
Loss per annum Sri Lankan rupees (LKR)	4.8 billion	5 billion	2.2 billion	not available	not available	–
Total loss per annum US dollars (USD)	43 million	55 million	16 million	56 million	37 million	41 million
Year of Estimate	2006–2008, 2011	2015	2015	not known	not known	2015
Approximate share of the Indian trawlers crossing over to Sri Lankan waters	50%	50%	25–30%	66%	50%	
Approximate number of times Indian trawlers cross into Sri Lankan waters in a year	83,600	150,000	not available	not available	150,000	

Source: Author's tabulation based on various sources.

Table 5. Direct and indirect losses due to poaching.

Sri Lanka Gross Domestic Product (GDP) in 2015 (provisional)	LKR million	11,183,220
	USD million	80,028
Northern Province GDP in 2015 (provisional)	LKR million	390.689
	USD million	2,868
Annual direct losses due to poaching 2015	LKR million	5,293
	USD million	40.5
Annual indirect losses due to poaching 2015	LKR million	2,646.5
	USD million	20.3
Annual direct loss to each member of the fishing households population in the Northern Province due to poaching	LKR	28,848
Annual direct and indirect losses due to poaching as a percentage of the Northern Provincial GDP	Percentage	2.0
Annual direct and indirect losses due to poaching as a percentage of the National GDP	Percentage	0.1

Per Capita Direct Loss to the Fishing Community in the Northern Province.

Source: Author's tabulation based on Tables 1 and 3, and other sources.

communities in Tamil Nadu and northern Sri Lanka), tripartite (between India, Sri Lanka, and Tamil Nadu), or quadripartite (India, Northern Province, Sri Lanka, and Tamil Nadu) political negotiations seem to be very remote for a variety of reasons, many of which have already been outlined above.

It is also important that Sri Lanka Navy personnel refrain from firing at Indian poachers in Sri Lankan waters, as has happened several times during the course of Sri Lanka's long civil war, hence severely injuring, (if not killing,) such fisherpersons from Tamil Nadu. There have also been instances of fisherpersons from northern Sri Lanka and Tamil Nadu having violently clashed with each other closer to the coastlines of the Northern Province, resulting in at least one Sri Lankan Tamil fisherperson being killed.³³

Given these circumstances, it is high time to explore scientific or technical dispute resolution mechanisms to resolve this long festering "soft-conflict". According to media reports, some time ago, there was a proposal to erect electric fences along the maritime borders between India and Sri Lanka. However, this proposal was understandably rejected by the GoI because such an electric fence could be fatal to fisherpersons of both the countries who may trespass into each other's maritime territory inadvertently, or in an emergency under distress.

A former Principal Scientist and Scientist-in-Charge at the Madras Research Centre of the Central Marine Fisheries Research Institute of India, Dr. Mohamad Kasim, proposed the construction and deployment of artificial reefs for the restoration of the coastal ecosystems, improvement of biodiversity, and for increasing the biological resources, which in turn would increase the marine fish stock and thereby improve the livelihood of coastal fishing communities.³⁴ The artificial reefs should complement the natural coral reefs and have already been successfully deployed along the coasts of Kerala state (Calicut, Kannur, and Trivandrum) and Tamil Nadu state (Chennai, Cuddalore, Gulf of Mannar, Kalpakkam, Nagapattinam, Neelankarai, Palk Bay, Pulicat, and various other places) in India.

It is claimed that the biodiversity of the bottom living bio-foulers could be greatly increased by increasing the sea bottom substratum. Shinya Otake, a Marine Biologist at Fukui Prefectural University in Japan, claims that some of the artificial reefs built in Japanese waters support a biomass of fish that is twenty times greater than similarly sized natural reefs.³⁵ A study undertaken at the Occidental College in Los Angeles confirmed the foregoing claim by revealing that the weight of fish supported by each square metre of sea floor by oil and gas rigs off the Californian coast was twenty seven times more than that supported by each square metre of sea floor by the natural rocky reefs.³⁶

The deployment of a three-dimensional artificial reef with dimensions 10 feet by 10 feet by 1 foot in the sea bottom will increase the surface area by 23 times as the bottom substratum increases to 230 square feet. An artificial reef of the size of these foregoing dimensions will cost about INR 2.5 million (38,610 USD or around LKR 5.4 million) and will last for a minimum period of 25 years.³⁷ Such artificial reefs are most suited for deployment in shallow waters as is the case of Gulf of Mannar, Palk Bay, and Palk Strait.

In addition to increasing the marine fishery resources, artificial reefs are an effective deterrent against bottom trawling by trawler boats. The trawlers would not operate in areas with artificial reefs as it would result in severe damage to the trawl nets, and possibly the trawler boats itself. Therefore, the fishing communities in northern Sri Lanka as

well as the fisheries authorities should seriously and expeditiously consider the construction and deployment of artificial reefs in the Gulf of Mannar, Palk Bay, and Palk Strait, first in order to deter the trawlers from Tamil Nadu illegally poaching in Sri Lankan waters, and second, to increase the stock of fish.

These artificial reefs could save the fishing community from dithering law enforcement agencies, inordinate delays of the legal processes, and parochial political haranguing. This scientific and technological approach could potentially result in a win-win outcome (non-zero sum game as per the game theory), for the fishing communities of northern Sri Lanka and indeed the entire supply chain of the fishing sub-sector in Sri Lanka.

Notes

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