



ASSESSMENT OF THE USE AND CURRENT STATUS OF CIRCLE HOOKS IN VIETNAM TUNA FISHERIES



**Technical report of the Vietnam Yellowfin Tuna
Fishery Improvement Project (FIP)
Implemented and Reported by: VIETNAM TUNA ASSOCIATION**

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I. INTRODUCTION

I.1. Backgrounds of study

Five species of marine turtles are found within the territorial waters of Vietnam, and all populations are declining. A major factor in their decline has been the incidental bycatch and subsequent mortality in longline (and also to a lesser extent handline) yellowfin tuna fisheries.

The use of circle hooks can reduce the proportion of sea turtles that swallow the hooks as compared to the traditional J-hooks with squid bait. Studies around the world, including Vietnam, have confirmed that the use of “Circle” hooks (or “C” hooks) – Tuna hooks which are sharply curved back in a circular shape – can reduce the hooking rate of marine turtles by as much as 80% percent compared to traditional longline hooks, leading to significant reductions in mortality rates.

WWF Vietnam initiated the nation’s first at-sea trials of C-hooks in 2008, in collaboration with MARD and international seafood partners. Since that time, C-hook activities have steadily evolved, focused both on training and capacity development for MARD managers as well as scaling up the testing and monitoring of C-hooks in partnership with seafood companies¹. These early collaborative studies and key partnerships have helped improve the baseline for fishing practices in tuna industry and have laid a foundation for the scaled-up use of Circle hooks in Vietnam. Furthermore, the Research Institute for Marine Fisheries (RIMF) have partnered with WWF in several studies related to Observer Program implementation and in comparative studies of C-hooks and their impacts on ETP species².

In 2014, WWF-Vietnam, Directorate of fisheries, provinces Binh Dinh, Phu Yen, Khanh Hoa and tuna industry companies are cooperating to implement the Fisheries Improvement Project (FIP) for Yellowfin tuna long handline fisheries with the goal of improving the tuna fishery so that it may enter a Full Assessment for MSC certification³. A key FIP objective is the development and implementation of marine turtle bycatch mitigation measures. Given the strong support from the Government of Vietnam and the dozens of international and domestic seafood industry partners engaged, the Vietnam

¹ This includes the NOAA-WWF-MARD 2008-2011 “Sea Turtle Bycatch Reduction, Research and Outreach” project and the 2012-2014 WWF-Sea Delight “Better Fishing Practices Initiative” project, focused on yellowfin tuna sector.

² See <https://drive.google.com/drive/u/1/folders/19CNV-OiC3jFbmlaWLjztTW6rNwt87UJt> as well as above-mentioned NOAA-WWF-MARD study

³ The FIP originally included both handline and longline, but in 2019 reverted to handline only FIP due to general absence of longline vessels (many of which had converted to handline).

yellowfin FIP provides a strategic platform for the increased adoption of C-hooks. Indeed, beginning in 2016, the FIP Coordination Unit has been working with industry partners and Government staff to further expand the testing of C-hooks and documenting their results. To date, results have been largely positive (i.e. reduced sea turtle encounters while not negatively impacting target catch).

Also under the FIP, WWF, VINATUNA and other partners have worked to expand the usage of C-hooks as well as raise awareness for fishers on the benefits of their use, with a long-term objective to ensure circle hooks are widely and fully embraced, becoming the standard for fisheries in Vietnam. Two at-sea monitoring projects have been implemented – in 2017 and 2019 – testing the effectiveness of C-hooks versus traditional J hooks. Data from both studies seemed aligned with generally perceived C-hook effectiveness in avoiding sea turtle encounters and suggested that target catch (CPUE) rates (on yellowfin tuna) was not significantly different between the two types of hooks. These studies also suggested that C-hooks tend to catch larger average size (weight) of yellowfin tuna compared to J-hooks. For sharks, less data is available, in part due to the relative low proportion of shark found in handline vessels. However, both studies were of relatively small sample size and further testing is required to better define correlations and comparative results for target and bycatch rates⁴.

Although C-hooks program has been implementing for several years and achieved some success, an overarching database on C-hooks use was not available. Past studies from RIMF-WW related to bycatch impacts on ETP species based on many years of Observer Program data have yielded some, although limited, comparative data on C-hook versus J-hook use. These data suggested that the use of C-hooks is relatively low (although significantly more common in handline compared to longline operations)⁵. Previous interventions from the FIP on at-sea testing, while focused on comparing catch rates in test vessels, did not obtain overall sector data on general hook use. Therefore, there is a need to do a baseline study to have a deeper understanding on the status of C-hooks in the yellowfin tuna fishery and to help the design and implementation of C-hooks program in the future.

1.2. Overview of Vietnam Tuna fishery

⁴ See <https://drive.google.com/drive/u/1/folders/19CNV-OiC3jFbmlaWLjztTW6rNwt87UJt> for 2017 and 2019 reports on Circle Hook trials

⁵ The analysis showed that handline vessels used 8.19 ± 4.82 j-hooks and 1.7 ± 3.25 c-hooks, meanwhile longline vessels used 713.27 ± 203.70 j-hooks and 82.54 ± 96.12 c-hooks.

Longlines (LL) and handline fisheries (HL) are the main fishing method used for catching oceanic tunas (i.e. yellowfin, bigeye tuna) and developed in the central provinces (i.e. Phu Yen, Khanh Hoa and Binh Dinh). Trends in overall number of vessels and their landings are listed in tables 1 and 2 below.

Table 1. Number of tuna longline/handline vessels in Viet Nam in 2011-2018

Size class (HP)	YEAR				
	2014	2015	2016	2017	2018
90 - 149	22	8	9	5	6
150 - 249	201	85	89	73	70
250 - 399	687	418	407	391	395
> 400	735	1,111	1,184	1,455	1,804
Total	1,645	1,623	1,689	1,924	2,277

The handline vessels tended to increase steadily over the years, from 2016 - 2018 increased from 1,689 to 2,275 vessels. The increase in size class is mainly vessels with capacity above 400 Hp, whereas vessels below 400Hp are on a downward trend. Encouraged by national subsidies program for offshore expansion, fishers are tending to offshore – fishing.

Table 2. Total tuna catches (MT) in Vietnam's EEZ estimated for tuna longline/handline fishery by species from 2010 - 2019.

Year	Yellowfin	%	Bigeye	%	Total
2010	9,513	79.58%	2,441	20.42%	11,954
2011	9,301	76.09%	2,923	23.91%	12,224
2012	12,456	76.81%	3,761	23.19%	16,217
2013	13,917	86.03%	2,260	13.97%	16,177
2014	11,603	83.16%	2,350	16.84%	13,953
2015	17,859	89.81%	2,026	10.19%	19,885
2016	16,423	93.64%	1,115	6.36%	17,538
2017	15,677	93.98%	1,004	6.02%	16,681
2018	16,500	95%	902	5%	17,402
2019	14,653	90%	1,554	10%	16,207

Total volume of tuna landing in 2019 compared to 2018 decreased from 17,402 to 16,207 tons, which means a decrease of 1,195 tons. In which, Yellowfin tuna landing volume in 2019 in compare with 2018 decreased from 16,500 to 14,653 tons. For Bigeye Tuna landing volume in 2019 increased from 902 tons to 1,554 tons. Yellowfin tuna volume accounts for 90% of the total catch.

It is notable that the slight decrease in overall landings has occurred at a time when, conversely, the capacity and number of overall vessels has slightly increased.

II. DATA COLLECTION METHODOLOGIES

Data collection methodologies and instruments were developed to support overall purpose of achieving a reliable estimate of C-hook use – and related parameters – in the yellowfin tuna fleet.

- *Secondary data:*

- In order to review and assess the status of Circle hook practices in Vietnam secondary data was collected using the statistical reports, research papers published on Circle hooks from government institutions (DFISH, RIMF) and from published documents in Vietnam and around the world.

At the end of 2018, the total tuna fishing vessels in 03 provinces were 2,277 vessels (N), thus the number of samples (n) needed to proceed with the C-hook baseline survey was determined by the formula of Yamane (1967) with a reliability of 95% as below:

$$n = \frac{N}{1 + N * e^2} = \frac{2275}{1 + 2275 * 0.05^2} = 339$$

With calculated 339 samples of interviews, the study has conducted surveys of 212 fishers in Binh Dinh, 75 fishers in Phu Yen and 52 fishers in Khanh Hoa which corresponding of 62.5% in Binh Dinh, 22.1% in Phu Yen and 15.4% in Khanh Hoa respectively with percentages of number fishing vessels.

Beside the interviewed fishers, the study has also conducted surveys with 04 hook manufacturers in Binh Dinh & 08 hook retailers in 03 provinces. The details of number of distributed interviewees by province are shown in Table 3 below:

Table 3. The distributed interviewed sample by provinces

Provinces	Total tuna vessels	Number of samples	Hook producers	Hook retailers
Khanh Hoa	348	52	0	3
Binh Dinh	1,425	212	4	2
Phu Yen	502	75	0	3
Total	2,277	339	4	8

The collected data were analyzed on Microsoft Excel.

III. RESULTS & DISCUSSIONS

3.1. Sample attributes

- **By fishing methods**

Through the survey process, the result shows that tuna vessels utilize 2 types of fishing methods. A large proportion (65.8%) are using “floating handline” in their fishing operation at night and early morning. This method involves the use of a series of floats connected by a single line, with handlines under each float. A single winch is used and the line is typically hauled in upon each catching event, based on the movements of floats and line. It is notable that as a more recent modification, the “floating handline” gear should be separated for investigations (compared to regular fishing) for future ETP monitoring programs or C-hook tests.

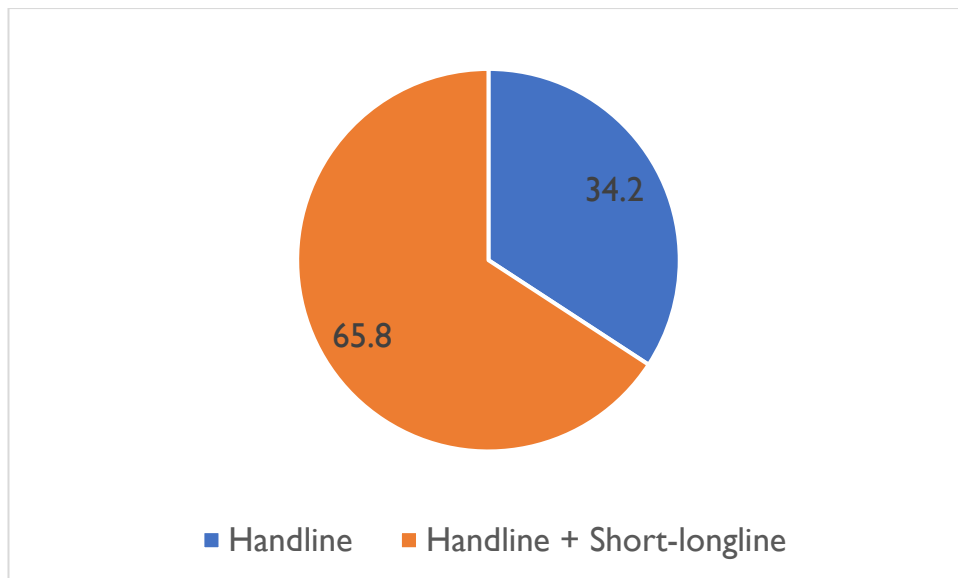


Figure 1. Survey samples by fishing methods

For “floating handline” can be considered a secondary fishing gear which is operated at early morning from 4am to 7am in every fishing day. In each vessel prepares 2 or 3 short – longline. Each short – longline has 25 - 40 hooks per line (maximum is 50 hooks per line), with the depth of short – longline from 40 – 45 meters. The estimate catch volume of short – longline accounts for 20-30% in total per fishing trips.

- **Work experience of fishers and hook manufacturers**

In general, most workers in the tuna fishery have extensive working experience. Employees working under 5 years account for only 14.12% of the total; 5-10 years group

accounts for 25.88%, 10-20 years group accounts for the highest proportion with 40% and 20% for over 20 years. Fishermen mainly work based on experience, which can affect their understanding and reluctance to adopt new technologies in their fishing work.

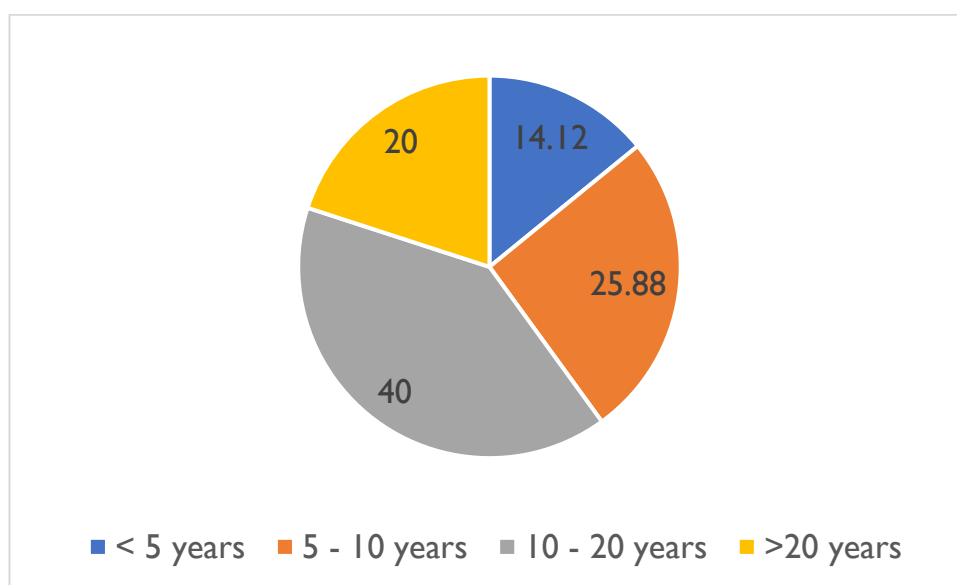
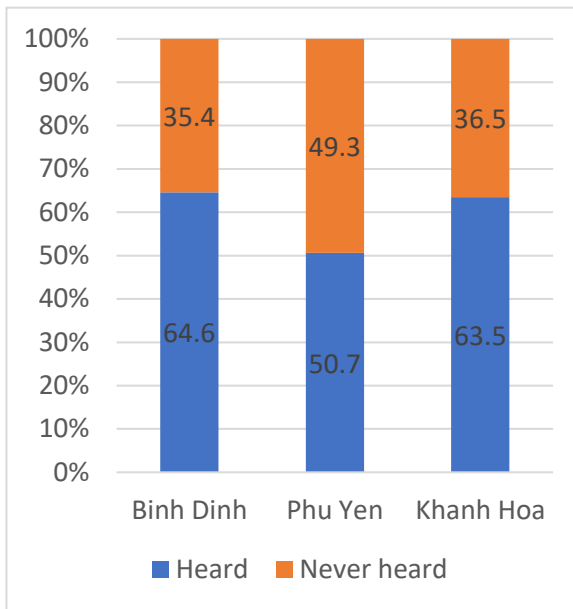


Figure 2. Working experience of tuna fisher groups

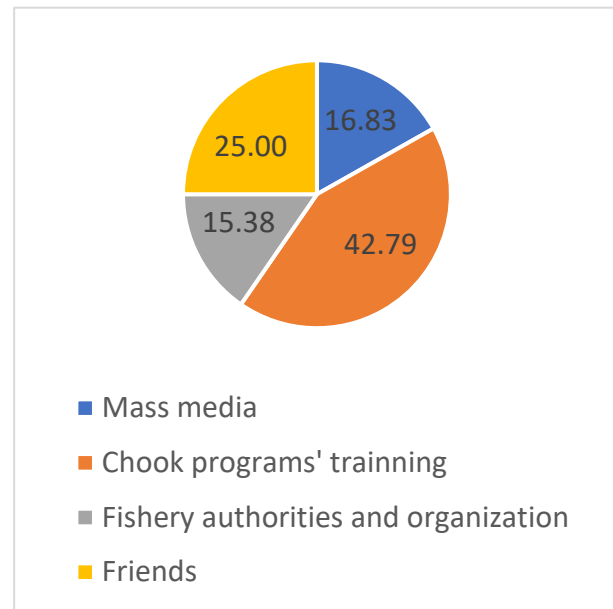
As for hook manufactures, 3 out of 4 have had 11-20 years of hook manufacturing experience, such as: Thu, Nam Hien, Hoc Huong. These hook manufacturers have experience of producing Circle hook and other types of hooks, and have already supplied to Korean, Indonesian and Taiwan hook markets. Tham Phap hook manufacturer is the newest one, with experience from 5-10 years..

3.2. General awareness of local fishers on C-hooks

The level of understanding about C-hooks in the three provinces of Binh Dinh, Phu Yen and Khanh Hoa is illustrated in Figure 3a below. From that, the general awareness of local tuna fishers in these three provinces is quite high with over 50%. Binh Dinh and Khanh Hoa provinces have accounted for 64.6% and 63.5% respectively, while this rate is a bit lower in Phu Yen with 50.7% having knowledge about C-hooks. The level of access to information about the C-hooks is currently quite good with from many kinds of information channels such as trainings, media, local authorities (Sub-DFISH) etc.



a. Fishernknowledge about CH



b. C-hook information Channels

Figure 3. Percentages of CH acknowledgement & information channels

Figure 3b shows the information channel that fishermen have access to and led to their knowledge on C-hooks. The highest proportion (42.79%) of the respondents said they had access to information about C-hook from training workshops from the C-hook programs under the FIP and related activities; 16.83% from the mass media (local television, social networks etc.); respectively 25% and 15.38% are from friends, relatives and fishing agencies, organizations.

3.3 General perceptions on the benefits C-hooks

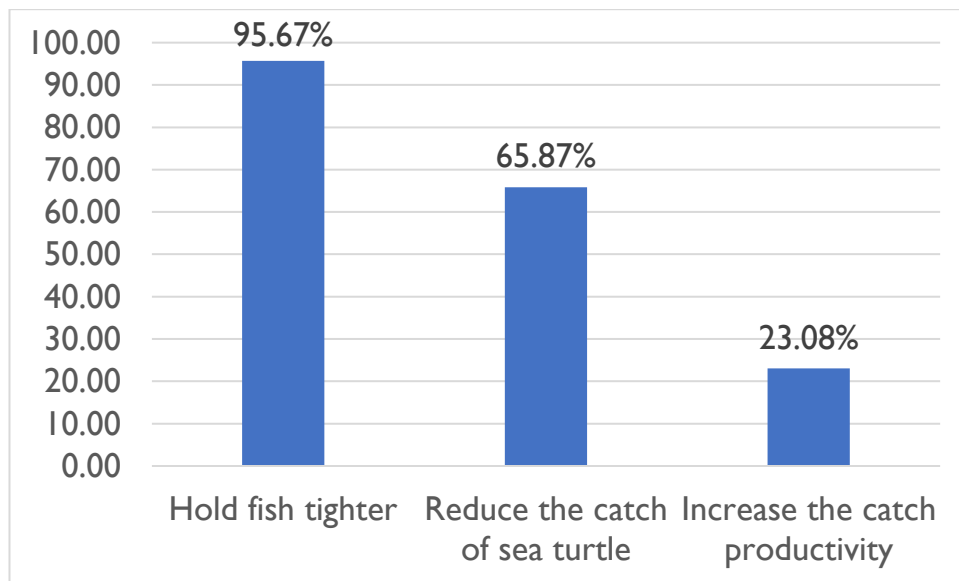


Figure 4. Perceptions on the benefit of C-hooks

Figure 4 illustrates that 95.7% fishermen agreed that C-hook will hold fish tighter whenever fish hooked. Tuna which is a large fast-moving fish will transfer lot of kinetic energy to the fishing hook while hooking and this could lead to hook failure, which ultimately results in loss of the catch. Fishermen assess that the structure of C-hook makes it difficult to break when hooked. 65.9% respondents agreed that C-hook will reduce the bycatch of sea turtle due to the difference of point angle. Only 23.1% respondent agreed that C-hook can help in increase the catch productivity.

3.4 Technical specifications of existing tuna hooks in Vietnam markets.

The types of hooks that are currently on the market through a survey process include J-hooks and C-hooks from domestic and imported manufacturers, to their specifications. shown as follows:

a. Korean C-hook

b. Taiwan C-hook



Hook descriptions:

- + Hook length (mm): 62.67
- + Front length (mm): 38.29
- + Gap (mm): 25.3
- + Wire diameter $\varnothing 1$ (mm): 4.64
- + Bend wire diameter $\varnothing 2$ (mm): 3.73
- + Point angle (degree): 90
- + Front angle (degree): 35
- + Offset angle (degree): 10



Hook descriptions:

- + Hook length (mm): 62.13
- + Front length (mm): 36.07
- + Gap (mm): 21.89
- + Wire diameter $\varnothing 1$ (mm): 4.68
- + Bend wire diameter $\varnothing 2$ (mm): 3.4
- + Point angle (degree): 90
- + Front angle (degree): 35
- + Offset angle (degree): 10

c. Nam Hien C-hook



Hook description:

- + Hook length (mm): 58.56
- + Front length (mm): 34.73
- + Gap (mm): 20.35
- + Wire diameter $\varnothing 1$ (mm): 4.3
- + Point angle (degree): 120
- + Front angle (degree): 25
- + Offset angle (degree): 10

d. Tham Phap C-hook



Hook description:

- + Hook length (mm): 53.57
- + Front length (mm): 35.22
- + Gap (mm): 22.34
- + Wire diameter $\varnothing 1$ (mm): 4.3
- + Point angle (degree): 115
- + Front angle (degree): 40
- + Offset angle (degree): 15

e. Thu C-hook

f. Tham Phap "Circular hook"



Hook description:

- + Hook length (mm): 59.37
- + Front length (mm): 33.6
- + Gap (mm): 18.28
- + Wire diameter Ø1 (mm): 4.3
- + Point angle (degree): 115
- + Front angle (degree): 40
- + Offset angle (degree): 15



Hook description:

- + Hook length (mm): 60.63
- + Front length (mm): 31.93
- + Gap (mm): 21.31
- + Wire diameter Ø1 (mm): 4.3

Figure 5. Technical descriptions of existing C-hooks in Vietnam

In the current hook market, there is a variety of types, and each type of hook has a slightly different size, structure and shape. Each hook is tailored for a specific purpose. Properties like hook shape, hook size and mechanical strength of the hook bend have a direct influence on the fishing performance of the hook. Out of all these parts, the ones with the most specific varieties are the point and the eye. The wire diameter and the unbending force of fishing hooks are positively correlated. Fishermen often depend on their experience while selecting a fishing hook. However, the evaluation of fishermen on effectiveness is still sensory, is affected by many external factors.

a. Hoc Huong J-hook



b. Nam Hien J-hook



Hook description:

- + Hook length (mm): 57.17
- + Front length (mm): 31.98
- + Gap (mm): 23.88
- + Wire diameter $\varnothing 1$ (mm): 4.3

c. Taiwan J-hook



Hook description:

- + Hook length (mm): 56.74
- + Front length (mm): 30.98
- + Gap (mm): 22.04
- + Wire diameter $\varnothing 1$ (mm): 4.25
- + Bend wire diameter $\varnothing 2$ (mm): 3.7

Hook description:

- + Hook length (mm): 57.19
- + Front length (mm): 32.45
- + Gap (mm): 22.68
- + Wire diameter $\varnothing 1$ (mm): 4.3

d. Tham phap J-hook



Hook description:

- + Hook length (mm): 57.53
- + Front length (mm): 33.34
- + Gap (mm): 19.43
- + Wire diameter $\varnothing 1$ (mm): 4.3

Figure 6. Technical descriptions of existing J-hooks in Vietnam

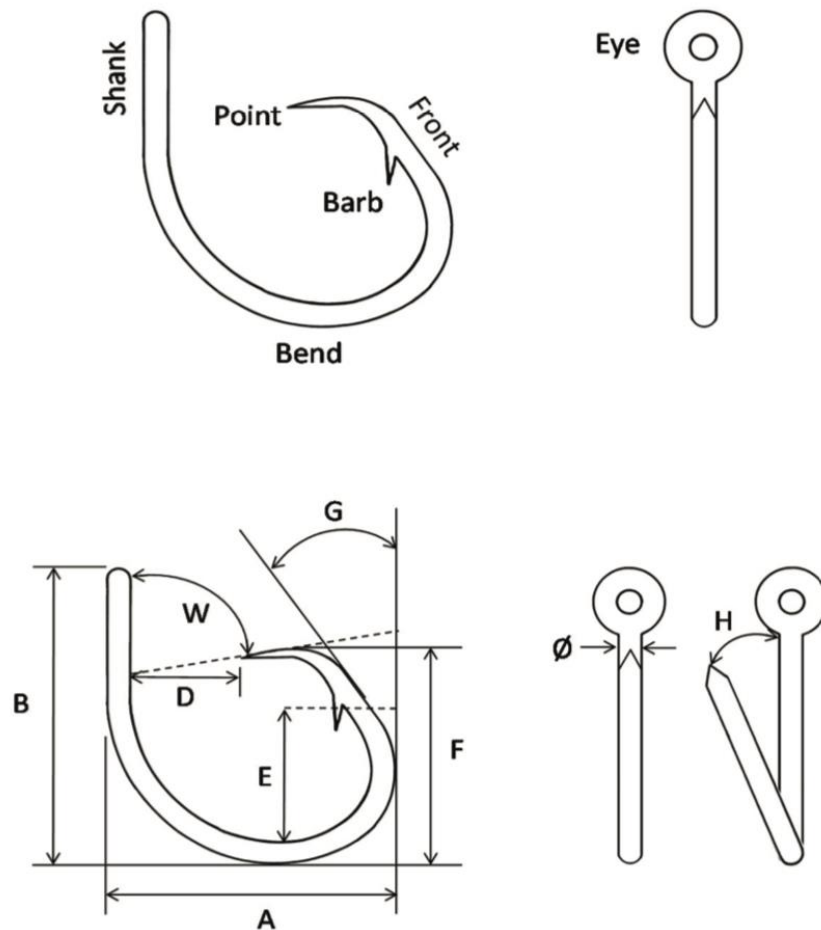
Table 4. Summary of C-hook specifications

Hook Types	Ø1 wire diameter (mm)	Ø2 wire bend diameter (mm)	Hook length (B) (mm)	Front length (F) (mm)	F/B (%)	Gap (D) (mm)	Point angle (W) (degree)	Front Angle (G) (degree)	Offset angle (H) (degree)
Korea C-hook	4.64	3.73	62.67	38.29	61.1	25.3	90	35	10
Nam Hien C-hook	4.3	N/A	58.56	34.73	59.3	20.35	120	25	10
Taiwan C-hook	4.68	3.4	62.13	36.07	58.1	21.89	90	35	10
Tham Phap C-hook	4.3	N/A	53.57	35.22	65.7	22.34	115	40	15
Thu C-hook	4.3	N/A	59.37	33.6	56.6	18.28	115	40	15
Taiwan J-hook	4.25	3.7	56.74	30.98	54.6	22.04	N/A	N/A	N/A
Hoc Huong J-hook	4.3	N/A	57.17	31.98	55.9	23.88	N/A	N/A	N/A
Nam Hien J-hook	4.3	N/A	57.19	32.45	56.7	22.68	N/A	N/A	N/A
Tham Phap “Circular hook”	4.3	N/A	60.63	31.93	52.7	21.31	N/A	N/A	N/A
Tham Phap J-hook	4.3	N/A	57.53	33.34	57.9	19.43	N/A	N/A	N/A

One of noteworthy thing that imported hooks are different from the domestic hooks is the bend part of the hook. The imported hooks have a flat bend which the wire bend diameter is smaller than the wire diameter at the shanks. Fishermen suppose that the flat bend will make hook stronger, firmer and reduce the deformation of the hook.

3.3. Evaluating the features and validity of the domestic and imported C-hooks

Circle hooks are generally circular in shape, with the hook point pointing back at the hook shaft. The term circle fishing hook refers to a specific design for fishing hooks that causes them to appear circular in shape. Used primarily for live bait fishing, these hooks increase hooking percentages and also help to prevent gut hooking fish. When a strike occurs, the hook slides out of the fish's throat. The barb does not penetrate until the hook reaches the corner of the mouth. At that point, the hook point pivots and sets for a safe, solid hookup. The C-hook is scientifically proven to reduce fish mortality. Hook set is not required. This hook has greater holding power, more hookups, fewer drop-offs and it holds bait better.



Anatomy of a circle hook. Basic components (upper panel) and measurements (lower panel): (A) width; (B) length; (D) gap; (E) throat; (F) front length; (W) point angle; (G) front angle; (H) offset angle; (Ø) wire diameter. Lettering conforms to hook manufacturer conventions.

Figure 7. Anatomy of a circle hook⁶

In according to the research result of Serafy at el (2012)⁷, the “true circle hook” has all three of the following characteristics: (i) angle of the point to the shank must be a minimum of 90°, (ii) angle of the front length of the hook must bend a minimum of 20° toward the shank, and (iii) the front length of the hook should be 70% - 80% of the hook’s total length. To evaluate the validity of the domestic C-hook, standards based on the above research were applied to make comparisons on C-hooks currently on the market. The measured results based on standardized C-hooks are demonstrated in Table 5 below:

Table 5. Comparison of indicators of Standardized C-hooks and existing C-hooks in Vietnam markets.

Type of C-hooks	Indicator 1	Indicator 2	Indicator 3
Standardized C-hook	Point angle (W) $\geq 90^\circ$	Front Angle (G) $\geq 20^\circ$	Front length (F) = 70-80% total length (B)
Nam Hien C-hook	120	25	(F) 34.73 = 59.3% x 58.56 (B)
Tham Phap C-hook	115	40	(F) 35.22 = 65.7% x 53.57 (B)
Thu C-hook	115	40	(F) 33.60 = 56.6% x 59.37 (B)
Korea C-hook	90	35	(F) 38.29 = 61.1% x 62.67 (B)
Taiwan C-hook	90	35	(F) 36.07 = 58.1% x 62.13 (B)

From Table 5 has shown that:

- **Indicator 1 – Point angle must be 90⁰**: Both domestic and imported C-hooks meet the requirement of point angle (≥ 90). In which imported C-hooks have the same point angle is 90°, Nam Hien C-hook has the highest degree of point angle is 120°.
- **Indicator 2 – Front angle (G) must be 20⁰**: Both domestic and imported C-hooks which are available in market meet the requirement of front angle (≥ 20). In which imported C-hooks have the same front angle is 35°. Nam Hien C-hook has the lowest degree of front angle is 25°.
- **Indicator 3 – Front length (F) must be 70 – 80% of total length (B)**: Both domestic and imported C-hooks have the front length ranging between 56-65% of the total length, thus not meeting indicator 3.

⁶ See Joseph E Serafy, Steven J Cooke, Guillermo A Diaz, John E Graves, Martin Hall, Mahmood Shivji, and Yonatan Swimmer, 2012, Circle hooks in commercial, recreational, and artisanal fisheries: research status and needs for improved conservation and management

⁷ ibid



Figure 8. Five types of C-hooks in Vietnam tuna fisheries

In general, types of hooks which are on the current hook market have somewhat met the standards of C-hooks, particularly in terms of the key feature of an inward-facing barb and size of the front angle. However, further investigation is needed to ensure the utility and function of the C-hooks, and to better understand their relative efficiency in reducing sea turtle bycatch and influence on target catch rates.

3.4. Current C-hook experience and use

During the surveys, some of tuna fishers indicated they use to use C-hooks while some fishers are currently using C-hooks. This is explored further below:

- Use of C-hooks by province

Khanh Hoa has the highest level of experience using C-hooks among the three provinces with 59.6% of respondents saying that they have used circle hooks. While Binh Dinh and Phu Yen have 45.3% and 30.7% of respondents who have used C-hooks, respectively. Figure 9 below shows the detail proportions of C-hook use in 3 provinces.

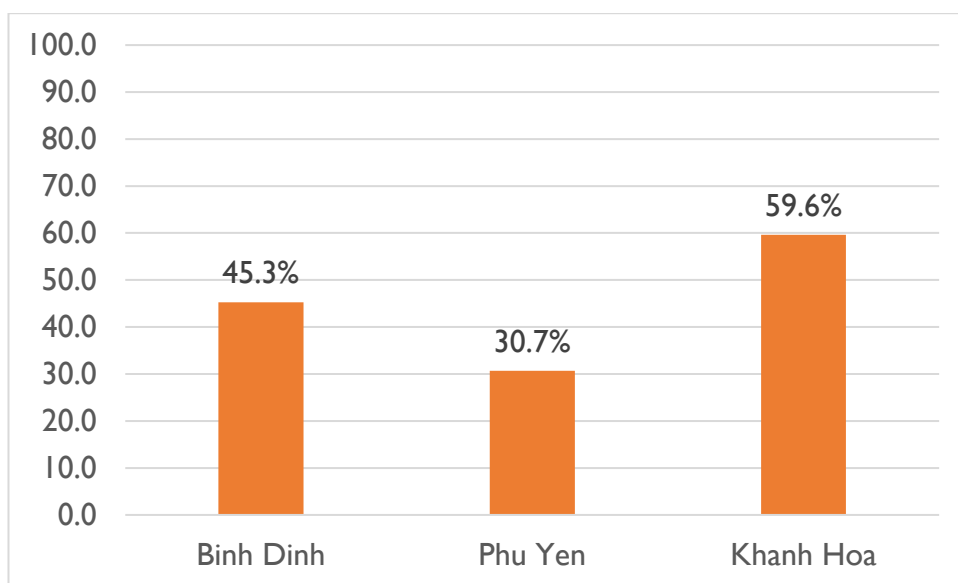


Figure 9. The percentage of fishers experienced using C-hooks by province

Provinces also differ in terms of the origin of hooks used. Specifically, tuna fishers in Binh Dinh province mainly use domestic C-hooks (82.3% of all C-hooks used in the province); it is notable that domestic fishing hook manufacturers are located in Binh Dinh, and so are more readily available to fishers in this provinces.

In Phu Yen, there is an opposite observation, where among those with C-hook experience the proportion of fishers having ever used *imported* C-hook accounts for a higher proportion (78.3%). These imported hooks were usually obtained from the C-hook programs from WWF and VINATUNA.

In Khanh Hoa, among those that used or are using C-hooks, 71.0% are domestic C-hooks. In addition to hooks provided via past projects from WWF and VINATUNA in Khanh Hoa, hook retailers also import C-hooks such as from Taiwan and Korea to sell to local tuna fishers. In total, imported C-hooks account for 29.0% of C-hook use.

The percentages of tuna fishers having ever used C-hooks by provinces and by hook origins are illustrated in Figure 10 below:

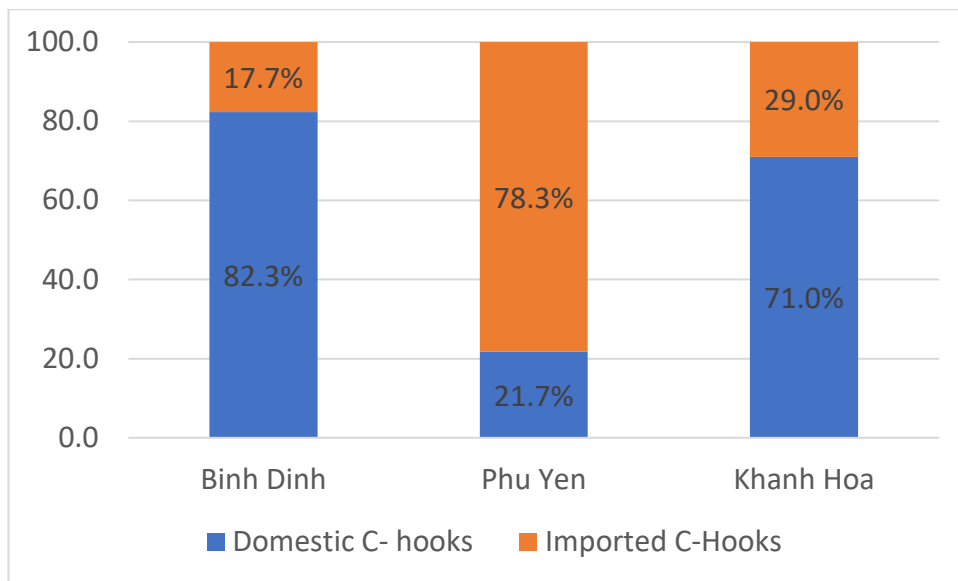


Figure 10. Relative percentage of imported vs. domestic C-hook use

- Overall use of C-hooks by province

In general, the rate of current use of C-hooks at the time of the survey is relatively low. 22.6% tuna fishers in Binh Dinh are currently using C-hooks; in Phu Yen, the current rate of C-hook only accounts for a very small proportion, the lowest rate among 3 provinces, with only 9.3% using C-hook. Khanh Hoa has the highest rate of current using C-hook (34.6%).



Figure 11. A type of domestic C-hook used in Binh Dinh

3.7 Discussion on C-hook use

Overall, the use of C-hooks compared to J hooks is around what the FIP team had estimated previously (around 25%) based on anecdotal information. The survey generally

confirms this past estimation and provides important confirmation of the current baseline use.

The relatively higher proportion of C-hook use in Khanh Hoa province may be due to a variety of factors. This province has participated in several past C-hook campaigns, awareness workshops and at-sea experiments, over the past several years. Thus, fishers here are relatively quite aware of the potential benefits of C-hooks and have experienced their effectiveness (including in terms of catch rates on target species). There is also a market of imported C-hooks, deemed to be of generally good quality, made available by local hook retailers here. In Phu Yen province, which has a smaller overall fisher, relatively fewer interventions related to C-hooks have occurred, which may help explain the low level of use. There are also no local hook manufacturers in Phu Yen providing C-hooks.

For those that already use C-hooks, the relatively higher proportion of use of domestic hooks C-hooks in Binh Dinh province is likely explained by the proximity of the hook manufacturer, who as noted has also produced C-hooks. This province has also experienced many interventions on C-hooks, from WWF, VINATUNA and industry partner Sea Delight, over many years, and thus the relative familiarity with C-hooks and requests for their use (e.g. by buyers such as Sea Delight) may bear some influence on the availability and use. However, the overall rate of current use of C-hooks in Binh Dinh (22.6%) is somewhat lower than had been anticipated, based on past anecdotal information.

The surveys highlight some perceptions and reasons why local tuna fishers may not use (or do not continue to use) C-hooks including: (i) the size of current C-hooks is bigger than traditional J –hook. Fishers explained that the big size can make fish detect the hook and avoid the bait and therefore may not be hooked. (ii) Structure of barb and point: Inconvenience of rigging live squid, and easier to have undesired effect of killing live bait. (iii) Offset of C-hook: the C-hook offset may make fish more difficult to hook. The final reason but very important is the relatively higher price of imported C-hooks, which are much higher than J-hooks.

The current use C-hook rates by province are demonstrated at Figure 12 below:

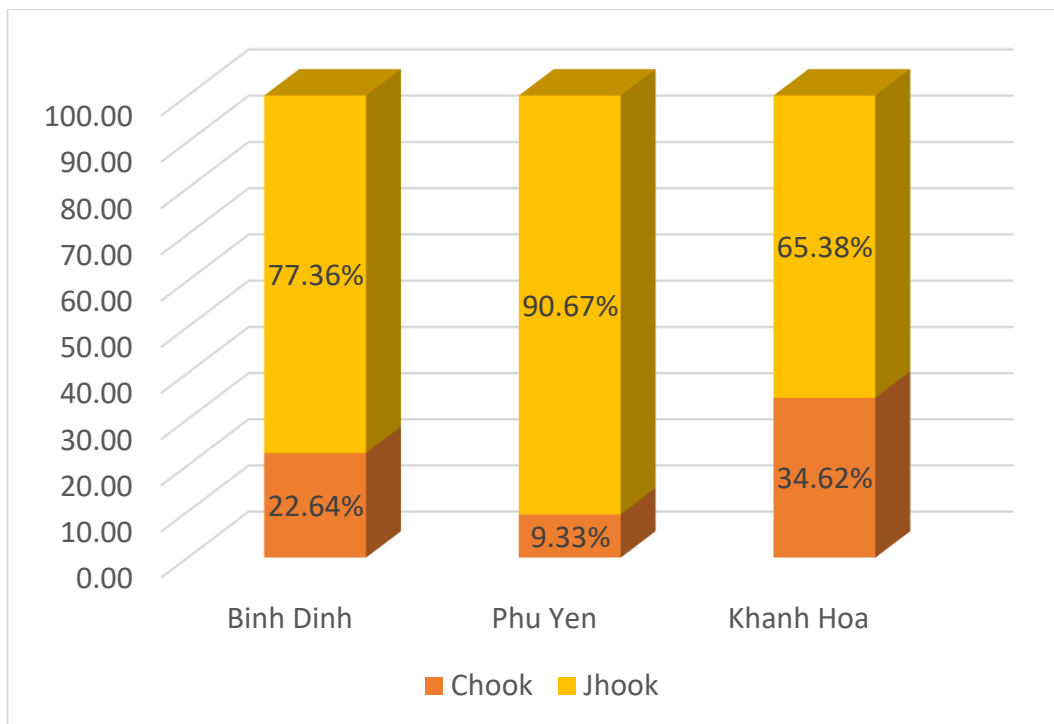


Figure 12. The percentage of fishers who are currently using C-hooks by provinces

- Profile of tuna hook manufacturing capacity

There are only four (04) hook manufacturers who are all located in Binh Dinh province. This study interviewed all these manufacturers. The monthly average manufacturing capacity from 4 producers is 1,650 hook-boxes (100 hooks per box) for both C-hooks & J-hooks, of which only 200 C-hook boxes were produced monthly by these 4 hook producers, accounted for only 12.1% of the total produced hooks monthly. The remaining of 87.8% is J-hooks, in which THU manufacturer produced the most with an average of 150 C-hook boxes monthly, accounted for 75% of the total produced C-hooks in Binh Dinh. HOC HUONG manufacturer does not produce any C-hooks, although they have knowledge about that.



Figure 13. Visiting Nam Hien & Thu hook manufacturers in Binh Dinh province

The hook producing capacity also depends on the fishing seasons. In the main fishing season of tuna fishery (in the northeast monsoon season - starting from October - to April of the lunar calendar), the volume of hook production and selling are higher than the other months. The average hook production in the highest months of 4 domestic hook manufacturers for C-hooks reaches 350 boxes per month. Meanwhile, for J-hooks this number reaches 1,700 boxes per month. The average hook production in the lowest months of 4 domestic hook manufacturers for C-hooks reaches 150 boxes per month. Meanwhile, for J-hooks this reaches 1,200 boxes per month.

- Tuna hook retailers and selling capacity

There are many hook retailers (fishing gears retailers) in 03 provinces. This study interviewed with 08 retailers (03 in Khanh Hoa province, 03 retailers in Phu Yen province and 02 retailers in Binh Dinh province) to evaluate the trend of tuna hook selling capacity. The results have shown that the average rate of production and trading of J-hooks still accounts for a large proportion (87.9%), while C-hooks only account for a small proportion (12.1%) of the hook production and business capacity of hook manufacturers and hook retailers. Of which, Khanh Hoa is the province which has the highest C-hook consumption levels, especially at “Hau Xinh” and “Ba Uyen” hook retailers in Khanh Hoa province currently import Taiwan C-hooks to supply to local tuna fishers.

The details of tuna hook manufacturing and selling capacity in 03 provinces by producers/retailers is illustrated in Table 6 below:

Table 6. Production and selling capacity of hook manufacturers and retailers

Unit: boxes (100 hooks) per month

	Company	Domestic C-hook			Imported C-hook			J-hook		
		Max	Min	Avg.	Max	Min	Avg.	Max	Min	Avg.
Hook Producers	Thu	200	100	150	N/A			400	300	350
	Nam Hien	100	50	75	N/A			500	300	400
	Hoc Huong	0	0	0	N/A			500	400	450
	Tham Phap	50	0	25	N/A			300	200	250
	Total	350	150	200	N/A			1,700	1,200	1,450
Hook Retailers	Phu Yen									
	My Linh	0	20	10	0	0	0	150	100	125
	Thu Ha	30	5	17.5	0	0	0	150	100	125
	Phuong Linh	10	0	5	0	0	0	100	50	75
	Binh Dinh									
	Dung	30	20	25	0	0	0	250	100	175
	Loan	30	20	25	0	0	0	200	150	175
	Khanh Hoa									
	Ba Uyen	30	20	25	10	0	5	150	50	100
	Hau Xinh	40	30	35	10	5	7.5	200	100	150
	Duc Toan	30	10	20	0	0	0	150	50	100

3.5. Feedback from local fishers on the quality of C-hooks

The fishing hooks available to the fishermen are not uniform in their physical and mechanical properties and a high degree of variation is seen between different brands. These variations could be attributed to difference in the steel used for manufacturing of hooks and differences in hook manufacturing process. Mechanical strength of a fishing hook bend is very critical for successful fishing. This is more important in the hook and line fishing of large fast-moving fishes like tuna. These fishes will transfer lot of kinetic energy to the fishing hook while hooking and this could lead to hook failure, which ultimately results in loss of the catch.

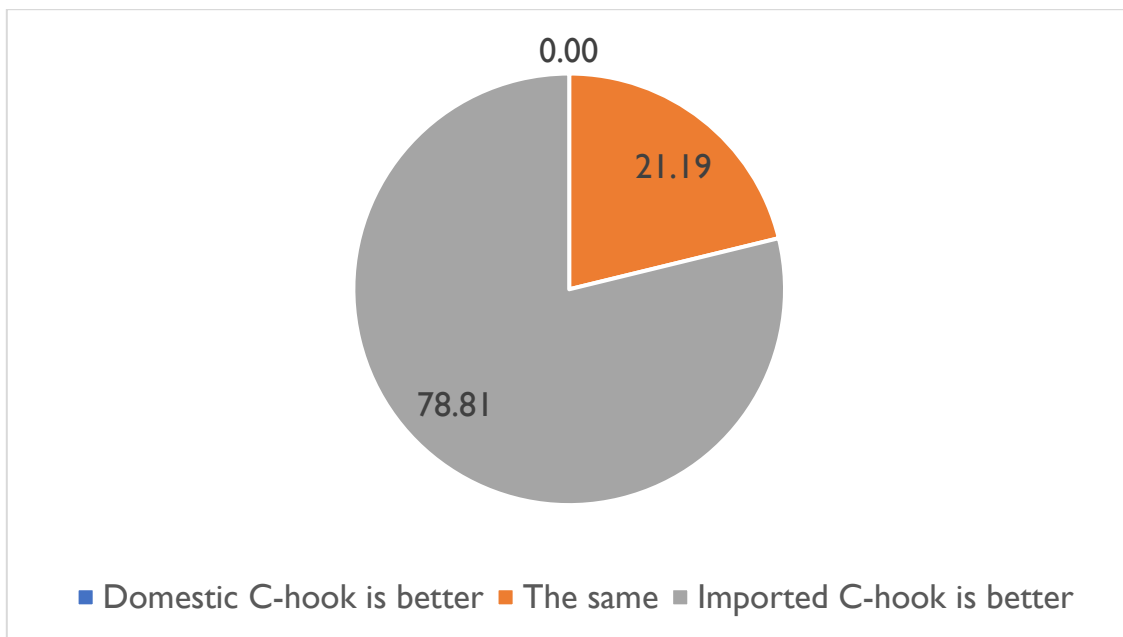


Figure 14. Feedback from local fishers about quality of existing C-hooks in Vietnam

When hook samples were analyzed by respondents, the following feedback was received:

The quality of steel materials, hardness, ring eyes and degree of perfection of Imported C-hook is better (accounting for 78.8%) than domestic hook. About 21.2% of the respondents said that the quality of the domestic and imported C-hooks are the same. Interestingly, none of the respondents said that domestic hooks are better quality compared to imported hooks. Fishermen highly appreciate the quality of the Imported hook (the quality of steel materials and the degree of perfection), giving the fishermen a sense of certainty, weight bearing ability, and rust-resistance. In terms of minimizing losses in the fishing process and improving catch effectiveness, the Imported C-hooks are perceived to have greater holding power, more hookups, fewer drop-offs and it holds bait better. Local tuna fishers agree that domestic fishing hooks were fragile and could be easily deformed or break under load when compared to imported brands of fishing hooks.



Figure 15. Nam Hien hook manufacturer is testing the quality of imported and domestic C-hooks

With domestic C-hooks:

- **Hook material:** 4 hook manufacturers are sourcing steel material from Ho Chi Minh city, Danang city or even imported from India. There are 2 types of steel that use for hook manufacturing: Inox 201 (Inox 201 + 4.5% nickel and 7.1% manganese) and Inox 304 (Inox 304 + 8.1% nickel and 1% manganese). According to Vietnam hook manufacturers, they prefer to use Inox 304 for hook manufacturing, because Inox 304 is brighter and do not rust easily while Inox 201 contains more high manganese content with dark, easy to rust surface. Moreover, 201 stainless steel material is relatively harder than stainless steel 304, easy to break when it is impacted under tuna's traction/ pressure. So stainless steel 304 which is more resilient, fatigue resistant much better than 201 and suit to tuna fishing.

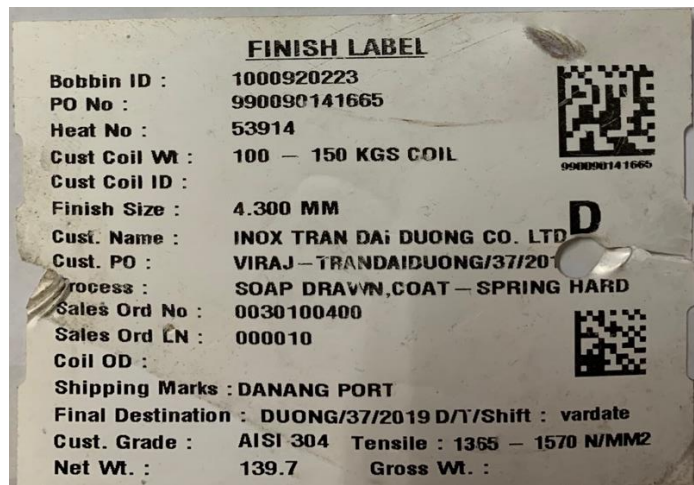


Figure 16. Label of steel material

- **Hook manufacturing process:**

The general hook manufacturing process is as follows: Circle hook are shaped from stainless steel coils. They buy stainless steel and roll it straight. Each stainless – steel coil is passed through the straightening machine. This process also reduces the thickness to match the order’s size and increases the hardness and gloss of the hook. After pulling straight, the craftsman puts it into a machine to cut it into short pieces, adjusted to the order size and to be pressed into spearheads at ends. The hook then continues to be sharpened into two blades. Two spearheads are put into the mold to be blended into two blades. There are many types of molds depending on the customer’s order. The worker then proceeds to cut the barb of the hook. Making the barb and the spearhead are the most difficult steps. Because it is the hard steel, the barb is made first and then the spearhead sharpened. Each piece of stainless steel is cut into two hooks, then crushing the ends. To increase the hardness, after the cutting process the hook continues to be heated. Next, use acid is used to bleach it and it is then put through the soap solution. Later, the hook is put through a whitening machine, which takes t about another hour. The bleached fishing hook are packaged in piles, ready to be delivered to the buyer.



Figure 17. Hook manufacturer demonstrating hook production process.

Modern day fishing hooks are manufactured from high carbon steel wire. The characteristic bend of fishing hook is formed by physically bending the wire to the desired shape and style. The most important step in hook manufacture is the tempering of the hook in which the hook is hardened to improve strength. This process hardens the metal and substantially increases its resistance to unbending, resulting in strong hooks with reduced brittleness. The resistance of fishing hooks towards unbending force is a very essential property as far as fishing hooks are concerned. Most of the work is now supported by the machinery but adjusting the hook still requires the craftsman to do it manually. The new type of fishing hook requires advanced techniques and skillful workmanship.

3.6. Feedback from tuna fishers on the fishing efficiency of C-hooks and J-hooks

The majority of tuna fishers (60.3%) agreed that J-hook has a higher fishing efficiency while 17.9% agreed that the fishing efficiency level of the two types of hooks are equal. The remaining of 21.7% agreed that C-hook has a higher fishing efficiency than J-hook. Local tuna fishers all point out the strengths and weaknesses of each types of hook: for J-hook a negative aspect is the higher probability of having a higher loss of the catch, whereas a negative perception for C-hook is about the size of hook, the offset impact and on the effectiveness on catch. The detail responses from local tuna fishers on fishing efficiency are shown in Figure 18 below:

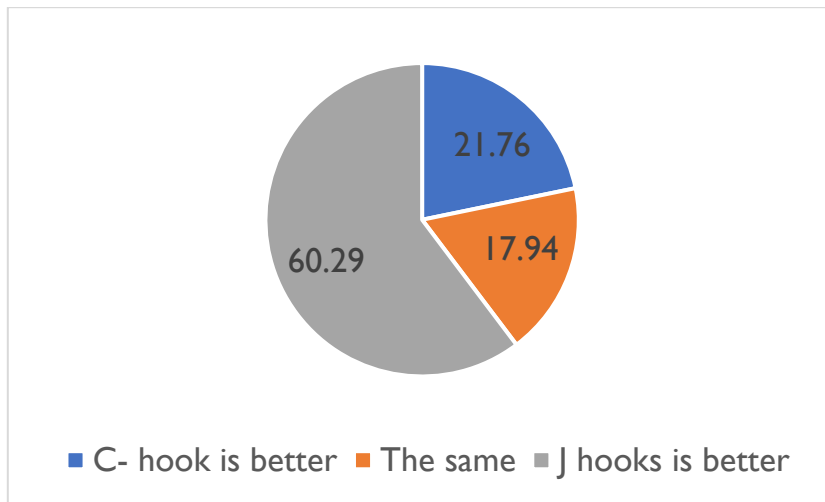


Figure 18. Feedback from local fishers on hook fishing efficiency

3.7. Feedback on the improvements needed for C-hooks

In order to increase the C-hook using rates in local tuna fishing communities, improvements needed for C-hooks were investigated. All feedbacks from local tuna fishers are recorded and analyzed. The results can be summarized as below:

- **For Domestic C-hook:**

In general, domestic C-hooks are produced partly based on market demands for, with certain modifications based on the examples of imported C-hooks and adjustments between hook manufacturers and fishers' requirements. Occupying the highest rate at 74.1%, the steel quality of the domestic C-hook is proposed to be improved so as to limit rust and break when work under great force of tuna. Additionally, 35.0% of respondents said that it is necessary to reduce the overall size (hook size from size 14 down to size 12) in order to reduce the thickness, roughness of the hook which can impact fish detection. 12.1% of the respondents said that the point angle should be adjusted to $<90^{\circ}$. 29.1% of the respondents said that it is necessary to adjust the offset of the hook, so that when the tuna is catching the bait at a fast speed, it can increase the sensitivity of the hook. Only 12.94% of the respondents said that it is necessary to lower the cost. The improvements needed for domestic C-hooks are shown at Figure 19 below:

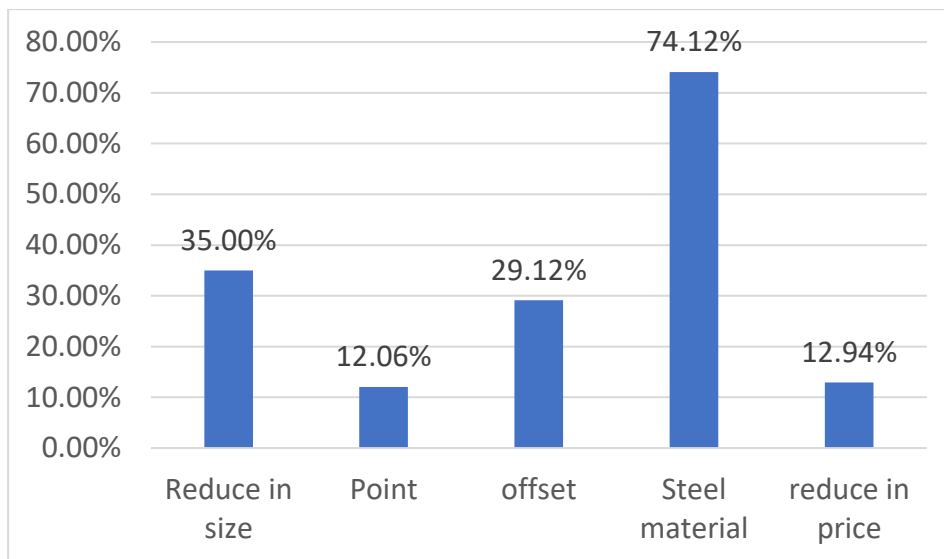


Figure 19. Suggested improvements from survey respondents for domestic C-hooks

- Imported C-hook:

The responses from local tuna fishers indicate two major points that need to be improved for imported C-hooks, with highest proportion related to lowering the cost of imported C-hooks (88.8%); as well as reducing the size of the hook (78.2%). Specifically, for imported C-hook cost, it is necessary to lower the current price of imported C-hook, which is between 7,000 to 9,000 VND higher per hook compared to domestic. For the hook size, fishermen asked to reduce size from current hook (size 14) to reduce the roughness of the hook.

For the quality of the steel material itself, fishermen do not recommend any adjustments, as the quality of steel and the degree of perfection of the imported C-hook is good compared to domestic C-hooks. Some other points also indicated by local tuna fishers include 32.1% of the respondents suggesting the point angle should be adjusted to <90, and 47.1% of the respondents said that it is necessary to adjust the offset of the hook, so that when the tuna is catching the bait at a fast speed, the hook sensitivity can be increased. The improvements suggested by respondents for imported C-hooks are shown in detail at Figure 20 below:

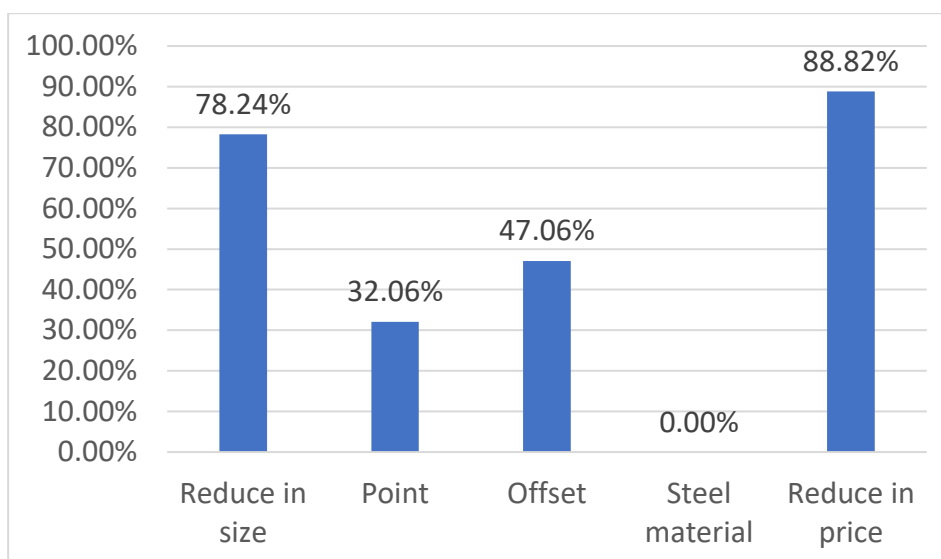


Figure 20. Suggested improvements from survey respondents for imported C-hooks

3.8. Hook selling price

Hook prices are one of the first and most important factors that effects to C-hook usages beside perceived fishing efficiency, and this plays an important role for willingness to use C-hook or not. Thus, the study also surveyed on hook selling prices at hook retailers. The survey results have shown that, domestic hooks are priced lower than imported hooks. Domestic hooks are competitively priced, suitable for the fishermen. The average price of domestic hooks is about 400.000 VNĐ/ box/ 100 hooks, whereas the imported brands of fishing hooks are more costly. The Korean C-hook has the highest price overall. In addition to the high price of hook a further constraint is that the imported circle hooks are less available and insufficient to supply fishermen after each fishing trip. The details of hook selling prices are shown in Table 7 below:

Table 7. Selling price of existing hook types in Vietnam

Type of hooks	Price (VNĐ/box/100 hooks)
Korea C-hook	1.200.000 - 1.400.000
Nam Hien C-hook	400.000
Taiwan C-hook	700.000
Tham Phap C-hook	400.000
Thu C-hook	400.000
Taiwan J-hook	720.000
Hoc Huong J-hook	450.000
Nam hien J-hook	400.000
Tham Phap J-hook	350.000

However, according to some fishermen, price is not the whole issue in making purchasing decisions. They can be willing to spend extra cost to buy good quality hooks, to avoid losses in the fishing operation process. When the value of a fish is up to millions of VND, poor – quality hooks can result in loss and damage to the vessel's revenue.

3.9. Willingness to use, manufacture and sell C-hooks

In order to gauge the sustainability and prospect of C-hook usages at these 03 provinces, the willingness to pay and use C-hooks was evaluated. The results have shown that Khanh Hoa is highest rate with 46.2% of local tuna fishers in Khanh Hoa willing to pay and continue to use C-hooks. The lowest level of willingness is in Phu Yen province with 17.3% of local tuna fishers willing to pay and use. This result is also consistent with the C-hook using rates in Phu Yen and is also consistent with the findings for current use in Khanh Hoa (i.e. highest of the three provinces). The rate in Binh Dinh was 37.6% of respondents saying that they would be willing to buy and use C-hooks. The details of willingness to pay and use C-hooks is illustrated in Figure 21.

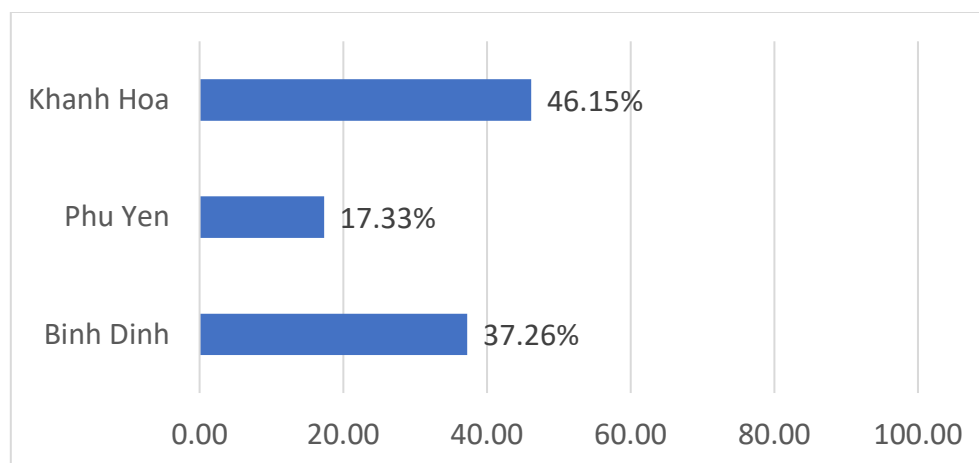


Figure 21. Willingness to pay and use C-hook of fishers by province

Willingness to produce and sell C-hooks from producers & retailers

Beside the willingness to pay and use from local tuna fishers, the study also investigated in the willingness to produce C-hooks from hook producers and willingness to sell C-hooks from local hook retailers. Regarding willingness to produce from manufacturers, the results have shown that 3 out of 4 (75%) hook manufacturers (namely: Tham Phap, Thu and Nam Hien producer) agreed that they are willing to continue to produce C-hooks, and are also willing to cooperate with the projects/ programs to promote the usage of the C-hook to local tuna fishers. The remaining manufacturer (Hoc

Huong) would like to produce hook types based on market requirements (thus, an Indicator of future success in C-hook outreach could be the inclusion in Hoc Huong inventory, as evidence of mainstreaming in market).

For willingness to sell from hook retailers, there are 7 out of 8 (87.5%) hook retailers agreed that they are willing to continue to trade in C-hooks, and are also willing to cooperate with the projects/ programs to promote the use of C-hooks for local tuna fishers by promotion programs, do marketing for C-hooks, make the trial in some fishing trips.

In general, hook manufacturers and retailers responded that the proportion of C-hooks accounts for a smaller proportion rather than traditional J-hooks and that the selling rates of C-hooks at hook retailers are not accounted significantly. However, as part of fishers is starting to switch to C-hooks, the level is gradually increasing, especially in Khanh Hoa province.

IV. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusions

- The proportion of handline in combination with “floating handline” accounts for a large proportion in the current oceanic tuna fishery, which accounting for 65.8% in the total. Short – longline is seems to be considered a secondary fishing gear which has 25-50 hooks per line and operate in the early morning of every fishing trip day;

- There is generally good, but variable, level of awareness about C-hooks in Binh Dinh, Phu Yen and Khanh Hoa, respectively 64.6%, 50.7% and 63.5% of surveyed participants aware of C-hooks and their use and perceived benefits. The level of access to information about the C-hook is currently quite good through various information channels such as past training programs under the FIP, WWF/MARD etc., through mass media and word-of-mouth among peers and friends;

- The current use of C-hooks in Binh Dinh, Phu Yen and Khanh Hoa respectively is 22.6%, 9.3% and 34.6%. these findings are consistent with anticipated levels based on anecdotal evidence and past general estimations (e.g. based on accounting of past C-hook outreach). These figures indicate a general increase overall in adoption of C-hooks and provide some proof of concept for the C-hook program. However, it also indicates that more efforts are required, particularly in Phu Yen, to bring C-hook use to a “tipping point” for overall transition (i.e. >50%);

- Khanh Hoa, Binh Dinh and Phu Yen had respectively 59.6%, 45.3% and 30.7% fishers who have ever used Circle hooks. The usages of domestic C-hooks and imported C-hooks depends on fisher's perceptions and approaches. There are some reasons make some fishers stop using C-hook, such as: price, size, offset and point. However, the assessment is still very subjective and it is impacted by many external factors, including past experience (or not) directly using C-hooks;

- More than 10 types of hooks are available in Vietnam tuna fishery from domestic hook manufacturers and imported hooks. In which: 5 types of C-hooks and 5 types of J-hooks. Each type of hooks has a different specification with suit to their functions and purposes;

- Hooks that are on the current Vietnam hook market have somewhat met the standards of C-hooks, based on the definitions in the research result of Steven et al (2012), specifically in terms of point angle and front angle. However, the front length did not meet the proposed standard. Moreover, improvements are needed to ensure the maximum utility and function of the C-hook, in parallel with ensuring effectiveness for fishers. The results highlight the general trend or preference in Vietnam for a smaller sized hook. While the international community has generally advised "bigger is better" for C-hooks, there is significant evidence to suggest that 14 size (and even 12 size) C-hooks still have a positive benefit in terms of sea turtle bycatch. This indicates the need for further investigation, including comparative bycatch and target catch rates of the smaller (12) hooks preferred by fishers, in order to better define an optimum approach for bycatch mitigation that may be applied in practice;

- Production and sales capacity of C-hooks from hook manufacturers and hook retailers has been slowly increasing, but is still only around 10%-15% compare to J-hooks;

- The imported brands of fishing hooks are costly. The Korea C-hook has the highest price in total. On average the domestic hooks are 7,000 to 9,000 VND (around 23-40 cents) cheaper per hook, compared to imported versions.

- 78.8% fishermen agreed that the quality of steel materials, hardness, ring eyes and degree of perfection of imported C-hook is better than domestic C-hooks. Domestic fishing hooks are considered fragile and could be easily deformed under load when compared to imported brands of fishing hooks;

- 39.7% of local fishers said C-hooks have higher or equal fishing efficiency rather than J-hooks while 60.3% of local fishers have feedbacks that J-hooks have higher fishing efficiency. In terms of target catch rates, this suggests a discrepancy between the empirical

results of at-sea tests of C-hooks (and of perceptions of fishers participating in those programs) and of the perceptions from fishers documented in the survey. Whereas past empirical studies under the FIP (and previously with WWF/MARD) have indicated no significant difference with target catch rate compared to J hook (and in fact a higher proportion of larger, higher valued tuna), in the current survey more than half of respondents felt that J hooks in terms of target catch. Further investigation is implied, to better understand the facts and factors around these perceptions, including for example co-relation between past experiences with C-hooks and any positive or negative perceptions on their catch characteristics.

- Feedback of local fishers on improvements needed for domestic C-hooks include improving the quality of steel material, and adjusting the size and point angle of hooks; suggestions for imported C-hooks include reducing the price and size of the hooks.

- The willingness to pay and use C-hooks among local fishers in Khanh Hoa, Binh Dinh and Phu Yen is 46.2%, 37.3% and 17.3% respectively. This indicates a need to continue expanding outreach work in all provinces, and particularly Phu Yen

- Some fishers are willing to spend extra cost to buy good quality hooks, to avoid losses in the fishing operation process. These fishers should be considered for future studies on economic and business case analysis, as well as efforts to promote further peer-to-peer exchanges on fisher experiences with C-hooks

- Khanh Hoa is a potential priority area to develop and promote the usage of C-hooks compared to other provinces, given the current using/selling rate and willingness to use rate are the highest. Moreover, hook manufacturers and retailers generally highly appreciative and engaged in hook transition of Khanh Hoa, likely in part as a response to the targeted activities in Khanh Hoa and the relatively higher proportion of international seafood suppliers sourcing from Khanh Hoa processors, all of whom have been participating in the FIP and/or C-hook activities.

4.2. Recommendations

- Scale up the C-hook program, including at-sea studies on C-hook efficiency and other outreach, with direct involvement of fishers, with key elements as:
 - Technical training related to onboard C-hook monitoring and catch data i.e. logbook protocols, species identification, comparative studies (incl. C vs. J hooks; C hooks of varying type or origin), as well as sea turtle handling and release methods

- Expand, in collaboration with fishers, private sector and fishery managers, the at-sea programs monitoring the effectiveness of Circle hooks (i.e. bycatch reduction; target catch efficiency; value enhancement and loss of hooks), using crew-based observer program and logbooks for use by Captains;
 - Continue to implement general outreach, awareness and training programs on C-hooks with local fishing communities, engaging more local fishers and in a peer-to-peer setting to share the practical experiences and benefits of C-hooks as well as general ETP species awareness and best practices in using C-hooks;
 - Further investigate the economic components of C-hook use, including related to comparative value of tuna caught with C-hooks, and as appropriate develop an economic or “business case” for C-hook use;
 - Communicating, through appropriate channels, the summary evidence and direct testimonies (from fishers, suppliers, manufacturers) etc. related to C-hooks
- The study and its findings provide some useful insights that can inform the strategic implementation of C-hook program in the future e.g:
- Stronger attention to Phu Yen, where rates of use (and perceptions) of C-hooks are lowest
 - The positive Khanh Hoa fisher and hook manufacturer experiences can be highlighted and use as a model for outreach strategy, as well as organizing peer-to-peer technical exchanges
 - The indication that the issue of hook size being very important: future at-sea monitoring should further compare different C-hook sizes (e.g. 12 vs. 14) in terms of their efficiency to reduce sea turtle bycatch impacts and in terms of catch rates on target and secondary fisheries (including sharks)
- Advocate to DFISH to conduct and publish Vietnamese regulations on standardization (ex. TCVN for tuna hooks) of fishing gear in tuna fishery; need to clarify status on custom/import tax for import of “eco-friendly” C hooks and potential new policy opportunities
- Work closely with DFISH and other relevant agencies to collected differentiated data on hook type, including in logbook/e-logbook applications;

- Collaborate with domestic hook manufacturers and local hook retailers, as well as relevant agencies and institutes (e.g. Trade) on improving the quality of domestic circle hook as well as promoting the approaches and usages of C-hooks in Vietnam handline/longline fishery.
- Consider how to work further with these hook retailers in KH selling imported C-hooks, to highlight and provide “peer to peer’ sharing of information as to why they are using them.

APPENDIXES

Appendix I. Questionnaires for local tuna fishers



PHIẾU KHẢO SÁT

Hiện trạng sử dụng lưới câu vòng tại Việt Nam
(Dành cho ngư dân, chủ tàu nghề câu cá ngừ đại dương)



Mã số phiếu

Người khảo sát:

Ngày khảo sát:.....Địa điểm:

PHẦN 1: THÔNG TIN NGƯỜI ĐƯỢC KHẢO SÁT

1	Họ và tên				
2	Địa chỉ				
3	Nghề khai thác	Câu tay <input type="checkbox"/>	Câu vàng <input type="checkbox"/>		
4	Nghề nghiệp	Chủ tàu <input type="checkbox"/> ; Thuyền trưởng <input type="checkbox"/> ; Thuyền viên <input type="checkbox"/> ;			
5	Kinh nghiệm	Dưới 5 năm <input type="checkbox"/>	5 – 10 năm <input type="checkbox"/>	11-20 năm <input type="checkbox"/>	Trên 20 năm <input type="checkbox"/>
6	Lưới câu đang sử dụng	Lưới câu vòng (C) : <input type="checkbox"/> Kích cỡ:.....		Lưới câu truyền thống (J): <input type="checkbox"/> Kích cỡ:.....	

PHẦN 2: NỘI DUNG VỀ HIỂU BIẾT VỀ LƯỚI CÂU VÒNG

I. Nhận thức về lưới câu vòng	
7	Anh/ Chị đã nghe và biết về lưới câu vòng chưa? Đã nghe <input type="checkbox"/> Chưa nghe <input type="checkbox"/>
8	Nếu có, Anh/ Chị đã biết về lưới câu vòng từ đâu?

	Phương tiện TTĐC <input type="checkbox"/>	Các chương trình thúc đẩy về sử dụng lưới câu vòng của VT/WWF <input type="checkbox"/>	Từ cơ quan nhà nước <input type="checkbox"/>	Bạn bè, người thân <input type="checkbox"/>
9	Anh/ Chị hiểu lợi ích của lưới câu vòng như thế nào?			
	Giữ cá chặt hơn <input type="checkbox"/>	Giảm thiểu đánh bắt rùa biển <input type="checkbox"/>	Tăng hiệu quả đánh bắt <input type="checkbox"/>	Không có tác dụng gì <input type="checkbox"/>
10	Có bao nhiêu loại lưới câu mà Anh biết hoặc đã từng sử dụng qua? Điểm khác nhau là gì?			
II. Sử dụng lưới câu vòng				
11	Anh/ Chị đã từng sử dụng lưới câu vòng chưa? Và đã sử dụng được bao lâu?			
	Chưa sử dụng <input type="checkbox"/>	Dưới 1 năm <input type="checkbox"/>	1-3 năm <input type="checkbox"/>	Trên 3 năm <input type="checkbox"/>
12	Anh/ chị đang sử dụng lưới câu vòng sản xuất nội địa hay nhập khẩu?			
	Nội địa <input type="checkbox"/>		Nhập khẩu <input type="checkbox"/>	
	(nếu biết) Xin vui lòng cho biết cơ sở sản xuất lưới câu vòng nội địa? Tại sao lại sử dụng sản phẩm của đơn vị này?			
13	Số lượng lưới câu sử dụng trên 1 chuyến biển?			
	Lưới câu vòng		Lưới câu truyền thống	
	Nội địa:	Nhập khẩu:		
14	Số lượng lưới câu mất trong 1 chuyến biển?			
	Lưới câu vòng		Lưới câu truyền thống	
	Nội địa:	Nhập khẩu:		
15	Anh mua lưới câu ở đâu:Giá lưới câu / hộp/ 100 chiếc?			
	Vòng nội địa:	Vòng nhập khẩu:	Truyền thống:	
16	(Nếu đã được sử dụng lưới câu vòng nhập khẩu) Xin vui lòng, Anh/ Chị đánh giá về chất lượng (chất lượng thép, ít hoen gỉ) của C và J? Loại nào tốt hơn ?			
	Lưới câu vòng <input type="checkbox"/>	Bằng nhau <input type="checkbox"/>	Lưới câu truyền thống (J) <input type="checkbox"/>	
	Nếu lưới câu vòng tốt hơn, giữa nội địa và nhập khẩu như thế nào?			
	Lưới câu vòng nhập khẩu <input type="checkbox"/>	Bằng nhau <input type="checkbox"/>	Lưới câu vòng nội địa <input type="checkbox"/>	

17	Anh/ Chị đánh giá thế nào về hiệu quả đánh bắt sau khi sử dụng 2 loại lưới câu (vòng và truyền thống)? Loại nào tốt hơn ?		
	Lưới câu vòng <input type="checkbox"/>	Bằng nhau <input type="checkbox"/>	Lưới câu truyền thống (J) <input type="checkbox"/>
	Nếu lưới câu vòng tốt hơn, giữa nội địa và nhập khẩu như thế nào?		
	Lưới câu vòng nhập khẩu <input type="checkbox"/>	Bằng nhau <input type="checkbox"/>	Lưới câu vòng nội địa <input type="checkbox"/>
18	Nếu anh chị, đang sử dụng lưới câu vòng, Anh/ chị có góp ý gì về chất lượng, hình dáng cấu tạo lưới không?		
	Lưới câu vòng nhập khẩu	Lưới câu vòng nội địa	
	Cần cải thiện về hình dáng cấu tạo lưới <input type="checkbox"/>	Cần cải thiện về hình dáng cấu tạo lưới <input type="checkbox"/>	
	Cụ thể:.....	Cụ thể:.....	
Cần cải thiện về chất lượng nguyên liệu <input type="checkbox"/>	Cần cải thiện về chất lượng nguyên liệu <input type="checkbox"/>		
Cụ thể:.....	Cụ thể:		
Về giá thành sản phẩm:.....	Về giá thành sản phẩm:.....		
20	Anh/Chị có sẵn lòng tiếp tục mua lưới câu vòng để sử dụng hay không?		
	Có <input type="checkbox"/>	Không <input type="checkbox"/>	

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Appendix 2: Questionnaires for hook producers / retailers



PHIẾU KHẢO SÁT

Hiện trạng sử dụng lưỡi câu vòng tại Việt Nam
(Dành cho đại lý ngư cụ/ cơ sở sản xuất lưỡi câu)



Mã số phiếu:

Người khảo sát:

Ngày khảo sát:.....Địa điểm:

PHẦN 1: THÔNG TIN NGƯỜI ĐƯỢC KHẢO SÁT

1	Họ và tên				
2	Địa chỉ				
4	Nghề nghiệp	Đại lý bán ngư cụ <input type="checkbox"/> ; Cơ sở sản xuất lưỡi câu <input type="checkbox"/> ;			
5	Kinh nghiệm	Dưới 5 năm <input type="checkbox"/>	5 – 10 năm <input type="checkbox"/>	11-20 năm <input type="checkbox"/>	Trên 20 năm <input type="checkbox"/>
6	Sản phẩm kinh doanh	Lưỡi câu vòng nội địa <input type="checkbox"/> Size:	Lưỡi câu vòng nhập khẩu <input type="checkbox"/> Size:.....	Lưỡi câu J truyền thống <input type="checkbox"/> Size:.....	

PHẦN 2: NỘI DUNG VỀ HIỂU BIẾT VỀ LƯỠI CÂU VÒNG

III. Nhận thức về lưỡi câu vòng				
7	Anh/ Chị đã nghe và biết về lưỡi câu vòng chưa? Đã nghe <input type="checkbox"/> Chưa nghe <input type="checkbox"/> <input type="checkbox"/> Nếu có, Anh/ Chị đã biết về lưỡi câu vòng từ đâu?			
	Phương tiện TTĐC <input type="checkbox"/>	Các chương trình thúc đẩy từ sử dụng lưỡi câu vòng VT <input type="checkbox"/>	Từ cơ quan nhà nước <input type="checkbox"/>	Người thân/bạn bè <input type="checkbox"/>
8	Anh/ Chị hiểu lợi ích của lưỡi câu vòng như thế nào?			
	Giữ cá chặt hơn <input type="checkbox"/>	Giảm thiểu đánh bắt rùa biển <input type="checkbox"/>	Tăng hiệu quả đánh bắt <input type="checkbox"/>	Không có tác dụng gì <input type="checkbox"/>
IV. Kinh doanh lưỡi câu vòng				
9	Năng lực sản xuất/ bán hàng của công ty/ năm?			
	Vòng nội địa:.....	Vòng nhập khẩu	J truyền thống:	
10	Giá bán trung bình các loại sản phẩm lưỡi câu như thế nào?			
	Vòng nội địa:.....	Vòng nhập khẩu	J truyền thống:	
11	Anh/ chị đang nhập khẩu và kinh doanh lưỡi câu vòng nhập khẩu không? Có <input type="checkbox"/> Không <input type="checkbox"/>			
	(nếu biết) Xin vui lòng cho biết công ty sản xuất lưỡi câu vòng nhập khẩu?..... Chất liệu như thế nào (không gỉ, ...)			

12	Để sản xuất những lưỡi câu vòng nội địa, anh chị sử dụng chất liệu gì? Nhập của chất liệu ở đâu?	
	
13	Trong quá trình sản xuất/ kinh doanh lưỡi câu vòng, anh chị có dựa theo tiêu chuẩn khoa học nào để sản xuất không? Anh chị có thể cho biết rõ hơn được không?	
	
14	Số lượng lưỡi câu bán được trên 1 tháng?	
	Lưỡi câu vòng	
	Nội địa:	Nhập khẩu:
15	Anh/ Chị đánh giá về chất lượng (chất lượng thép, ít hoen gỉ, độ chắc chắn) của lưỡi câu vòng và truyền thống?	
	Lưỡi câu vòng <input type="checkbox"/>	Bằng nhau <input type="checkbox"/>
	Lưỡi câu truyền thống (J) <input type="checkbox"/>	
	Nếu lưỡi câu vòng có chất lượng tốt hơn, giữa nội địa và nhập khẩu như thế nào?	
16	Lưỡi câu vòng nhập khẩu <input type="checkbox"/>	Lưỡi câu vòng nội địa <input type="checkbox"/>
	Bằng nhau <input type="checkbox"/>	Lưỡi câu truyền thống (J) <input type="checkbox"/>
	Nếu lưỡi câu vòng có chất lượng tốt hơn, giữa nội địa và nhập khẩu như thế nào?	
	Lưỡi câu vòng nhập khẩu <input type="checkbox"/>	Lưỡi câu vòng nội địa <input type="checkbox"/>
16	Anh/ chị đánh giá mức độ hài lòng của khách hàng đối với từng loại như thế nào?	
	Lưỡi câu vòng nhập khẩu Tốt <input type="checkbox"/> Cần cải thiện về hình dáng cấu tạo lưỡi <input type="checkbox"/> Cần cải thiện về chất lượng nguyên liệu <input type="checkbox"/> Cụ thể:..... Về giá sản phẩm:	Lưỡi câu vòng nội địa Tốt <input type="checkbox"/> Cần cải thiện về hình dáng cấu tạo lưỡi <input type="checkbox"/> Cần cải thiện về chất lượng nguyên liệu <input type="checkbox"/> Cụ thể:..... Về giá sản phẩm:
	Lưỡi câu J truyền thống Tốt <input type="checkbox"/> Cần cải thiện về hình dáng cấu tạo lưỡi <input type="checkbox"/> Cần cải thiện về chất lượng nguyên liệu <input type="checkbox"/> Cụ thể:..... Về giá sản phẩm:	
	
17	Anh chị có nhận thấy những thay đổi nào trong việc sử dụng lưỡi câu của ngư dân không? Mức độ tăng trong nhu cầu sử dụng lưỡi câu vòng hằng năm như thế nào?	
 Mức độ: Cao <input type="checkbox"/> trung bình <input type="checkbox"/> Thấp <input type="checkbox"/>	
18	Anh/Chị có sẵn lòng tiếp tục đẩy mạnh việc bán các sp lưỡi câu vòng hay không?	
	Có <input type="checkbox"/>	Không <input type="checkbox"/>

Xin chân thành cảm ơn Anh/Chị đã cung cấp thông tin hữu ích trên!