



Fishermen acceptance on introduction of fishing technology: perception and its development strategies

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Abstract. Factors that influence the fishing catches are varied, such as some physical environmental parameters of the waters and biological conditions of the aquatic environment. Fishing pressures and climate change both globally and regionally that have altered the physical and biological conditions of aquatic environments are thought to have affected the stock availability. Consequently, fish catch in recent decades has decreased. As an effort to cope with the decline in catches, we introduced fishing aids, Nelpin (*Telepon Pintar*), a mobile-based application that provides information on fishing. In order for this introduction to work well, a target fishermen perception mapping has been conducted before introducing Nelpin. A mapping survey was conducted in 28 fish landing sites. The result of the perception mapping shows that although the catch is decreasing, the fishermen have high optimism to catch fish in the sea. Fishermen provide a good perception of the introduction of fishing aids. Further improvements to the introduction of this tool are discussed in this paper.

Key Words: fisherman, introduction, perceptions, Nelpin.

Introduction. On many occasions, it is often stated that the catch of fishermen decreases sharply and the income of fishermen is reduced (Allison & Ellis 2001). These conditions ultimately led to the decreasing of fishermen welfare. The catch really are function of several factors, such as availability of fish stock, fishing grounds, fishing season, fishing gear productivity and fisher's skills. Therefore, to produce adequate catches, fishermen must be able to combine these factors of production well.

In most cases, fishermen capture fish by applying their experience and intuition. In fact, the biophysical environment that affects the existence of fish in the sea has changed very drastic (Eissa & Zaki 2011). Global climate change has driven the condition of oceanography and the ecosystem environment in which fish live. However, the fishermen's understanding on the fisheries ecosystem is still based on the past. As a result, there is an information gap between fishermen understanding and environmental facts. On the other hand, there is also an information gap among fishermen in assessing the environmental changes occurring around them (Wiyono 2009). Finally, if fishermen perceptions on the environment is wrong, then the fishermen fishing strategy most likely will meet failures.

On the other hand, in order to optimize the catch, the introduction of a new fish production factor, such as ships, fishing gear and fishing aids, is often carried out by the fishermen authority. One of the keys to the successful introduction of fishing facilities is the fishermen's acceptance of the given production factors. Such attitudes will be reflected by their perception. Thus, for the successful introduction of fishing facilities, the mapping of perceptions and behavior of fishermen is important.

Perception can be interpreted as a cognitive process experienced by each individual in understanding every change of information in the environment (Robbins 2003). This process is obtained from several senses that exist in the individual, namely

sight, hearing, appreciation, feeling and smell (Thoha 2010). Factors influencing the perception of a society are persons, target (object) and situation (Robbins 2003). Because of attention, needs, willingness and value system, the perception between individuals is different, although the object being considered or valued is the same (Pareek 1989).

In an effort to optimize fishing, the Ministry of Marine Affairs and Fisheries (MMAF) of Indonesia has established an introduction of fishing equipment program, including Nelpin (Indonesian name), an application that provides information to support fishing activities in sea. To measure the fishermen's acceptance of the introduction of Nelpin, and in order to develop and disseminate Nelpin in the future, it is necessary to map the perception of fishermen. The aims of this study are: 1) mapping perception of fishermen to the introduction of Nelpin; and 2) development recommendation for corrective improvement in the future.

Material and Method. This study was conducted in May-December 2016. The data were collected at 28 fishery landing sites located in Java, Sumatera, Kalimantan, Nusa Tenggara, Bangka-Belitung and Riau Islands. The distribution of study sites were 14 locations in Java, 3 locations in Sumatera, 4 locations in Kalimantan, 3 locations in Nusa Tenggara, 2 locations in Bangka Belitung and 2 locations in Riau Islands. In general, at each location were randomly selected 30 respondents to answer questionnaires.



Figure 1. Sampling location (<http://www.enchantedlearning.com>).

To explore the perception of fishermen, the questionnaires (Appendix 1) were grouped into 3 groups, there are perceptions on:

- 1). fish resources:
 - a) local resource conditions;
 - b) economic value of fishery resources;
 - c) social-economic condition of fishermen.
- 2). Fishermen acceptance to introduction of fishing equipment:
 - a) acceptance to the introduction of fishing equipment;
 - b) acceptance of the introduction of Nelpin.
- 3). Potential development of fishing equipment:
 - a) social capital of society;
 - b) fishing capacity of fisherman.

Respondents were interviewed to give their perceptions of some aspects above by giving a 0-5 rating score (Likert scale). A value of 0 (zero) indicates a very low level of approval/assessment and value of 5 was indicative of excellent rate of approval/valuation. Furthermore, to get information about the general perception of fishermen, the fishermen answers (based on each question) were calculated. The fishermen answers were then analyzed by using descriptive statistics. All data were grouped and presented in terms of percentage of each alternative answers. Finally each percentage value were displayed in the bar charts.

Results. Based on survey results, generally fishermen in almost all survey locations still have high optimism to be fishermen. Fishermen still considered that the resources and other aspects that accompany it are still in good condition. Fishermen have great hopes for the development of fishing activities. Detail of fishermen's perception of fish, socio-economic and environmental resources will be analysed in the following discussion.

Potential of fish resources

Fishermen perceptions to local resources. When fishermen were given the question about current fishery conditions, the fishermen in the survey location gave an average rating about 4.02 (± 0.6). That is, fishermen convinced that fishery resources are still in very good condition. Fishermen are still optimistic to work in fishing activities, because the catch is believed to be high and potentially can be become increased.

The perception of fishermen from various survey areas shows that almost more than 70% fishermen gave answers that local resources are still good. About 39% fishermen believe that the fish catches can be greatly increased and about 32% fishermen believe that fish catch can still be increased (Figure 2). These results indicate that prospects for future fisheries development are still prospective.

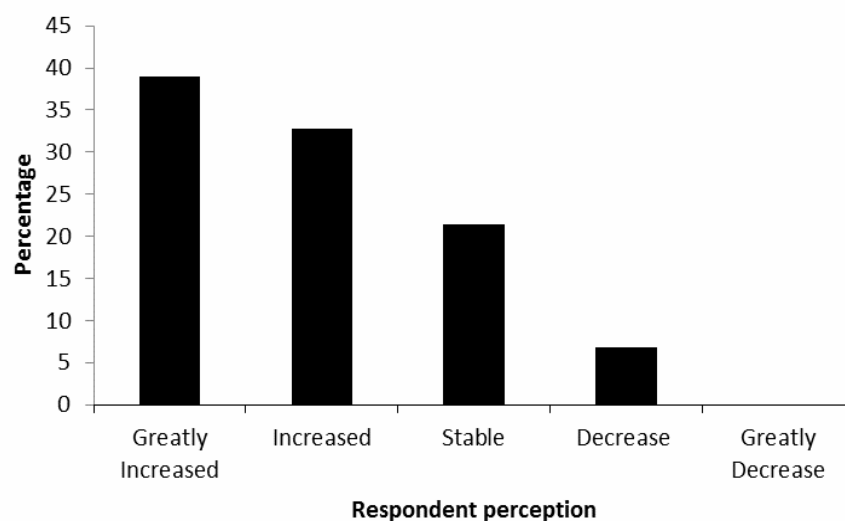


Figure 2. Fishermen perception to fish resources.

Fishermen perceptions to the economic value of resources. Furthermore, when analyzed from the aspect of the resources economic value, an average rating of fishermen were 3.76 (± 0.2). This indicates that the fisherman income did not improve. In general, about 70% fishermen stated that the economic income will increase in the future. Approximately 18% fishermen said it greatly increased while 52% fishermen said the economic value of fishermen increased. While about 30% fishermen said economic income were unchanged (stable) and decreased (Figure 3). In addition, beside giving a good rating of the resources economic value, fishermen also explain that they still believe in existing economic institutions such as middlemen. They judged that middlemen gave a significant role in keeping the price of fish in the location of the study.

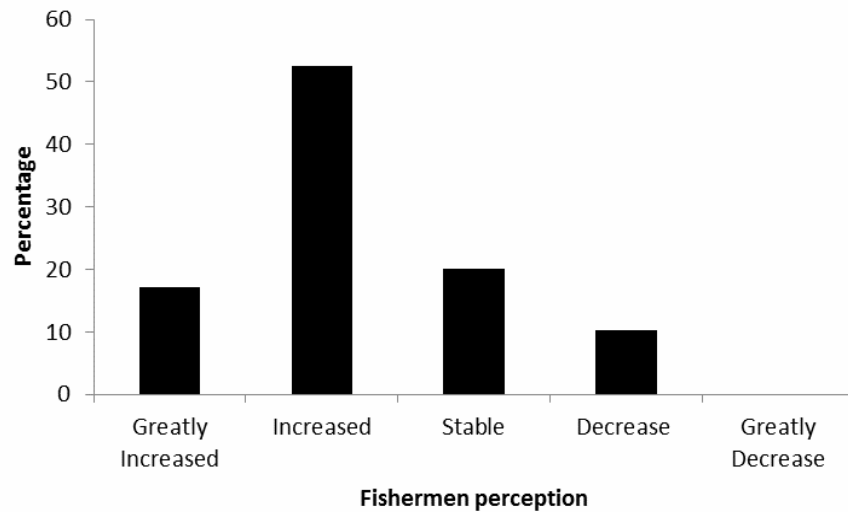


Figure 3. Fishermen perception to resources economic value.

Fishermen perceptions to socio-economic value. The perception of fishermen on economic value shows that more than 60% of fishermen stated that their income is satisfactory. In average, fishermen gave rating value about 3.68 (± 0.3), which means that socio-economic fishermen condition was upper than the minimal economic needed. In detail, about 40% fishermen stated that their family income was good and 16% of fishermen stated that his family income was very good. On the other hand, about 40% of fishermen stated that the family income was enough and tends to be less (Figure 4). In general, fishermen stated that most of their income was contributed from capture fishery sector. Most fishermen judge that their income is almost 60% resulting from the fishing activity.

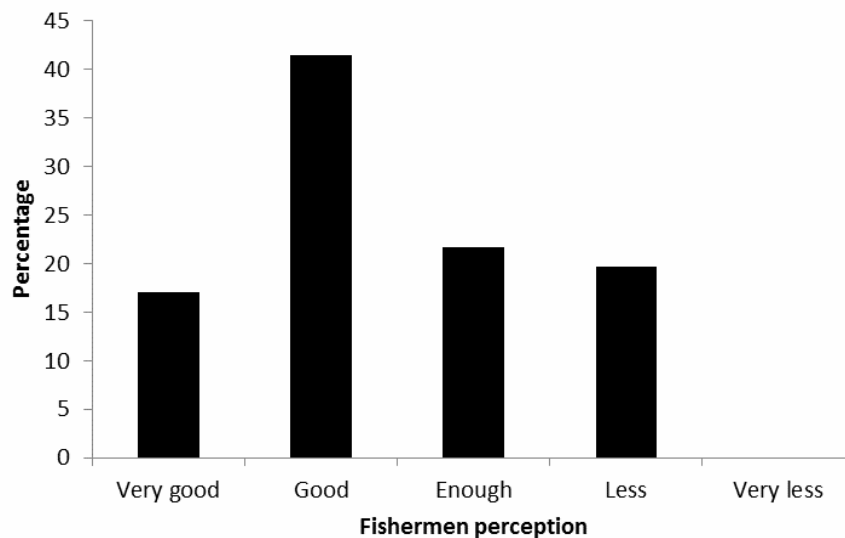


Figure 4. Fishermen perception to fishermen socio-economic.

Fishermen acceptance to fishing aids introduction

Acceptance to new fishing aids technology. The level of acceptance of the introduction of fishing aids was measured by the perception of fishermen. The survey results show that, fishermen have a good perception to the introduction of fishing aids. Fishermen in general (> 80%) are agree with the introduction of fishing facilities (Figure 5). By considered fishery conditions, fishermen perceive that the catch can be increased with the new fishing aids technology. Fishermen have given rating value about 4.19 (± 0.3) on

a new fishing aids introduction. The high rating value means that fisherman agree to the introduction of new fishing aids technology.

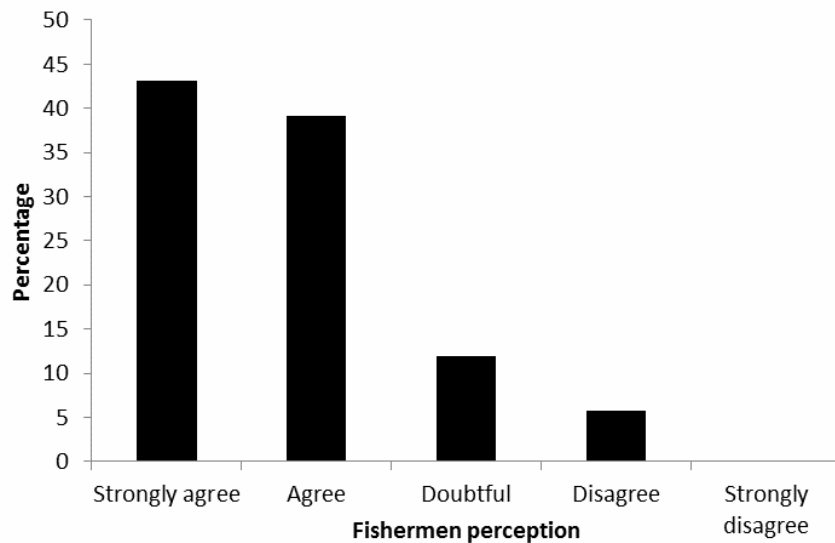


Figure 5. Fishermen perception to introduction of new fishing aids.

Acceptance to the Nelpin introduction. The results of fishermen's perception study on the introduction of Nelpin indicate that fishermen strongly need information that make fishing activities more easier. Nearly 65% of fishermen strongly agreed and 25% of fishermen agreed with the introduction of fishing aids that can help fishermen to determine the fishing grounds more easier. The fishermen gave rating about 4.46 (± 0.5) to the question on introduction of Nelpin (Figure 6). This is not surprisingly because today they have difficulties to obtain such information. Furthermore, fishermen also strongly agree if the information was delivered directly to them with a mobile phone media. They have a positive perception on the introduction of Nelpin. Almost 90% of respondents agreed and strongly agreed to the introduction of Nelpin. In general, fishermen are interested in Nelpin because it is easy to operate, good display and provided information that fishermen needed. This study was in accordance to another study which was conducted by Apriliani & Nugroho (2016). They explained that the perception of fishermen on the trial use of electronic logbook also gives the same response. A total of 94.44% of fishermen agreed to the introduction of electronic logbook.

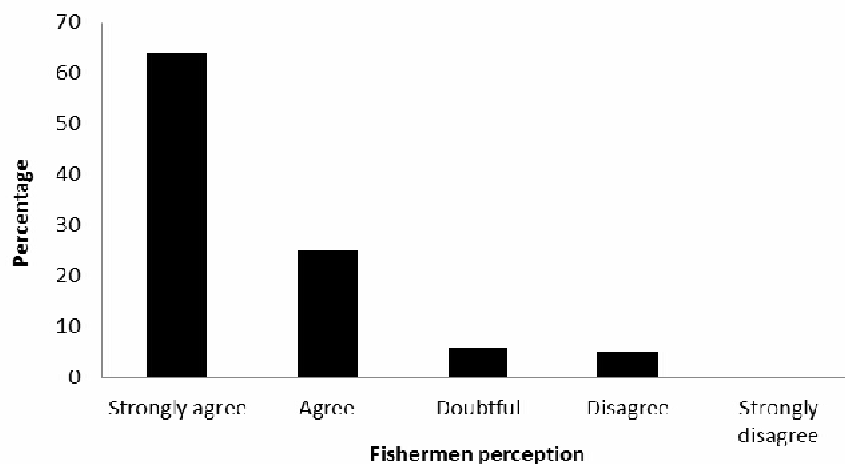


Figure 6. Fishermen perception to Nelpin.

Development strategy

Social capital of fishermen. In terms of social capital of the community, fishermen have a perception that the existing social organization is running well. Nearly 80% of fishermen gave sufficient judgment on the existing institutions. Fishermen who gave very sufficient ratings were almost 58% while those who gave a sufficient rating were 22% (Figure 7). In general, fishermen gave 4.16 (± 0.4) rating for social capital condition. Fishermen still trust existing institutions, and actively participate in existing organizational activities. In other discussion, fishermen tend to form groups with less than 20 members in operating fishing facilities. Because of limited Nelpin, fishermen are willing to share the opportunity to use of the Nelpin with other members. The results of this study correspond to the results of research Wijaya & Saptanto (2014) in Jakarta. Solutions for fishing problems are jointly entrusted to the group.

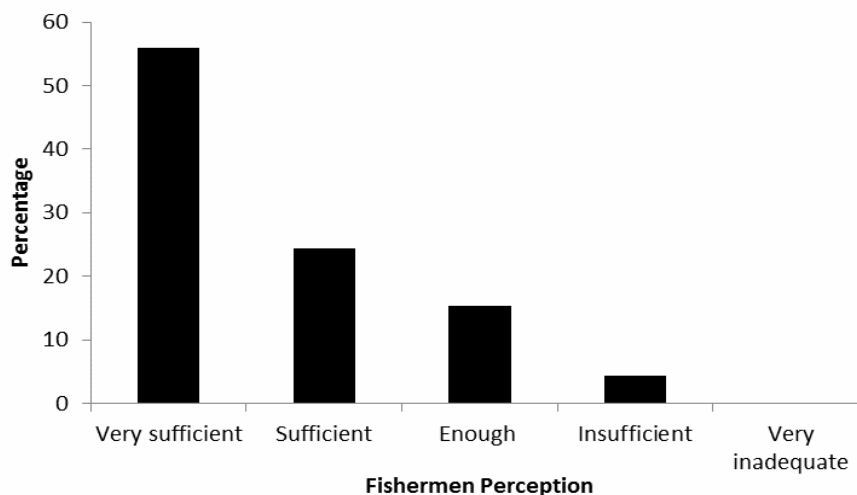


Figure 7. Fishermen perception to social capital of fishermen.

Fishing capacity improvement. In terms of fishermen's capacity, as long as it gives benefits to them, the fishermen will be ready to join the programs. The result study shows that majority of fishermen (95%) agreed to increase their capacity. In general, fishermen gave 4.56 (± 0.1) rating for increasing the fishermen capacity. It's mean that fishermen still have hope for better develop in the future. As many as 66% fishermen strongly agree with the capacity increasing, while 29% of fishermen agreed with the increasing fishermen's capacity (Figure 8). This fact indicated that fishermen still have high spirit to improve their capacity and to be better in the future.

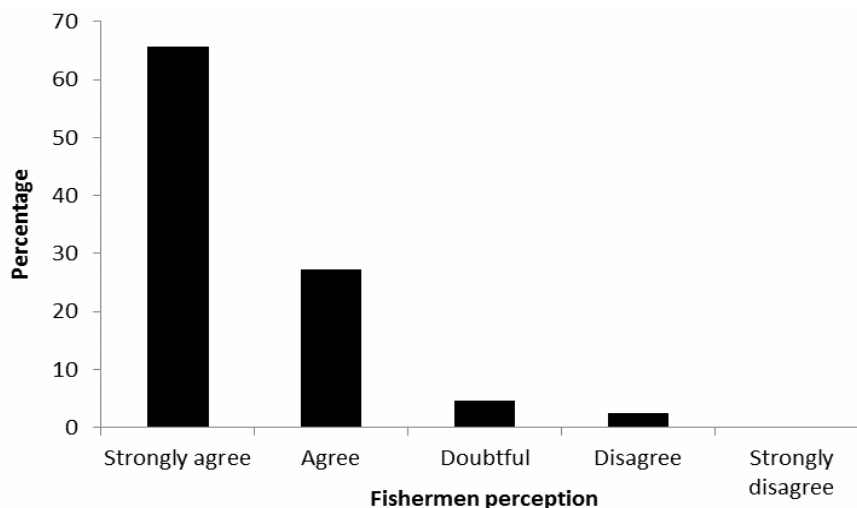


Figure 8. Fishermen perception to increasing fishermen capacity.

Discussion. Perception is a process whereby individuals organize and interpret their sensory impression to give meaning to the environment (Robbins 2003; Simamora 2005). In this study, we have measured fishermen interpretation to the introduction of new fishing aids technology. The study results show that fishermen are still optimistic about the current condition of fish resources. Despite the fact that in some areas the catch has begun to decline and fishing areas have extended to far away (Simbolon et al 2011) but fishermen still have a good perception to fishing activities at sea. Furthermore, fishermen also still have positive expectations on the economic value of resources. They still consider that fishing activities still provide business benefits and are a reliable livelihood to meet the needs of their families. Based on this result, it is believe that fishermen perceive the fisheries problems based on their personal view and sometimes, their perception are different by the real condition. However, economic factors are expected as main factors that drive their perception and behaviour (Bachtiar et al 2003).

Another potential finding in this study is a positive attitude of fishermen to self-development and institutional development. Fishermen still have a strong spirit to develop and upgrade their knowledge in order to improve their business. This positive attitude is important and required in introducing a new fishing aid. Immanuel (2018) reveal that a positive perception of fishermen will encourage to a right action. Since the fishermen express a negative perception firstly, a community empowerment program will be rejected and face to failure. In contrary, if fishermen have a positive perception, the community development programs including the introduction of new fishing aids will be succeeded. In this case, fishermen have a positive perception to the introduction of aids Nelpin because they expect to catch fish better in the future.

Results of this study show that both the fishermen potential development and the introduction of Nelpin were well accepted. In order to optimize Nelpin, it is necessary to consider local institutions whether local leaders (Wardah et al 2017) and local norms and ethics (Pramitasari et al 2015). A good understanding of local institutions will greatly assist in accelerating the introduction of fishing gear or the model of fish resource management. On the other hand, it is also need to apply prudential principles in fisheries management especially in the introduction of fishing gear. This is because, the management policy applied organization in fisheries will have an impact on risk taking in fishing (Edvardsson et al 2011) and perception of fishermen to responsible fisheries (Katikiro & Mahenge 2016).

Based on the result findings and some considerations from the previous research results, some items that must be done for development strategy of Nelpin in the future, are: a) to maintain the cohesiveness of fishermen, at a regional fishery level it is should be formed a group of fishermen with less than 20 members; b) to maintain the fisheries information, it is needed to establish an institutional of Fishery Data Collection Center base on Nelpin; c) if Nelpin functioned as a server as well as collector of fishery data, it should be establish an institutional both in terms of software and hardware; d) in order to develop Nelpin, it is needed a roadmap, with the content of direction of development in the future (Nelpin must be improved in several aspects by adding road maps so that to become a fishing aid for both fishermen and stakeholders); and e) in order to become a reliable fishing equipment, Nelpin needs to provide information about potential fishing areas, weather, map of the sea, fishing seasons and potential markets landings.

Conclusions. Based on the results of this study it can be concluded that fishermen still have high spirit and optimism to conduct fishing activities at sea. Fishermen welcome the introduction of Nelpin. There is a need for a follow-up policy and strategy for Nelpin as a fishing facility for collecting and providing fisheries information.

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References

- Allison E. H., Ellis F., 2001 The livelihoods approach and management of small-scale fisheries. *Marine Policy* 25(5):377-388.
- Apriliani T., Nugroho H., 2016 [Fishers perceptions and fishery officers to trial of electronic fishery logbook]. *Jurnal Kebijakan Sosek KP* 6(1):1-13. [in Indonesian]
- Bachtiar S. A., Setiawan B., Sunarto, 2003 [Fishermen perception and behavior of marine resources exploitation in Kodingareng Island, South Sulawesi]. *Jurnal Manusia dan Lingkungan* 10(3):148-155. [in Indonesian]
- Edvardsson I. R., Tingley D., Asmundsson J., Conides A. J., Drakeford B., Holm D., 2011 Fisheries management systems and risk perception amongst fishermen in Iceland, Faroe Islands, and UK. *International Journal of Humanities and Social Science* 1(4):31-41.
- Eissa A. E., Zaki M. M., 2011 The impact of global climatic changes on the aquatic environment. *Procedia Environmental Sciences* 4:251-259.
- Immanuel E., Hendrawan I. G., Puspitha N. L. P. R., 2018 Fishermen's perception to shark conservation status and its effect on shark catch: case study in Badung district, Bali Province. *Journal of Marine and Aquatic Sciences* 4(2):244-252. [in Indonesian]
- Katikiro R. E., Mahenge J. J., 2016 Fishers' perceptions of the recurrence of dynamite-fishing practices on the Coast of Tanzania. *Frontiers in Marine Science* 3:Article 233.
- Pareek U., 1989 Motivational analysis of organizations - Climate (MAO-C). In: The 1989 annual. Pfeiffer J. W. (ed), University Associates, San Diego, California, pp. 161-171.
- Pramitasari S. D., Gallardo W. G., Ebberts T., 2015 Fishers perception and attitude toward local knowledge and local practices and its role in the fisheris management: a case study in Mae Klong River, Samut Songkhram, Thailand. *Turkish Journal of Fisheries and Aquatic Sciences* 15:795-804.
- Robbins S. P., 2003 *Organizational behavior*. Prentice Hall, Upper Saddle River, NJ, 300 pp.
- Simamora B., 2005 [Multivariate analysis of marketing]. PT Gramedia Pustaka Utama, Jakarta, 346 pp. [in Indonesian]
- Simbolon D., Wiryawan B., Wahyuningrum P. I., Wahyudi H., 2011 [Level of utilization and pattern of fishing season of lemuru in the Bali Strait]. *Buletin PSP* 19(3):293-307. [in Indonesian]
- Thoha M., 2010 [Organizational behavior: basic concepts and application]. Rajawali Press, Jakarta, 376 pp. [in Indonesian]
- Wardah E., Nasruddin, Rosnina, 2017 [Fishermen's perception on the role of Panglima Laot in Pidie Jaya Regency]. *Jurnal AGRIFO* 2(2):1-8. [in Indonesian]
- Wijaya R. A., Saptanto S., 2014 [Fishers perceptions and adaptation strategy to fuel subsidize revocation]. *Jurnal Kebijakan Sosek KP* 4(2):185-196. [in Indonesian]
- Wiyono E. S., 2009 Perception of fishermen on fishery resources. *SOCA* 9(3):330-334. [in Indonesian]
- *** <http://www.enchantedlearning.com>.

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Questionnaire for access the perception of fishermen on the introduction of fishing technology

Circle the numbers that you think are right.

I. LOCAL PERCEPTION OF COASTAL RESOURCES

1. In the last 5 years, how is the condition of the catch in your area?
 - 1) Increased 2-fold
 - 2) Increased but not much
 - 3) It's the same all along
 - 4) Decreased but not much
 - 5) Decreased 2-fold
2. In the last 5 years, what about the number of fish you captured?
 - 1) Increased than last year
 - 2) It's the same all along
 - 3) Decreased than last year
 - 4) Do not know
3. In the last 5 years, what about the size of fish that you often catch?
 - 1) It's bigger than 5 years ago
 - 2) It's the same all along
 - 3) It's smaller than 5 years ago
 - 4) Do not know
4. According to you, how is the condition of the fishing area in your village?
 - 1) Still relatively good
 - 2) It's getting polluted
 - 3) No changed
 - 4) Do not know
5. If fishing area polluted, what about causes it?
 - 1) Human activities, for example:
 - 2) Natural
 - 3) Do not know
6. According to you, is it necessary to conserve the fishing area in your area?
 - 1) It's need, reason: _____
 - 2) It's not need, reason:
 - 3) Do not know

II. LOCAL PERCEPTION ON THE ECONOMIC VALUE OF FISHERY RESOURCES

1. In the last 5 years, how is the price of the main fish catches?
 - 1) Increased 2-fold
 - 2) Increased but not much
 - 3) It's the same all along
 - 4) Decrease but not much
 - 5) Decreased 2-fold
2. If the price increased, what is the cause?
 - 1) middleman increased
 - 2) The catch is less
 - 3) Other: _____
 - 4) Do not know
3. If the price decrease, what is the cause?
 - 1) The middleman is getting less
 - 2) the catch is increased
 - 3) Do not know
 - 4) Other:
4. What do you think about the current price of fish?
 - 1) Too high
 - 2) Too low, reason:
 - 3) Enough
 - 4) Do not know
 - 5) Other:

5. If the catch is getting decrease, what would you do?
- 1) Moving to another village but still being a fisherman
 - 2) Remains in the village but change to other profession
 - 3) Do not know
 - 4) Other:

III. SOCIAL ECONOMIC FISHERMAN'S PERCEPTION

1. In the last 5 years, how is your family's income?
- 1) Increased 2-fold
 - 2) Increased but not much
 - 3) It's the same all along
 - 4) Decreased but not much
 - 5) Decreased 2-fold
2. How does the contribution of the catch to the total income of your family?
- 1) All revenues from fish catch
 - 2) 80 percent of income from fish catch
 - 3) Half of income comes from fish catch
 - 4) Only 20 percent of revenues from fish catch
 - 5) Other:

IV. ACCEPTANCE TO THE INTRODUCTION OF FISHING EQUIPMENT

1. What is your response if there is introduced a new fishing gear in your area?
- 1) Strongly agree
 - 2) Agree
 - 3) Disagree
 - 4) Do not know
2. If the new fishing gear is granted in your group, how is your response?
- 1) Strongly agree
 - 2) Agree
 - 3) Disagree
 - 4) Do not know
3. According to you, who is eligible to operate the tools/fishing gear?
- 1) Community groups
 - 2) Local government
 - 3) Private
 - 4) Personal
4. According to you, how to determine the ownership of the tools/fishing equipment?
- 1) Determined by the government
 - 2) Deliberation in fishing organization
 - 3) Do not know
5. If the ownership is given to the group, how many group members are in the group?
- 1) < 20 people
 - 2) 20 people
 - 3) > 20 people
 - 4) Do not know
6. If the group who want to operate the fishing gear is more than one group, do you agree if the operation is interchangeable?
- 1) Strongly agree
 - 2) Agree
 - 3) Disagree
 - 4) Do not know

V. ACCEPTANCE TO THE INTRODUCTION OF NELPIN

1. Do you know information about fishing area, weather, fish price, etc. in the fishing port around you?
- 1) Yes, I do
 - 2) No, I do not
2. If yes where is the source of the information?
- 1) Internet
 - 2) Fishing port
 - 3) Ship owner
3. Do you often see the information?
- 1) Yes
 - 2) No

4. What is the difficulty in obtaining the data?
 - 1) Long distance
 - 2) Sustainability
 - 3) Accuracy
 - 4) No information
5. Are you happy with the information in an HP?
 - 1) Yes, I am
 - 2) No, I am not
 - 3) Doubtful
6. If Yes, what information do you expect from this HP app?
 - 1) Fishing grounds
 - 2) Weather
 - 3) Fish prices
 - 4) Others, specify:
7. If there is an application of fishery information within HP, would you like to install it?
 - 1) Yes, I would
 - 2) No, I would not
 - 3) Doubtful
8. If there is a fishery information application within HP, would you like to pay the pulse fee?
 - 1) Yes
 - 2) Not
 - 3) Doubtful
9. Who is the person to make a decision on the use of Nelpin application in this HP?
 - 1) Crew
 - 2) Captain
 - 3) Skipper
10. What kind of HP do you have? Mention!
11. Have you attended an introduction training on Nelpin application in HP?
 - 1) Yes, I have
 - 2) No, I have not
12. What is your impression of the HP application?
 - 1) Very interested
 - 2) Interested
 - 3) Not interested
 - 4) Very uninterested
13. How do you feel to operate Nelpin?
 - 1) Yes, it is easy
 - 2) No, it is not easy
14. Does the Nelpin performance represent your liking?
 - 1) Yes, it does
 - 2) No, it does not
15. Is the information presented representing your liking?
 - 1) Yes, it is
 - 2) No, it is not
16. Does the speed of Nelpin represent your liking?
 - 1) Yes, it does
 - 2) No, it does not
17. What is your suggestion for this application to be better?

VI. SOCIAL CAPITAL OF SOCIETY

1. Is there an organization or group of fishermen in your village?
 - 1) Exist and work well
 - 2) Exist but not work well
 - 3) None
 - 4) Other:
2. How many times per month do you participate in group meetings?
 - 1) 1 time a month
 - 2) 2-4 times a month
 - 3) More than 4 times a month
 - 4) Other:

3. If there is an organization or group of fishermen, do you become a member?
 - 1) Yes and active
 - 2) Yes, but not active
 - 3) No
 - 4) Other:
4. How is your relationship with middleman?
 - 1) It's dependent
 - 2) Not too dependent
 - 3) Ordinary
 - 4) Other:
5. If dependent, in what form is your dependency with middleman or owner of pond/capital?
 - 1) Borrow money for family needs
 - 2) Borrow money for the purposes of fish farming
 - 3) Other:

VII. FISHING CAPACITY OF FISHERMAN

1. In the past 5 years, have you followed an extension program about fisheries?
 - 1) Yes, I have and often
 - 2) Yes, I have, but rarely
 - 3) None
 - 4) Have not know
 - 5) Other: _____
2. If so, what about your participation?
 - 1) Often participate
 - 2) Rarely follow
 - 3) Never participate
 - 4) Other: _____
3. In the last 5 years, did your fishing knowledge increase?
 - 1) Yes, it did
 - 2) It's the same all along
 - 3) None
 - 4) Do not know
 - 5) Other: _____