The impacts of policy implementation of cantrang prohibition for fishing activities in Paciran Sub-district, Lamongan Regency, East Java, Indonesia

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Abstract. Prohibition of Cantrang regulated by the Ministerial Decree of Maritime and Fisheries Affairs No. 2 year 2015 which was further amended to the decree No. 71 year 2016 have brought for some unexpected consequences on fishing activities and their related sectors in Lamongan, East Java. This research is particularly aimed at analyzing for both economic and social impacts of this policy in fishing activities in Paciran Sub-District, Lamongan Regency, East Java, Indonesia. The study was conducted from March to April 2019 in three different fishing villages. Data and information were collected using a deep interview technique. The gathered data were analyzed qualitatively. The results of this research exhibit that this policy of restricting the use of Cantrang has appeared to influence negatively the fishing activities for both fishermen and downstream sectors of fishing industries. Some aspects have been identified as the direct impacts of the policy such as reduced catch, lowering incomes of fishermen and regarding actors, fish shortage triggering high prices but not delivering better welfare for fishermen and other actors, and switching livelihoods for those who could not afford the condition. This research concludes that this policy has directly affected the economies of fishermen in the local level.

1. Introduction
The fishing activity provides jobs and livelihoods for millions of people for the world. This sector delivers an important contribution to the economic development for some certain countries [1]. Uses of fishery resources and environmental hazards are defined in new policies, regulations, and acts to regulate exploitation level of the fishery resources. This is intended for the availability of food and livelihoods and then the basic needs of people can be shifted to achieve sustainable fishery and marine conservation [2]. A fishery resource richness of Indonesia is highly potential in economic development both within and outside of this country [3]. However, the abundance of this resource in Indonesian
waters is not able to reduce the poverty level of people in the coastal areas [3, 4], and the fishing gears used of fishermen affect their welfare [4, 5]. Furthermore, varied complex issues facing for small scale fishermen in the coastal areas starting from the exploitation of coastal resources, degradation of fish resources, coastal area contour changes, fuel crisis until urbanization that all threats the coastal areas [6].

The abundantly potential fishery resource belongs to East Java Province is located in Lamongan Regency. This regency possesses more than 70,000 tons of fish production (18% of all fish production of East Java Province) and this production grows 2.8% annually which is valued as many as Rp 806 billion in 2014. Further, approximately 28 thousand of fishermen and almost 8,000 fishing vessels are operated in that area. The numbers of fish landed in Brondong/Blimbing Fishing Port are approximately 67,886.60 tons and including in four other fishing ports in 2017. There are 19,030 catch fishermen, more than 3,334-unit fishing vessels, and 13 units of processing industries that can employ more than 1,198 people [7]. One of important sub-district except Brondong becoming central of fish in this regency is Paciran with three fishing villages namely Weru that is recognized as fishermen owning fishing vessels (424 fishermen), Blimbing which has the many crews of catch fishermen (3,914 people), and Kranji that is most of fishermen (4,257 people) are living in this village [8]. The majority of catch fishermen in Paciran and mostly in Lamongan are small modified trawls well known as Cantrang or Payang.

Based on the ecological consideration and sustainability of resources, the government of the Republic of Indonesia has officially enforced the prohibition of unfriendly fishing gears starting from January 1, 2018. This restriction refers to the Ministerial Decree of Marine and Fisheries Affairs No. 2 of 2015 about Prohibiting Trawls and Seine Nets Operation in all fisheries management areas of Indonesia. One of fishing gears defining in this policy is the Cantrang due to it is environmentally unfriendly and destroys marine ecosystem, however it is economically feasible.

The operating prohibition of cantrang in Makassar Strait and Bone Bay affects significantly on fishing activity of fishermen (96-100%) and generates structurally unemployment in the research locations in a range of 28.7-60% [9]. This prohibition is impacted on unemployment; decrease the welfare of fishermen, and raising criminals [10], and it had decreased fish catch approximately 30% [11]. Fishermen (mostly crews of fishing gears) are tough to want and ready changing over to other allowable fishing gears as fishermen of cantrang switch to fishing gears possessing lower productivity due to it reduce clearly and factually their welfare [12].

Problems of prohibition policy of operating cantrang also are found in Lamongan Regency especially at Paciran Sub-district that has been occurred since last three years. This policy has brought about some economic flaming for catch fishermen both owners of fishing vessels and the crews of fishing vessels as well as businessmen who depend their livelihoods on fish catch from this fishing gear. The study about how far the economic and social impacts on fishing actors due to the mentioned policy above in three fishing villages in Paciran Sub-district makes this research is important to be analyzed further.

2. Research method

This research was conducted in three fishing villages namely Weru, Kranji and Blimbing at Paciran Sub-district, Lamongan Regency – East Java Province starting from March to June 2019. This is qualitatively descriptive research with a case study to explain the social problems becoming objects of the research [13]. Two data collecting methods used namely literature review and field observation. The various results of similar research were collected and analyzed to seek how deep the object was observed including other supporting data. Observation was taken in the field to monitor directly the problem of this research. Primary data of this research were resourced from groups of fishermen for both owners of fishing gear and the crews as well as actors depending on fish catch, officers from local Fisheries Office and other related institutions. Respondents of this research were determined using purposive samplings. Interviews were carried to those respondents using a prepared
questionnaire and their responses were recorded using a recorder and written in a field note. The required data then analyzed and presented descriptively.

3. Results and discussion

Becoming one of two coastal sub-districts in Lamongan Regency, Paciran plays an important role after Brondong in fishery activities. Most of the people living in this sub-district work in the sector of agriculture in this context as catch fishery (fishermen), merchants, processing industries, and tourism. Data presenting in the Lamongan in Figures [7] exhibits that numbers of people work in the fishery sector in this regency is approximately 19,030 in 2016 for brackish water fishery and increases in the next year. The dominant fishing gear used by fishermen in this regency especially at Paciran sub-district is Cantrang which is well known as Payang at Brondong Fishing Port [14]. Furthermore, the down-stream activity (processing industry) are abundant in this regency where its number of worker and types of the industry in Paciran sub-district is presented in Table 1 and 2, respectively. Moreover, the number of fishing vessels operated and fishing gears used according to the Fishing Port are listed in Table 3 and 4 as follows.

Table 1. Numbers of fishing processing industries according to types and workers in Lamongan Regency in 2017.

| Type of Industry                  | Number of Workers ≤ 20 | Number of Workers > 20 | Total |
|----------------------------------|------------------------|------------------------|-------|
| 1. Drying fish                   | 185                    | -                      | 185   |
| 2. Steaming fish                 | 126                    | -                      | 126   |
| 3. Frozen fish                   | 261                    | -                      | 261   |
| 4. Fish Paste                    | 89                     | -                      | 89    |
| 5. Liquid fish paste (Petis)     | 45                     | -                      | 45    |
| 6. Fish Smoking                  | 278                    | -                      | 278   |
| 7. Fish Powder                   | 22                     | -                      | 22    |
| 8. Fish Crackers                 | 128                    | -                      | 128   |
| 9. Cold Storage/Surimi           | -                      | 10                     | 10    |
| 10. Fish Meatball/Nugget/Abon    | 17                     | -                      | 17    |
| 11. Grilled fish cake (otak-otak)| 14                     | -                      | 14    |
| 12. Steamed (Presto)             | 7                      | -                      | 7     |
| 13. Others                       | 16                     | -                      | 16    |
| **Total**                        | **1,188**              | **10**                 | **1,198** |

Source: Lamongan in figures, 2017 [7].

Based on data in table 2 above, the number of workers employing in the fish processing industry in Lamongan is approximately 1,198 dominated by industries with workers less than 20 people namely as many as 1,188 people (Table 1). From these numbers, six types of fish processing industry are located Paciran sub-district composing of 19 business groups that employ more than 190 people (Table 2). Furthermore, these fish processing industries are supported by materials dominantly coming from catch fish. There are five fish ports in this regency that accommodate more than 3,344 units of fishing vessels composing of 519 outboard motorboats, 494 motorized boats in categorizing big, and 416 motorized boats in categorizing medium, as well as 1,915 motorized boats in categorizing small (Table 3). Fishing gears used in this area are distinguished into 7 types namely Purse Seine, Seine net (Big Payang), Longline, Danish Seine (Dogol), Gill Net, Trammel Net, and Fish Traps. The big payang is the most fishing gears used approximately 1,106 units or 28.9% from the entire fishing gears from two fishing ports, Brondong (Blimbing) and Weru Komplek (Table 4).
Table 2. Groups of fish processing and merchants in Paciran sub-district in 2019.

| No. | Type of processing products | Name of villages | Groups name | Number of members |
|-----|-----------------------------|------------------|-------------|-------------------|
| 1.  | Meatball /fish paste        | Paciran          | Anugrah Laut | 10 workers        |
|     |                             | Sidokumpul       | Bina Mandiri, Duta Neayan | 20 workers |
| 2.  | Fish Abon                   | Kd. Semangkon    | Gampang Usaha | 10 workers        |
| 3.  | Fish crackers               | Kranji           | Hasil Laut, Anugerah, Barokah Jaya | 30 workers |
|     |                             | Warulor          | Patri Laut, Bina Usaha II | 20 workers |
|     |                             | Kd. Semangkon, Blimbing | Rizkuna | 10 workers        |
|     |                             | Tunggul          | Aromah, Barokah Jaya | 20 workers        |
|     |                             | Paloh            | Putra Setia | 10 workers        |
| 4.  | Salted fish                 | Tunggul          | Bintang Laut | 10 workers        |
| 5.  | Frozen fish                 | Blimbing         | Mina Lestari | 10 workers        |
| 6.  | Drying fish / Petis         | Sidokumpul       | Bina Usaha I | 10 workers        |

Total: 190 workers

Source: Fishery Office of Lamongan, 2018 processed.

Table 3. Types of fishing vessels according to the base of fishing ports in Lamongan in 2017.

| Fishing Port | Outboard motorboat | Motorized Boat | Total | % |
|--------------|--------------------|----------------|-------|---|
|              | Big | Medium | Small |     |   |
| 1. Loghung   | 20  | -      | 224   | 244 | 7.3 |
| 2. Labuhan   | 26  | -      | 235   | 380 | 11.4 |
| 3. Brondong/Blimbing | 372 | 394 | 143   | 909 | 27.2 |
| 4. Kranji    | 519 | 22     | 406   | 1,001 | 29.9 |
| 5. Weru      | -   | 22     | 788   | 810 | 24.2 |
| Total        | 519 | 494    | 416   | 1,915 | 3.344 |

Source: Fishery Office of Lamongan, 2017 with a little modification.

Table 4. Fishing vessel based in fishing ports in Lamongan, 2017.

| Type of Gear | Fishing Port | Labuhan | Brondong (Blimbing) | Kranji | Weru Komplek | Lohgung | Total | % |
|--------------|--------------|---------|---------------------|--------|--------------|---------|-------|---|
| 1. Purse Seine |              | 26      | 8                   | 72     | 26           | 11      | 143   | 3.7 |
| 2. Seine net (Payang) |        | 224     | 404                 | -      | 401          | 77      | 1,106 | 28.9 |
| 3. Longline   |              | 17      | 368                 | -      | -            | 197     | 582   | 15.2 |
| 4. Danish Seine (Dogol) |       | 10      | -                   | 30     | -            | 155     | 195   | 5.1 |
| 5. Gill Net   |              | 82      | 28                  | 290    | 178          | 218     | 796   | 20.8 |
| 6. Trammel Net |            | -       | -                   | -      | 254          | -       | 254   | 6.6 |
| 7. Fish Trap  |              | 23      | 52                  | 609    | -            | 65      | 749   | 19.6 |
| Total         |              | 382     | 860                 | 1,001  | 859          | 723     | 3,825 |     |

Source: PPN Lamongan, 2017 data has been modified.

The results of interviewing deeply to the fishing actors in three villages at the research location point out that since the prohibition policy implemented on their fishing gears has given a significant
influence on their catch. The local fishermen and related downstream fishing industries underwent economic loss, even though this policy is good for the environment in short term, however, this policy raises the number of unemployment in short term due to workers who work in both catching fish and processing industries stopping directly. This policy also gives consequences on decreasing fish production because of lack of fishing vessels operating, lowering locally-generated revenues, creating the bad debt, bringing down the employments which than generates new social problems. In terms of fish availability in the fish auction is very limited that increases a high price due to the limited operating fishing gears, however, this high demand of fish does not deliver directly influence on uplifting the welfare of fishermen.

In a point of catch fishermen using Cantrang, most of them then avoid this policy by disguising their used fishing gears in their fishing boats or fishing vessels, marking down the size of their fishing vessels at issuing permission (SIUP/SIKPI). Furthermore, the accountability in the central level regarding fulfilling the target groups is not maximum, and even the recommendation of Ombudsmen is ignored, decision making is slow and not suitable, and the offered solution is not appropriate with the needs of fishermen. The fluctuation of implementing this policy on service mechanism to deliver supports affects the responses of fishermen using cantrang is low. This is due to change from using cantrang to other fishing gears such as gill net needs a big enough capital. While, in terms of time choosing in implementing this policy, according to fishermen, is not proper because stopping the use of this kind of fishing gear directly without any prior socialization, assistance, and support to the fishermen. The fisherman communities and other related stakeholders need to make adjustments in order to adapt to this new policy bearing in mind that the activity of fishing using cantrang has been occurring for a long time. The Ministry of Maritime and Fisheries Affairs has to provide the opportunity for the cantrang fisherman to adapt to this policy first.

The policy administered by the Government of the Republic of Indonesia to recover the demersal fishery resource through issuing a ban on the operation of trawl and other fishing gear is not something new. The chronology of regulation regarding the trawl fishing gear prohibition since Dutch colonialized era in 1920-s until the new issuing of the Ministerial Decree of Maritime and Fisheries Affairs No. 2 year 2015 about Trawls and Trawls and Seine Nets in all fishery management areas of the Republic of Indonesia and then amended to be the Decree No. 71 year 2016 about the routes of fishing and placing fishing gears in the fishery management areas of the Republic of Indonesia [12]. This policy has direct implication for both economic and social impacts for business actors diversely in catch fisheries in different locations locally. It creates unemployment, decreasing the welfare, and increasing crime level [10], unemployment for the crews of fishing vessels that flashes consequently on decreasing their welfare, however, this prohibition in long term is able to secure the marine ecosystem [15], and reduces fish catch in the amount of 30% [11]. The implementation of this policy in Makassar Strait and Bone Bay affects significantly on fishermen activity in a range of 96-100% and resulted in unemployment structurally in the research locations starting from 28.7% to 60% [9], and decrease the fisher men activities in Takalar (65%), Pangkep (15%) dan Palopo (28.7%) and consequently decreasing the income of fishermen as many as 27.6%, 76.7%, and 70.2%, respectively [14]. This restriction policy is responsible for financial loss in billion rupias for fishermen (fish skippers, crews of fishing vessels), merchants, weighing, transporters, bankers, and entrepreneurs in the fishery sector. However, this implementation of the regulation in the long term will have an impact in recovering the destroyed marine ecosystem and distribute the income equally to all fishermen of Probolinggo City [16]. Moreover, it is since had been issued causing 15 paste factories and surimi for a time being stopped their activity in Java [17].

In terms of effectiveness, enforcement of this policy is perceived as not efficient. Fishermen mostly the crews of fishing vessels on the north coast of Java especially in Lamongan Regency, they want to replace the fishing gear used with a fishing gear that is not prohibited or the lower productivity fishing gears due to it is able to reduce their welfare factually [12]. The obedience of fishing actors and fishermen (crews) regarding this policy is still questionable. [18] These fishermen modified their fishing gears for both construction and the name. This is applied to disassemble the trawl which is
restricted by laws and then disguise it to be a new name, cantrang as an alternative name of trawls. However, the policy of restricting the operation of cantrang should be accounted more mature in terms of time by bearing in mind of economic and social aspects of fishermen. Hence, [19] the punishment is still applied gradually for small fishermen until they replace their fishing gear to be more environmentally friendly.

4. Conclusion
The policy of the government regarding a cantrang prohibition at local level especially in Paciran sub-district has direct the economic and social activities of fishery actors starting from upstream to the downstream of this industry. To account this policy wisely is good in a point of ecology in the long term; therefore it should be bearing in mind aspects of economic and social of those actors in the short term also. Hence, the strategy of problem-solving is needed to overcome the probably arising problems due to the mentioned policy in the long term conducted by the government, in this case, the Ministry of Maritime and Fisheries Affairs and Fishery Office at local level consistently in order to fishery resources can be sustainable and the welfare of fishing communities is able to be improved.

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References
[1] Sharma C 2011 Securing economic, social and cultural rights of small-scale and artisanal fisher works and fishing communities *Masti* 10(2) 41-61
[2] Lam M E 2012 Of fish and fishermen: shifting societal baselines to reduce environmental harm in fisheries *Ecology and Society* 17(4) 1-18
[3] Dahuri R 2003 Marine biodiversity as sustainable development asset of Indonesia (Jakarta: Gramedia Pustaka Utama Publishing) [In Indonesia]
[4] Satria A 2015 Introduction to coastal sociology (Jakarta: Pustaka Obor Indonesia)
[5] Aji I N, Wibowo B A and Asriyanto 2013 The production factor analysis of cantrang catch in fishing port base of Bulu, Tuban Regency *Journal of Fisheries Resources Utilization Management and Technology* 2(4) 50-58 [In Indonesia]
[6] Sudarmo, Agnes P, Baskoro M S, Wiryawan B, Wiyono E S and Monintja D R 2015 Social economics characteristics of coastal small-scale fisheries in Tegal City, Indonesia *International Journal of Scientific & Technology Research* 4(1) 85-88
[7] BPS [Central Bureau of Statistics] 2018 Lamongan in figures [In indonesian]
[8] Yaskun M and Sugirtio E 2017 The potential results of brackish fishery toward fishermen welfare and coastal community in Lamongan Regency *Jurnal Studi Manajemen dan Bisnis* 4(1) 257-264 [In Indonesian]
[9] Adhawati S S, Baso A, Malawa A and Arif A A 2017 Comparative study of economic value post cantrang moratorium on the Waters of the Gulf of Bone and Makassar Strait, South Sulawesi Province *International Journal of Oceans and Oceanography* 11(2) 201-215
[10] Ermawati N and Zuliati 2015 The social and economic impacts of the Ministerial Decree No. 2 year 2015 (A study case in Juwana sub-district, Pati Regency) Proceeding SENDI_U Retrieved from https://www.unisbank.ac.id/ojs/index.php/sendi_u/article/view/3287
[11] Sukandar R G D, Setyohadi D, Sambha B, Bintoro G, Darmawan, Ika L and Fuad 2015 An academic review on the Ministerial Decree of Maritime and Fisheries Affairs No. 2 year 2015 about prohibiting use of some fishing gears in the fishing management area of the Republic of Indonesia (Malang: Fakultas Perikanan dan Ilmu Kelautan Universitas Brawijaya)
[12] Nababan B O, Solihin A and Christian Y 2018 *The socio-economic impacts of prohibiting trawls and seine nets in north coastal of Java* The research reports Indonesia Marine Fellows Program – MFP Conservation Strategy Fund–Yayasan Strategi Konservasi dan IPB [In Indonesia]

[13] Sugiyono 2010 *Quantitative, Qualitative Research Method and R&D* (Bandung: Alfabeta) [In Indonesia]

[14] Adhawati S S, Baso A, Malawa A and Arief A A 2017 Social study of cantrang (danish trawl) fisheries post moratorium at Makassar Straits and Bone Gulf, South Sulawesi Province, Indonesia *AACL Bioflux* 10(5) 1140-1149

[15] Dhuha R S, Munir M and Suprapti Y 2017 *Perception of fishermen communities who utilize cantrang on the cantrang restriction* Prosiding Seminar Nasional Hasil Penelitian dan Pengabdian Kepada Masyarakat II (Tuban: Universitas PGRI Ronggolawe Tuban) [In Indonesia]

[16] Suryawati S H, Pramoda and Radityo 2016 The economic impacts of implementing the Ministerial Decree No. 2 year 2015 towards the cantrang business in Probolinggo City, East Java *Buletin Ilmiah “MARINA” Sosial Ekonomi Kelautan dan Perikanan* 2(2) 45-55 [In Indonesia]

[17] Yusrizal, Krisnafi Y, Nainggolan C, Husen E S, Suharto, Kusndinar A, Kusumo T E, Choerudin H and Danapraja S 2018 Cantrang fisheries performance in Tegal, Central Java, Indonesia *The International Journal of Engineering and Science* 7(12) 45-51

[18] Riyanto M, Purbayanto A, Maradi W and Suheri N 2011 Technical study of operating cantrang in Brondong Waters, Lamongan Regency, East Java *Buletin PSP* XIX(1) 97-104 [In Indonesia]

[19] Artati S U I 2018 The regulation of cantrang fishing use prohibition for small scale fishermen *Jurnal Hukum Pidana dan Pembangunan Hukum* 1(1) 1-8 [In Indonesia]