

THE DISPUTES AND INFLUENCE AMONGST FISHERMEN ON MARITIME CONTAMINATION

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ABSTRACT

This study intends to examine the fishermen's disputes over marine pollution, concentrating on the triggers and consequences of marine pollution on the fishermen. The scope of the study is performed at Kubang Rotan, Kuala Kedah, Kedah, Malaysia. The purpose of the study encompasses as follows: a) to determine the disputes faced by fishermen from marine pollution, b) to examine the influences faced by the fisher from marine pollution, and c) to evaluate the volume of fish caught from marine pollution. The descriptive quantitative analysis is utilized based on the data that have been collected from the 62 respondents of the questionnaire survey distribution among the samples. The respondents were randomly selected to contribute to the data collection process. There are three sections in the questionnaire. Section A covers the respondent's background, including age, gender, race, experience, and education level. Section B covers the disputes, including the causes and the effects and section C covers the volume of fish caught by the fishermen from the marine pollution effect. The correlation analysis has shown that the volume of the caught fish is positively correlated at 0.659 by the disputes and the influence is positively associated at 0.694 correspondingly.

Keywords: *Disputes, Fishermen, Volume Fish Catch, Influences, Marine Pollution*

1.0 INTRODUCTION

The fishing business is growing in Malaysia and is vital to the Malaysian economy and society [1]. It has donated to the national products, being the main supply of protein for society's diets, a supply of occupation, and a source of foreign exchange [2]. It has also offered an advantage of opportunities and advantages through investment in the fishery sector and the construction of seafood processing [2]. There is an expansion in the worldwide need for fish commodities [3]. However, facing rapid expansion, various concerns were confronting fishermen, especially pollution, harmful effects, and disputes about fish supply adequacy [4]. The fishermen's community easily gets endangered when the fishermen are faced with a risk beyond their hopes [5]. The marine pollution issue has uninfluenced fish populations and should earn severe consideration as it has influenced the fishermen's income [6]. The affected income is normally amongst the impoverished fishermen society [7-8]. As a coastal society, the fishing population depends on marine resources. According to statistics in the Rancangan Malaysia Ke Sepuluh (RMK10), the fishing community includes 40% of the low-income population (Malaysia, 2010). In the area of Kuala Kedah, the fishermen face problems with the scarcity of fish supply in the future due to marine pollution. The number of fish caught has decreased yearly and has caused a shortage in the emergence of fish supply in Kuala [9]. This study intends to determine the disputes faced by the fishermen from marine pollution, evaluate the face of the influence by fishermen from marine pollution, and estimate the volume of fish caught at Kuala Kedah owing to marine pollution.

2.0 LITERATURE REVIEW

2.1 *The Disputes Faced by Fishermen*

Marine pollution is the conception of humans as harmful to the marine environment, triggering harmful effects on human health as the loss of living resources, a hindrance to marine activities, particularly fishing, and reducing seawater quality [11]. Marine pollution could daily decrease the number of fish caught when this problem keeps on arising and could destroy populations and species regularly [11]. Marine pollution could occur in various ways including land-based activities, sea-bed pollution, oil spills, and vessel pollution [12]. The earlier study has revealed various disputes faced by fishermen due to marine pollution. The sand-dragging action, the coastal vision, and the issue of fishing income due to unsustainable activity development would damage the ocean ecosystem and marine life [13]. The aquatic habitat has been interrupted and has decreased the quantity of fish supply. The coastal area should be low due to the result of the development of the implemented area. This could cause fishermen not to go out and has moved toward the fisherman's jetty because the depth of the sea level is very low. The environmental influences of the oil spill incidents caused long-term damage to species and habitats [14]. Many parts of the oceans are overfished which caused fishery resources to turn out to be destroyed [15]. Blast fishing or dynamite fishing or fish bombing is another way that could reduce the number of fish caught [16].

2.2 The Effects Face by Fishermen

Marine pollution causes an influence economic activity such as fishing areas and fisherman areas [17]. It also affects food manufacturing and economic influence contributing to commercial expansion [18]. Marine pollution might destroy marine life, seafood production, the economy, contaminated seafood, and food poisoning. Therefore, fishermen face sufficient capital to catch fish [19]. The fishermen are obliged to have sufficient equipment to catch fish at sea. The fishermen may lose their jobs when cannot accommodate the cost [20]. Fishermen might lose their income, damage the fishing gear and net, affect their livelihoods, and face difficulty to sustain daily lives [21]. Marine pollution could also affect social problems and tourism activity. Marine pollution causes dirty water and the environment, exposing tourists to illnesses and putting their lives in danger [22]. The polluted environmental causes pollution of seafood products and affects tourist spots [23]. Lastly, it could be disrupted marine animals' reproductive process, and marine animals and plants could also turn out to be vanished [24].

2.3 The Amount of Fish Catch

The increase in the fish volume fishes, and revenue rate may depend on the technology or catch equipment applied by the fishermen. The fishermen may also utilize the previous version with low-technology equipment and skills rather than apply modern technology [25]. The more advanced the technology applied by fishermen, the higher the productivity increases and lead to higher income [26]. The new adopting technologies such as satellite placement systems create better opportunities for fishermen to search for fish [27-28]. The application of modern technology is applied to increase the operation and replace the human workforce [29]. The factor of education standards and skill is also another contributor which may influence the amount of caught fish. However, some of the fishermen may not have the ability and expertise to steer the boat and possess skill and courage [30]. Therefore, it needs the fishermen to have better education to facilitate them in recognizing the existing modifications [30]. The application of sonar management facilitates fish detection around the boat and could facilitate the prevention of sea obstacles [30]. The application of modern technologies could protect operational time, decrease the cost of losses during the fishing operation, and increase the volume of fish caught at the correct fishing location. Nevertheless, the fishing industry receives lacks support from the younger group [31]. Finally, the fishery sector's development contributes to the supply of food and offers job prospects [31].

3.0 RESEARCH METHODOLOGY

This study utilizes a quantitative survey approach to achieve the anticipated conclusion of the study. The questionnaires were circulated to respondents amongst the fishermen situated at Kubang Rotan, Kuala Kedah, Kedah, Malaysia. The application of the Statistical Package for the Social Sciences (SPSS) technique is utilized to gather the statistics and to produce the analysis for the descriptive statistics, frequency, mean, standard deviation, and reliability tests.

3.1 Theoretical Conceptual Framework

The proposed theoretical conceptual framework illustrates the correlation between the independent and dependent variables. The independent variables cover the disputes and influences that fishermen are facing, while the dependent variable is the volume of fish caught.

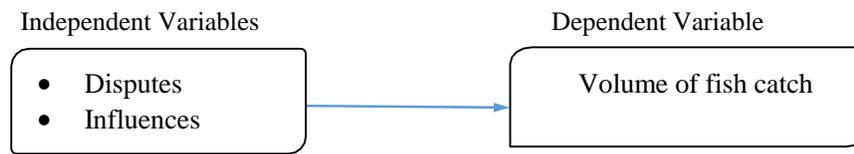


Figure 1. The Theoretical Conceptual Framework

3.2 The Population, Sample, and Respondents

The population for this study entails a population of 186 fishermen from the Kubang Rotan, Kuala Kedah, Kedah, Malaysia. The sample size was drawn at 118 fishermen or 63.44%. Meanwhile, the respondents were 62 fishermen, or 52.54% who contributed to this study.

Table 1. The Population, Sample, and Respondent

	Population	Sample	Respondent
Total	186	118	62
Percentage	100%	63.44%	52.54%

3.4 The Development of the Questionnaire

A questionnaire was arranged and circulated to target respondents to find the information required for the objectives of this study. The questions were utilized to connect the disputes and the influences of the volume of fish caught by fishermen. There are five sections in the questionnaire. Section A covers the respondent's detailed information, Section B covers the job scope, Section C covers the disputes faced by fishermen, Section D covers the influences faced by fishermen, and Section E covers the evaluation of the volume of fish caught due to marine pollution.

4.0 RESULTS AND DISCUSSIONS

4.1 The Pilot Test

The pilot study was conducted among six fishermen from Kubang Rotan in Kuala Kedah. There were 18 items for the pilot respondents and required pilot respondents to respond to the questions. The Cronbach's coefficient of alpha internal consistency reliability is shown in Table 2 and is applied to determine the reliability of questionnaires (George Ursachi, et al, 2015). The values shown are more than 0.9 and have indicated that the reliability is excellent at 0.907. As the reliability coefficient value is closer to 1.0, it has indicated that the reliability is excellent. Thus, internal consistency is also exceptional for this study.

Table 2. Cronbach's Alpha (Source: SPSS version 25)

Cronbach's Alpha	No of Items
.907	18

Table 2 declares the Cronbach Alpha at 0.907 from 18 items of questions. Cronbach's alpha reveals a very intense correlation. Therefore, the value of 0.907 is acceptable for the questionnaire distribution to the real respondent.

Table 3. The Correlation Coefficient Value (r) (Source: SPSS version 25)

The correlation coefficient value (r)	Strength Beyond Relations (+/-)
1	Perfect
0.8 - 0.9	Very strong
0.5 – 0.8	Strong
0.3 – 0.5	Simple
0.1 – 0.3	Weak
Less than 0.1	Very Poor
0	Zero

Table 3 discovers the concentration of the correlation based on the correlation coefficients (Coakes, Steed & Ong, 2009). The correlation coefficient analysis is utilized to describe the strength of the correlation among variables. The reliability test is at 0.907 and shows a very strong relationship. Therefore, the correlation coefficient analysis explains the intensity of the correlation between variables. The person correlation coefficient (r) was analyzed to confirm the intensity of the association between the two variables. To examine the correlation, the investigation reflects the significance (p) of which the value accumulated is more substantial than 0.5. Table 4 shows the review of Cronbach's alpha if an item is removed with the range of 0.920-0.928.

Table 4. The Summary of Cronbach's Alpha if Item Removed (Source: SPSS version 25)

Scale Mean ifItem Deleted	Scale Variance ifItem Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
69.82- 70.24	82.35- 92.50	0.323 - 0.824	0.920- 0.928

4.2 The Demographics of Respondents

Table 5 indicates the background information of the 62 respondents. The respondent's background contains data on age, gender, race, the highest level of education, work experience, number of households, and monthly income of respondents.

Table 5. The Demographics of the Respondents

Items	Descriptions	Frequency	Percentage
Age	18-25 Years old	29	46.8
	26-40 Years old	15	24.2
	41-54 Years old	16	25.8
	5 years old and above	2	3.2
	Total	62	100
Gender	Male	58	93.5
	Female	4	6.5
	Total	62	100
Race	Malay	52	83.9
	Chinese	6	9.7
	Indian	4	6.5
	Total	62	100
Education Level	MR	14	22.6
	SPM	35	56.5
	STPM	8	12.9
	Diploma	3	4.8
	Others	2	3.2
	Total	62	100
Experience as a fishermen	Less than 2 year	28	45.2
	3 - 15 years	25	40.3
	16 – 30 years	9	14.5
	31 years and above	0	0
The Number of Households	1 – 3	30	48.4
	4 – 6	24	38.7
	7 – 9	5	8.1
	10 and above	3	4.8
Monthly Income	Less than RM1500	10	16.1

	RM 1500 – RM 2000	26	41.9
	RM 2000 – RM 3500	22	35.5
	More than RM 3500	4	6.5
	Total	62	100
Working hours/day	3 hours	7	11.3
	4 – 6 hours	37	59.7
	7 – 9 hours	15	24.2
	10 hours and above	3	4.8

Table 5 indicates most of the age group of the fishermen is from 18-25 years old with 46.8% or 29 respondents who have to measure the degree of proficiency and maturity in problem-solving related to marine pollution. There were 58 males or 93.5% and four females or 6.5% among those who responded. Thus, there is a gender difference, with males being more than females in the fishing industry. In conditions of race, Malay is the common race of the respondents for 83.9 % or 52 respondents compared to the other races. These Malay fishermen stay within 10 to 20 kilometers of the community's area, which has supported why the Malay population is the top group. For the education level 35 respondents with SPM or 56.5%. The majority of 28 respondents have less than two years of work experience 45.2%. It is because the skilled fishermen are well-versed in sophisticated bot technology and capable to operate the boat and equipment with no difficulty. The greatest result for monthly income was in the range of RM1500.00 – RM2000.00 with 26 respondents or 41.9%. Lastly, the working hours per day for fishermen were in the middle of 4-7 hours which was characterized by 37 respondents or 59.7%.

4.3 Instrument of Likert Scale

There are five sections contained in the study method. The Likert scale of 1 to 5 has been utilized for Sections C, D, and E. It has indicated 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree.

4.4 The Normality Test

A normality test such as the Kolmogorov-Smirnov and Shapiro-Wilk tests were used to ascertain whether a sample or a group of data corresponds to the standard distribution (Mishra et al. 2019). It indicates that the extreme variation among the examined and anticipated cumulative-normal distributions from the sample mean and the standard deviation is evaluated by the Kolmogorov-Smirnov test. The sample size is more than 50 respondents.

Table 6. The Normality Test (Source: SPSS version 25)

Kolmogorov-Smirnov ^a			Shapiro-Wilk		
Statistic	df	Sig.	Statistic	df	Sig.
.371	62	.000	.719	62	.000

Table 6 illustrates the normality test of the disputes faced by the fishermen with the independent variable

(IV) at 0.371. The significant value is 0.000 and it is normal (Razali & Way, 2011). The statistical value of the disputes faced by fishermen shows higher than the significant value.

4.5 The Correlation Between Disputes, Influences, and Volume of Fish Catch from Marine Pollution

The correlation analysis establishes the degree and direction of the relationship between the variables and has provided an anticipated correlation between the variables. This study considers whether there is a statistically significant correlation between the independent variables of disputes and the influences on the dependent variable of the volume of fish caught. These elements have been evaluated as the independent variables that influence the outcome of the disputes, the influence of the disputes, and the volume of fish caught from marine pollution. The main justification for applying this correlation analysis is to discover the statistically significant relationship between these variables. It also can be utilized as a gauge to establish whether the other variables are decreasing or increasing. Based on the 62 respondents it reveals that the Pearson correlation method utilized has revealed a significant and the greatest connection.

Table 7. Correlation Between Disputes, Influences, and Volume of Fish caught from Marine Pollution
(Source: SPSS version 25)

		Disputes	Influences	The volume
Disputes	Pearson Correlation Sig. (2-tailed)	1	.629**	.659**
		.000	.000	.000
	N	62	62	6
Influences		.629**	1	.694**
	Pearson Correlation Sig. (2-tailed)	.000		.000
	N	62	62	62
The Volume of Fish Caught		.659**	.694**	1
	Pearson Correlation Sig. (2-tailed)	.000	.000	
	N	62	62	62

** Correlation is significant at the 0.01 level (2-tailed)

Table 7 exhibits the significant and strong correlation between disputes, influences, and the volume of fish caught from marine pollution. The Pearson correlation coefficient reveals the range of 0.629 to 0.694 has been achieved. The independent variables and dependent variables were discovered to be significantly correlated (Al-Majed, Adebayo & Hossain, 2012) and (Zhong & You, 2011). The respondents have granted that the fishermen's influence is an important indicator that must be considered when determining the value or yield of catch acquired by the fishermen. This is due to the relationship between the disputes faced by fishermen and the number of catches showing a significant and intense correlation.

5 DISCUSSION AND CONCLUSION

5.1 Discussion

The major influence on the volume of fish caught in marine pollution among fishermen has been revealed. The analysis generated in this study indicates the magnitude of the problems faced in the fishing industry which has had its landing results decrease in recent times. Moreover, regarding the dilemma of marine pollution, this study has indicated the other factors that influence the number of fish caught involve the different boat types, time (credit hours), and the number of fishermen.

5.2 Recommendations

To support the discovery of the problems confronted by the fishermen and to enhance the future volume of fish catches, this study proposes to have more studies on the concerned topic. The upcoming study requires the discovery of substantial data in the literature review or interviews on marine pollution among the fishermen in the study area. To get a valid data analysis, it is recommended to involve all the fishermen as the respondents. The questionnaire could also reach the respondents via numerous channels such as WhatsApp, email, google forms, and phone calls. If the response rate of the fishermen is not adequate, it is advised to utilize the qualitative method when performing the study. The information attained is suggested to be associated with their area and the disputes they are confronting. Another reason why this study could not reach all the fishermen is primarily to the Covid-19 outbreak. This study only applied online data collection during Covid-19. It is proposed the upcoming study meet respondents face to face for the questionnaire distribution. The future study may incorporate more disputes and disputes faced by the fishermen towards the amount of fish volume due to marine pollution.

5.3 Conclusion

Based on the findings indicates that the aims of the study have been accomplished. The results from 62 respondents indicated a substantially positive relationship between disputes and the influence of fish volume due to marine pollution.

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This study is effectively performed from the great collaboration earned from 62 respondents among the fishermen at Kubang Rotan, Kuala Kedah, and Kedah. Malaysia even though during the pandemic Covid-19 outbreak. Deprived of the dedication of the team members also this study cannot achieve the study objective and cannot complete.

REFERENCES

- [1] Al-Majed, A. A., Adebayo, A. R., and Hossain, M. E. (2012). A Sustainable Approach to Controlling Oil Spills. *Journal of Environmental Management*, vol. 113, pp. 213-227.
- [2] Barro, R. D., Vuong, Q. D., and Lee, D. C. (2018). Marine Intermediate Shaft Fatigue Strength and Lifetime During Barred Speed Range Passing. *Transactions of the Korean Society for Noise and Vibration Engineering*, vol. 28(3), pp.259-263.
- [3] Carroll, J., Vikebø, F., Howell, D., Broch, O. J., Nepstad, R., Augustine, S., and Juselius, J. (2018). Assessing Influences of Simulated Oil Spills on the Northeast Arctic cod fishery. *Marine Pollution Bulletin*, vol. 126, pp. 63-73.
- [4] Coakes, S. J., Steed, L. G., and Ong, C. (2009). *SPSS Version 16.0 for Windows: Analysis Without Anguish*. John Wiley & Sons Australia.

- [5] Department of Fisheries (DOF). (2017, November) Prestasi dan Pencapaian Sektor Perikanan <https://www.dof.gov.my/index.php/pages/view/42>.
- [6] D, George., and P. Mallery (2018) IBM SPSS Statistics 25 Step by Step: A Simple Guide and Reference, Fifteenth Edition.
- [7] George Ursachi, Ioana Alexandra Horodnic, Adriana Zait, (2015) How Reliable are Measurement Scales? External Factors with Indirect Influence on Reliability Estimators, pp. 679-686.
- [8] He, Y., Li, M., Perumal, V., Feng, X., Fang, J., Xie, J., and Wang, F. (2016). Genomic and Enzymatic Evidence for Acetogenesis Among Multiple Lineages of the Archaeal Phylum Bathyarchaeota Widespread in Marine Sediments. *Nature Microbiology*, vol. 1(6), pp.1-9.
- [9] Ishak, I. C., Johari, A. A., Mazlan, N., and Ismail, S. B. (2018). The Correlation Between Management Approaches Towards Oil Spill Preparedness and Response: A Case Study in Lumut, Perak, Malaysia. AIP Conference Proceedings, 2020(2018). <https://doi.org/10.1063/1.5062683>
- [10] Khalik, W. M. A. W. M., Ibrahim, Y. S., Anuar, S. T., Govindasamy, S., and Baharuddin, N. F. (2018). Microplastics Analysis in Malaysian Marine Waters: A Field Study of Kuala Nerus and Kuantan. *Marine Pollution Bulletin*, vol.135, pp.451-457.
- [11] Lawless H., Heymann H. (2010) Descriptive Analysis. In: Sensory Evaluation of Food. Food Science Text Series. Springer, New York, NY. https://doi.org/10.1007/978-1-4419-6488-5_10
- [12] Leasiwal, T. C., and Rijoly, J. C. D. (2019). Determinants Of Fishermen Income in Regency of West Seram, Maluku (Study in 3 Village of West Seram Regency). XI (1), pp. 1–14. <https://doi.org/10.31227/osf.io/cdg8w>
- [13] Lein, A. A. R. (2018). Factors Affecting the Fishermen's Household Income and Welfare. *International Research Journal of Management, IT and Social Sciences*, vol. 5(4), pp. 80–90. <https://doi.org/10.21744/irjmis.v5n4.266>
- [14] Liu, Y., Bunting, S. W., Luo, S., Cai, K., and Yang, Q. (2019). Evaluating Influences of Fish Stock Enhancement and Biodiversity Conservation Actions on The Livelihoods of Small-Scale Fishers On The Beijiang River, China. *Natural Resource Modeling*, vol. 32(1), pp. 1–17. <https://doi.org/10.1111/nrm.12195>
- [15] Malaysia (2010) Rancangan Malaysia Ke Sepuluh 2011-2015. Jabatan Perdana Menteri, Malaysia.
- [16] Mishra, Prabhakar & Pandey, ChandraM & Singh, Uttam & Gupta, Anshul & Sahu, Chinmoy & Keshri, Amit. (2019). Descriptive Statistics and Normality Tests for Statistical Data. *Annals of Cardiac Anaesthesia*. 22. 67-72. [10.4103/aca.ACA_157_18](https://doi.org/10.4103/aca.ACA_157_18).
- [17] Mohamed Shaffril, H. A., Hamzah, A., D'Silva, J. L., Abu Samah, B., & Abu Samah, A. (2017). The individual Adaptive Capacity of Small-Scale Fishermen Living In Vulnerable Areas Towards Climate Change in Malaysia. *Climate and Development*, vol. 9(4), pp. 313–324. <https://doi.org/10.1080/17565529.2016.1145100>
- [18] Mohd Shaladdin M, Wan Abdul Aziz WMA and Nik Wan O (2006). Analisis Kesejahteraan Hidup Nelayan Pesisir. *Jurnal Kemanusiaan*, vol.8, pp.58-77.
- [19] Novianti, Jamluddin MDJ, Abd Rahim MN (2011) Kualiti Hidup Nelayan di Sumatera Barat: Kekangan dan Adaptasi. *Sari-International Journal of Malay World and Civilization*, vol.29 (1), pp.245-257.
- [20] Norfatihah Othman, Abdul Rahman Abdul Latip And Nor Hayati Sa'at. (2019). Fasa Peralihan Nelayan Laut Dalam Serta Kesan Ke Atas Ekonomi, Sosiobudaya dan Persekitaran (Transitional Phase of Deep-Sea

- Fishermen and Influence on Economic, Sociocultural and Environment). *Akademika*, vol.89(2), pp. 169–185.
- [21] Norizan, A. G., M, Amirul, R., Adam, F., Berhanudin, A., Afgani@Eusoff, Y., and Ali Puteh, D. A. H. M. (2017). Quality of Life (QoL) of Fishermen in the West Coast states of Peninsular Malaysia. *International Journal of Academic Research in Business and Social Sciences*, vol. 7(4), pp. 313–330. <https://doi.org/10.6007/ijarbss/v7-i4/2808>
- [22] O. Odeku, K., and M. Paulos, B. (2017). Prohibition of Pollution of Marine Environments: Disputes and Prospects. *Environmental Economics*, vol.8(3), pp. 127–136. [https://doi.org/10.21511/ee.08\(3-1\).2017.05](https://doi.org/10.21511/ee.08(3-1).2017.05)
- [23] Odeku, K. O., and Paulos, B. M. (2017). Prohibition of Pollution of Marine Environments: Disputes and Prospects. *Environmental Economics*, (8, Iss. 3 (cont.)), pp.127-136.
- [24] Razali, N. M., and Wah, Y. B. (2011). Power Comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling Tests. *Journal of Statistical Modeling and Analytics*, vol. 2, pp. 21-33.
- [25] Sahabat Alam Malaysia (SAM) dan Persatuan Pendidikan Dan Kebajikan Jaringan Nelayan Pantai Malaysia (JARING) (2017, November). Memorandum Masalah Sumber Perikanan. November.
- [26] Showen, R., Dunson, C., Woodman, G. H., Christopher, S., Lim, T., and Wilson, S. C. (2018). Locating Fish Bomb Blasts In Real-Time Using A Networked Acoustic System. *Marine Pollution Bulletin*, vol. 128(January), pp. 496–507. <https://doi.org/10.1016/j.marpolbul.2018.01.029>
- [27] Sumaila, U. R., Bellmann, C., and Tipping, A. (2016). Fishing for the Future: An Overview Of Disputes And Opportunities. *Marine Policy*, vol. 69, pp. 173–180. <https://doi.org/10.1016/j.marpol.2016.01.003>
- [28] Sumaila, U. R., Lam, V., Le Manach, F., Swartz, W., and Pauly, D. (2016). Global Fisheries Subsidies: An Updated Estimate. *Marine Policy*, vol. 69, pp. 189-193.
- [29] Verma, R., Vinoda, K. S., Papireddy, M., and Gowda, A. N. S. (2016). Toxic Pollutants from Plastic Waste- A Review. *Procedia Environmental Sciences*, vol. 35, pp. 701–708. <https://doi.org/10.1016/j.proenv.2016.07.069>
- [30] Zella Adili, Y., and Antonia, M. (2017). Determinants Influencing Fishing Income to The Coastal Households of The Indian Ocean. *Oceanography & Fisheries Open Access Journal*, vol.4(3), pp.85-91.
- [31] Zhong, Z., You, F., (2011), Oil Spill Response Planning with Consideration of Physicochemical Evolution.