

THE ECONOMIC EVOLUTION OF THE LARGE SEINERS IN THE JAVA SEA

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ABSTRACT

The Java Sea large seiner fleet has undergone a marked growth, because of the interdiction of trawling in 1980. In this study, we describe the profile of the economic change undergone by this fleet and we analyse the implications of the new wave of investments started at the beginning of the current decade. The launching of a large number of large seiners should have a significant impact on the fisheries social environment, at the owner's level as well as the wage earning fishermen' level.

KEYWORDS : Java Sea, economic evolution, seiners.

ABSTRAK

Kapal-kapal pukat cincin besar di laut Jawa telah mengalami pertumbuhan yang nyata, sebagai akibat pelarangan pukat harimau pada tahun 1980. Dalam studi berikut digambarkan profil perubahan ekonomi yang dialami kapal-kapal tersebut dan implikasi perubahan investasi yang dimulai pada sepuluh tahun terakhir. Pengoperasian kapal-kapal pukat cincin besar dianggap mempunyai dampak yang nyata dalam hal pendapatan bagi lingkungan sosial perikanan, baik pada tingkat pemilik kapal maupun tingkat nelayan.

KATA KUNCI : Laut Jawa, evolusi ekonomi, kapal pukat cincin.

After the decision to ban trawling in the Java Sea in 1980 (Chong and Hutagalung, 1987) to end conflicts over fishing along coastal waters, purse-seiner fisheries have experienced a remarkable growth, as well in volume as in value. Many trawlers have been converted in purse seiners, this type of net becoming the prevailing gear used to catch the small pelagic species of the Java Sea, notably *layang* (*Decapterus russelli*, *D. macrosoma*).

The fleet of purse seiners can be divided into two groups, in function of their respective size (Potier and Sadhotomo, 1995). The small purse seiners prevail in East Java and the largest ones are based in Tegal, Pekalongan and Juwana, the three major harbours of the province of Central Java.

The analysis will focus on the place occupied by the whole purse seiners' fishery of the Java Sea, before dealing with the economic results of the large seiners only.

METHODOLOGY

The analysis is derived from statistics published in the Fishery Statistics of Indonesia, the Fishery Yearbook Statistics of the province of Central Java and the Statistical Yearbooks of Indonesia.

It is also based on fieldwork undertaken between 1993 and today, mainly through :

- the analysis of the boats' account books provided by selected owners;
- interviews with fisheries' key people: owners and crew, traders and entrepreneurs of fish processed products, personnel of harbours and auction places; people in charge of cooperatives and fishermen's associations, officials and persons of influence;
- inquiries among crew and their families on the skills, fishing income and other household resources.

RESULTS

The importance of the purse seine fishery of the Java Sea

The different kinds of flotillas

The fleet of seiners can be divided into two main groups in function of their respective size (Potier and Sadhotomo, 1995) :

- The small seiners have a length ranging from 12 to 18 meters, a crew ranging from 15 to 20 persons, with a carrying capacity between 1 and 2 tons. They prevail in East Java.
- The medium and large seiners have a length ranging from 20 to 38 meters, a crew of 30 to 45 persons, with a fishhold capacity ranging from 50 to 100 tons. They are based in Tegal, Pekalongan and Juwana, the three major harbours of Central Java.

Therefore, the differences among seiners are not only related to their size. They correspond above all to a division of labour, according to fish species, fishing grounds and landing places and to specific methods of management. Apart that different types of seiners use the same type of gear, there are really two distinct types of exploitation.

In such a context, the characteristics of the purse seine fishery tend to evolve as following :

- A new design of seiners, locally built and no longer in Bagan Siapi Api (Sumatra), appeared in Pekalongan on 1987. The so called "medium purse seiners" tend now to increase in size and power.
- Large seiners are extending their range of action toward the east part of the Java Sea and toward the south China Sea, with longer trips. Consequently, unlike the small seiners that fish close to the shore, they have to salt a growing part of fish inboard because of the lack of freezing equipment, considered to be too expensive. At last, the increasing capacity of their holds forces them to spread the landings over several days. This set of constraints, as well aboard as ashore, strongly acts on the fish quality hence on the fish price.

- Within the category of large seiners, the relaunching of shipbuilding beginning in the nineties is marked by a spectacular increase in boat size and power. This phenomenon could announce the change from an artisanal functioning scheme to an industrial management.

On the whole, the increase of the fishing capacity leads to a growing economic differentiation among the owners and to a recomposition of the social hierarchies among the fishermen.

Production and income of the Javanese seiners

In 1991, the fisheries of the Java Sea caught one third of the national harvest, as well for all species as for pelagic species alone (Tab. 1). Yet, the output of Javanese seiners was significantly higher than that of other Indonesian fisheries.

Table 1 : Production (tons) of all fish species and of pelagic species only (1991)
Produksi (ton) dari semua jenis ikan dan jenis ikan pelagis saja (1991)

	Java Sea	Indonesia	% Java Sea
All species	700,000	2,200,000	32
Pelagic species	485,000	1,450,000	33
Purse seiners	190,000	440,000	43

(Source: Potier and Sadhotomo, 1995)

However, results vary in function of the types of boats used, since the production ranges from one to seven and a half between small and large purse seiners based in the province of Central Java, their respective average catches being 36 and 270 tons in 1991 (Tab. 2).

Table 2 : Catch of fishes by purse seiners in the Java Sea (1991)
Hasil tangkapan ikan oleh pukat cincin di laut Jawa (1991)

Purse seiners	Number of gears	Total catch (tons)	Catch by gear (tons)
Small	1,760	63,200	36
Large	470	126,900	270
Total	2,230	190,100	

(Source: Potier and Sadhotomo, 1995)

The value of the catch in 1991, for the major species traded (mackerels, scads, trevallies and sardinellas) in Pekalongan, can be estimated in the following terms :

- The turnover of the large seiners, derived from the average current price of 600 rupiahs per kilo, should be approximately of 76 billion rupiahs for the whole fleet and 162 million rupiahs per boat.
- The small seiners, which land fish of better quality, obtain prices about 50% to even 100% higher than those of the large seiners. By assessing an average price of 900 rupiahs/kilo, the turnover of the small seiners should be approximately of 57 billion rupiahs for the whole fleet and 32 million rupiahs per boat.

In terms of earnings (20% of the value of the boat's catch) to the sharing system only, these results mean an approximate basic income of 380,000 rupiahs for the individual crew of small seiners and of 930,000 rupiahs for the larger ones. This is to be compared with the per capita income of 1,048,000 rupiahs for the Indonesian population at large in 1991, and more relevant with the net income of 966,000 rupiahs for a Javanese farmer, cultivating one hectare of paddy (Statistical Yearbook of Indonesia, 1994).

In 1991, the population of full time purse seiners's fishermen in the Java Sea (by using the average of 35 men for the larger units, and 17 men for the smaller ones) can be estimated at 45,000 individuals, 14,000 manning the large purse seiners and 31,000 working on the small units.

The economic performances of the Java Sea's large seiners

Fishing success and price constraints

The steady increase in the landings accompanies a significant increase in the vessels' turnover. With an Indonesian inflation rate of approximately 10% per year, the tendency is therefore towards the decline of the constant price of fish (Fig. 1)

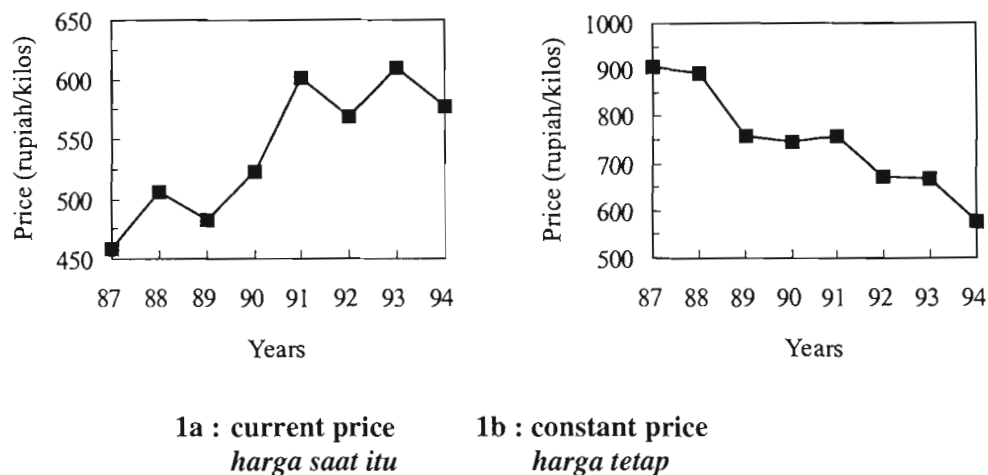


Figure 1 : Average price of the pelagic species in Pekalongan
Rata-rata harga jenis ikan pelagis di Pekalongan

Between 1987 and 1994, the average price of the main pelagic species in Pekalongan diminished by 33%, from 900 to 600 constant rupiahs/kilo¹, whereas the current price was progressing at the same rate, from 450 to 600 current rupiahs/kilo. This trend corresponds to usual evolution, when a significant change in the production scale occurs.

In the short term, it should be also interpreted as a warning sign given by the market, as most of the Indonesian revenues remain very low. The consumers may prefer to reduce the part of fish in their food diet and/or to turn to less expensive animal proteins (chicken) or even to vegetal substitutes (*tahu*²). All our interviews with the professionals indicate that there could exist a ceiling price, above which the poor households would limit their fish consumption. Unfortunately it is not possible to validate this hypothesis because of the lack of consumers' behaviour inquiries.

If we consider the long run, the hypothesis of progression in the fish demand appears likely, because the gross national product (GNP) shows a steady 6-7% growth rate per year.

Despite the price decline, there has been a significant raise of the income earned by both fishermen and boat owners. The increase in scale of the production (Tab. 3; Fig. 2) accounts for these two simultaneous and opposite phenomena. Yet, it is also significant to pay attention to seasonal variations that indeed highlight the economic risk faced by the fisheries of the Java Sea.

¹ Current prices are deflated by the consumer price index (at December 1994 constant prices) for food in Semarang, the capital of the province of Central Java.

² Soy paste, that is a highly rated dish in Indonesia.

Table 3 : Catch by large seiners of Central Java (total length ≥ 25 m)
Hasil tangkapan pukat cincin besar di Jawa Tengah (panjang keseluruhan ≥ 25 m)

Year	Number of boats	Total catch		Catch per unit	
		tons	index	tons	index
1987	495	75,700	100	153	100
1988	413	61,500	81	149	97
1989	355	83,500	110	235	154
1990	338	86,800	115	257	168
1991	326	109,000	144	334	218
1992	360	125,300	166	348	227
1993	378	118,500	156	313	205
1994	379	144,800	191	382	250

Number of purse seiners registered which achieved at least one trip during that year.
 (Source: PELFISH, statistical collection)

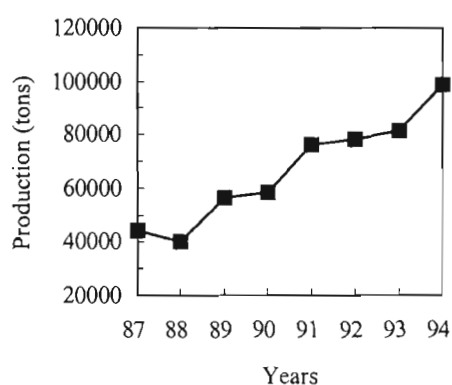


Figure 2 : Landings of the major pelagic species in Pekalongan
Produksi jenis ikan pelagis utama yang didaratkan di Pekalongan (layang, banyar, lemuru, bentong juwi, tongkol)

A profitability based on the productivity gains

The growth dynamic of the large seiners' flotilla resulted in a quasi doubling of catches in less than 10 years (Tab. 3). The productivity gains were even higher, while the average production per boat was multiplied by two and half during that period. These have resulted in an improvement of the boats' profitability, despite the decline of the constant price. The calculation on a one boat case study (Tab. 4) gets the measure of the phenomenon, even though broad deviations from the average are common in this flotilla.

Table 4 : Apparent³ average income of a large seiners' owner in 1994 compared to 1987 (constant price Pekalongan 1994)

Pendapatan rata-rata dari seorang pemilik pukat cincin besar dalam tahun 1994 dibandingkan dengan tahun 1987 (harga tetap di Pekalongan 1994)

	1987	1994
fish landings (tons)	153	339
fish price (rupiahs/kilo)	900	600
turnover (million rupiahs)	138	203
owner's share (20% of the turnover)	28	41 (+46%)

³ The owner's effective income is significantly higher, since he takes substantial inclusive deductions before to share fifty-fifty with crew the so called net revenue.

In brief, the increase in size of the large seiners is justified by the excellent results they obtain. In fact, the risks have much increased since the current amount of the investment can reach up to 500 million rupiahs for the biggest boats. Consequently, only the richest owners are able to risk capital of such an amount. They also have to borrow to the banks a bigger part of the investment, with very expansive real interest rates of about 10 to 13%.

Otherwise, the successful alternative of building medium seiners, for which the investment costs are much lower, could incite the owners to return to more wisdom and to stop the race to gigantism.

Characteristics of the growth of the Javanese large seiners, since 1980

The period is characterised by the soaring volume of catches as well as by the soaring number of boats launched. The results of the large purse seiners based in Tegal, Pekalongan and Juwana, show this strong growth pattern (Tab. 5).

Table 5 : Production of the large seiners for the three main harbours
Produksi pukat cincin besar pada tiga pelabuhan utama

Harbours	1980		1989		1994	
	Units	Tons	Units	Tons	Units	Tons
Tegal	57	9,100	55	12,600	36	17,500
Pekalongan	222	24,300	234	48,200	279	70,200
Juwana	-	-	37	22,200	55	55,000

(Source : PELFISH, statistical collection)

The sharp growth of the catches can be explained by the improved productivity of boats, which has tripled during the past fifteen years, from 120 tons to 339 tons per unit and per year. In addition, the creation of a modern fishing port in Juwana has facilitated the eastward shift of the fishing sites used by large purse seiners.

The first years of the current decade constitute a turning point. The increase in scale, typical of the preceding period, opens the way to even heavier investments and to the adoption of technological innovations by the leading owners. Added to the adoption of modern navigational aids and fishing gears or to the attraction of the most qualified fishermen, this change transforms drastically the profile of the activity. It modifies relations not only between owners and crews, but also relations within each one of these two groups.

Yet, discontinuities in the growth rate of catches represent warnings of the enhanced risks associated with the race toward ever larger bats. Between 1986 and 1989, drops in the volume of *layang* had been compensated for by increases in the tonnage's of other, albeit, less valued such as *lemuru*.

Meanwhile, even though the dynamics at work have facilitated the opening of new jobs and the rising of standards of life within the fishery, the likelihood of a stagnation or even of a reversal in the growth rate is looming large.

The recent years (1992-1994) are characterised by a variety of technological and social innovations. Those boat owners, who participate in larger holdings, diversify their activities, and display a variety of managerial skills, should adjust best to the new constraints. The same dynamics, and notably the race to ever larger units, jeopardise nevertheless the chances of survival of the small scale owners, since they do not enjoy adequate resources to resist the ensuing pressures.

CONCLUSION

The last period may be characterised by the shift of an artisanal management by fishermen owning their means of production to a system managed by investors, who are endowed with significant financial resources.

Using the trends highlighted here, it is possible to draw several hypotheses as to the future. The favourable conjuncture has generated sufficient profits to maintain a short payback period from two to four years. The high returns obtained accentuate competition and increase the risks that the leading owners are willing to take. At the same time, one can suspect that these owners anticipate the intervention of regulations limiting access to the activity.

This scenario is neither certain nor exclusive. To start with, a number of owners have already divert some of their resources toward other sectors, for example in the catch of oceanic tunas. Their “upward” move would leave a sufficient leeway to facilitate the sharing of the ensuing opportunities, either through agreements among surviving operators, or as a result of a decision imposed by the authorities.

Meanwhile, all the actors diversify their risks by using various gears (seines, but also gill nets and long lines). Since the demersal species offer a high added value and remain less exploited, it looks as if there are still opportunities for modernising fisheries without jeopardising the social balance of the communities involved.

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