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Socioeconomic Characteristics of Payang Seine (Lampara) and Driftnet Fisheries in West Sumatra, Indonesia

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Abstract

A proportionate random sample survey of ten percent of the driftnet and *payang* seine fishers in West Sumatra was carried out in 1998. A total of 45 driftnet and 66 *lampara* fishers were interviewed to obtain socioeconomic data on the fisheries. About 40 percent of the driftnet and 76 percent of the *lampara* fishers owned and operated their fishing vessels and gears indicating a high level of ownership of fishing assets by these small scale fishers. The *lampara* catches consisted mainly of eastern little tuna, skipjack tuna, yellow fin tuna and mackerel, while the driftnets caught mainly Spanish mackerel, Indian mackerel, eastern little tuna and scad.

Introduction

This article describes the West Sumatra fishery sector, and presents some socioeconomic characteristics of two of the most important fisheries of West Sumatra in Indonesia, the *payang* seine (*lampara*) and driftnet fisheries.

West Sumatra Fishery Sector

West Sumatra is one of the 27 provinces in Indonesia. It is located on the west coast of the island of Sumatra between latitude 0° 54' north and 3° 30' south and between longitude 98° 36' and 101° 53' east. The province has a coastline of 450 km with a total sea area including the Exclusive Economic Zone (EEZ) waters of 138 750 km^2 (Fig. 1).

The province of West Sumatra had a population of 4.4 million in 1996 and about 3.41% or 149,668 people were directly engaged in the fishery sector. The majority of the fishers in West Sumatra in 1996 were fish farmers (54%), about 22% were marine fishers while the remainder were inland capture fishers. The total number of fishers in West Sumatra increased between 1990 and 1995 but began to decline in 1996 (Table 1). This decrease in 1996 was due to the decline in the number of fish farmers and inland capture fishers. However, the number of marine fishers increased between 1990 and 1996.

The estimated maximum sustainable yield of the marine fishery in West Sumatra, based on a 1991 survey was 538 457 tonnes/ year but only 37% was being exploited (Directorate General of Fisheries, 1994). The marine fish landing which constitutes a large proportion (more than 74%, see Table 2) of total fish production in West Sumatra, increased from 53 029 tonnes in 1990 to 80 184 tonnes in 1996.

In 1996, there were 6 796 fishing vessels operating in the coastal areas of West Sumatra, of which 4 253 were non-powered while 2 543 were powered by either outboard or inboard engines. Most of the fishing vessels were small in size (for example, majority of inboard

powered vessels are less than 30 gross tonnage). The dominant fishing gears used in West Sumatra in 1996 (Fig. 2) comprised seines (Danish seine and *payang* seine), drift gillnet, liftnet, and troll-line. These fishing gears, except troll-line were primarily used by small-scale fishers. The marine fish landings increased for all types of seine nets (except Danish-seine) and gillnet (except shrimp gillnet) from 1990 to 1996 (Fig. 3). Marine fish landing by *payang* seine (*lampara*) increased from 1990, reached its peak in 1993, then decreased until 1995 but increased again in 1996. Similar trends were observed for Danish seine, beach seine, and drift nets.

Socioeconomic Characteristics of the Driftnet and *Lampara* Fisheries

Information on the socio-economic characteristics of the driftnet and *lampara* fisheries in West Sumatra was obtained from a sample survey conducted by Linda Waty Zen in 1998. A proportionate random sample of 10% of the driftnet and *lampara* fishers population in West Sumatra was selected. This resulted in 45 driftnet and 66 *lampara* fishers being selected. However, data from 10 *lampara* fishers was not analyzed because the information provided by them was incomplete.

The driftnet and *lampara* are fishing gears primarily used by small-scale fishers operating within a few miles from the shore. For the driftnet, the average distance from shore to the fishing grounds was about 18 km. Each fishing trip lasted on average 13 hours and the average number of trips made were 276 per year. For the *lampara* fishers, their fishing grounds was about 13 km from shore, and the number of trips made per year was 218, each lasting on average about 9 hours.

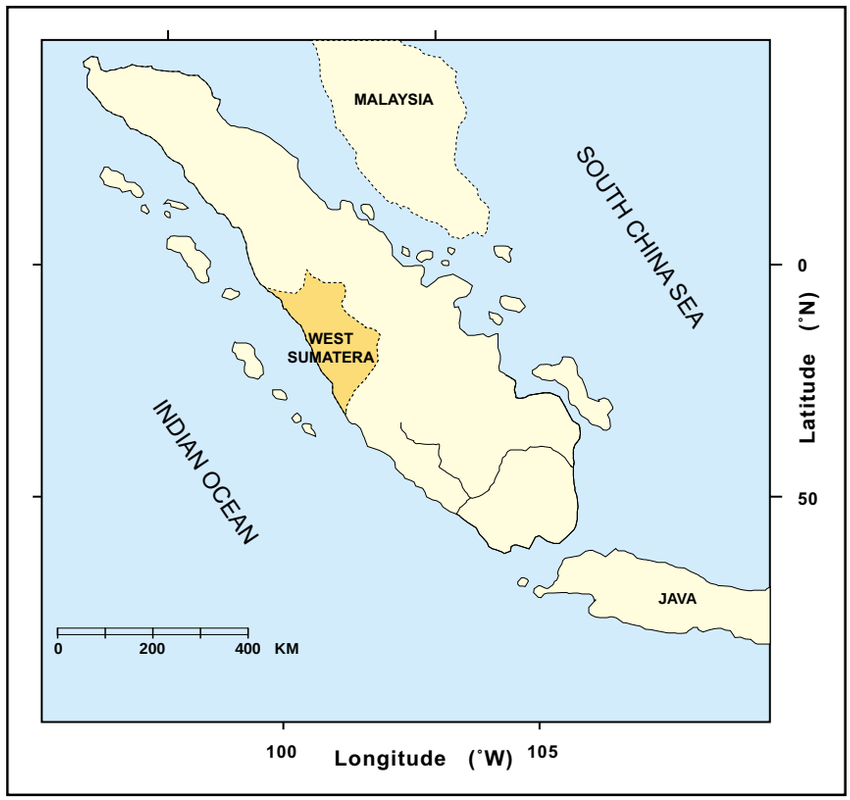

Table 1. Number of fishers in West Sumatra, 1990 - 1996.

Year	Fish farmer	Inland fishers	Marine fishers	Total fishers
1990	85,726	41,706	28,446	155,878
	(54.99)	(26.76)	(18.25)	(100.00)
1991	87,277	40,863	29,587	157,727
	(55.33)	(25.91)	(18.76)	(100.00)
1992	89,193	41,430	29,587	160,210
	(55.67)	(25.86)	(18.47)	(100.00)
1993	88,259	41,500	30,600	160,359
	(55.04)	(25.88)	(19.08)	(100.00)
1994	94,218	40,728	31,804	166,750
	(56.50)	(24.43)	(19.07)	(100.00)
1995	94,695	40,451	31,895	167,131
	(56.66)	(24.26)	(19.08)	(100.00)
1996	81,372	35,576	32,720	149,668
	(54.37)	(23.77)	(21.86)	(100.00)

Note : Figures in parentheses indicate percentages.
Source : West Sumatra Fisheries Extension Services, various issues.

Fishing Assets

In terms of the ownership of fishing assets, it was found that about 40% of driftnet and 76% of *lampara* fishers owned and operated their fishing vessels and gears, while the remainder were non-owner operators. A small proportion of the non-owner operator (3% and 23% respectively for driftnet and *lampara* fishers) had kinship relationships with the owners of the fishing assets.

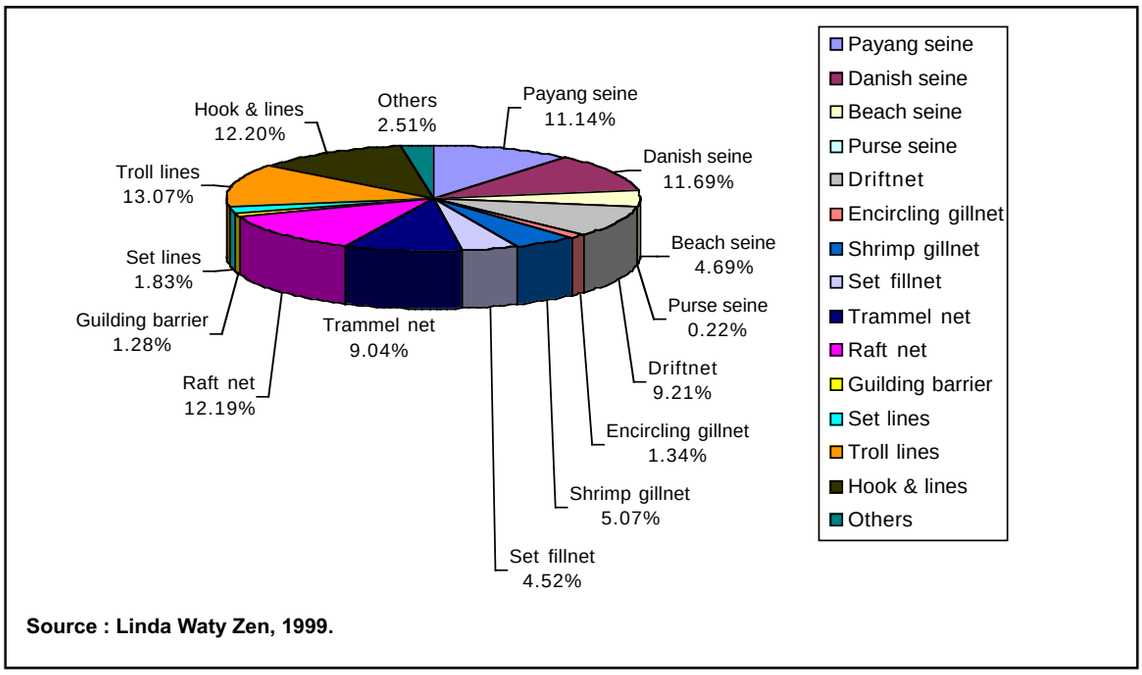

Fig.2. Fishing gears used in West Sumatra, 1996.

All fishing vessels used by the driftnet and *lampara* fishers were small in size. The average length of driftnet vessels was 11.78 m with a range from 7 m to 13 m. For the *lampara* vessels the average length was 11.08 m with a range from 6.5 m to 15 m. The driftnet vessels weighed 6.48 gross tonnage (GT) on average, with a maximum and minimum weight of 8.0 GT and 2.0 GT respectively. The average weight of *lampara* vessels was 2.8 GT, ranging from a maximum of 6.0 GT to a minimum of 1.5 GT. The average age of driftnet vessels was 6 years while that for *lampara* vessels was 7 years. As a comparison, the driftnet vessels were bigger in size and were newer than the *lampara* vessels. About 93% of the *lampara* vessels were financed by owners' savings while only 32% of the driftnet vessels were purchased through this source of financing (Table 3). The major source of financing for driftnet vessels (63%) was through a government credit scheme.

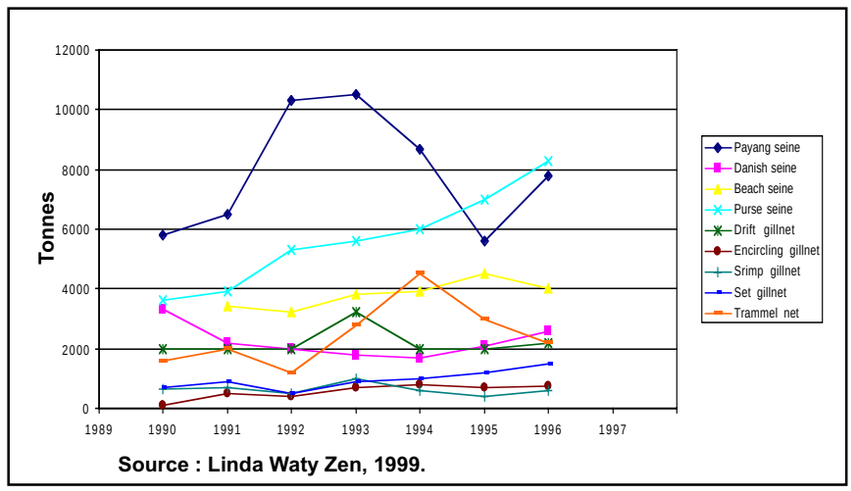

Fig.3. Annual marine fish landings of seine and gillnet in West Sumatra, 1990-1996.

In contrast to the vessel size, *lampara* vessels have larger engine capacity (averaging 29.11 horsepower) compared to the driftnet vessels (averaging 23.29 hp). This is because additional power is required to drag the *lampara* net during fishing operation. All the engines for the *lampara* vessels were new at the time of purchase and the majority (93%) were financed from owners' savings. For driftnet vessels, about 76% of the engines were new at the time of purchase and the main source of financing was the government credit scheme (63%, see Table 3).

The length of the net used by driftnet fishers in West Sumatra varies from 1 800 m to 7 200 m, with an average length of 3 752 m. The average mesh size of these nets was 8.81 cm. On the other hand, the

length of *lampara* nets was much shorter, ranging from 100 m to 400 m with an average of 204.27 m. The mesh size for *lampara* nets differ at the wings and the cod-end, with the wings having larger mesh sizes. The major source of financing for the purchase of driftnet and *lampara* net was from owners' savings (100% and 93% respectively, see Table 3). The average age of the driftnet used was 6.02 years compared to that of the *lampara* nets which was 7.65 years.

Fishing Crew

The number of fishing crew employed on board the driftnet vessels ranges from 3 to 6 persons with an average of 4 persons per vessel. On the other hand, the *lampara* vessels employed more crew members on board, ranging from 4 to 12 persons with an average of 8 crew members per vessel.

The fishing crew can be categorized according to their job responsibilities onboard the vessels. These categories include the captain (locally known as "*tukang lomba*"), the net specialist (locally known as "*pawing*"), the engine man and ordinary crew. From the survey, it was found that the majority of the driftnet fishers interviewed were crew members while the majority of *lampara* fishers interviewed were vessel captains (38% and 56% respectively, see Table 4).

Major Fish Species Caught

The main target species for both the driftnet and *lampara* vessels were the small pelagic fishes. The percentage of major species caught by drift net and *lampara* during several sampled trips is shown in Table 5. The *lampara* catches consisted mainly of eastern little tuna, skipjack tuna, yellowfin tuna and mackerel, while driftnet caught mainly Spanish mackerel, Indian mackerel, eastern little tuna and scad.

Table 2. Fisheries production (tonnes) in West Sumatra, 1990 - 1996.

Year	Aquaculture	Inland capture	Marine capture	Total catch
1990	11,149	4,952	53,029	69,130
	(16.13)	(7.16)	(76.71)	(100.00)
1991	11,330	5,206	55,412	71,948
	(15.75)	(7.23)	(77.02)	(100.00)
1992	12,757	5,460	59,790	78,006
	(16.35)	(7.00)	(76.65)	(100.00)
1993	14,663	5,915	65,654	86,233
	(17.00)	(6.86)	(76.14)	(100.00)
1994	15,398	6,187	70,853	92,438
	(16.66)	(6.69)	(76.65)	(100.00)
1995	15,725	6,315	73,777	95,818
	(16.41)	(6.59)	(77.00)	(100.00)
1996	20,350	6,593	80,184	107,127
	(19.00)	(6.15)	(74.85)	(100.00)

Note : Figures in parentheses indicate percentages.
Source : West Sumatra Fisheries Extension Services, various issues.

Table 3. Sources of financing for fishing assets owned by respondents for driftnet and* Lampara *in West Sumatra.

Sources of financing	Driftnet		*Lampara*	
	No.	%	No.	%
Vessel				
Own savings	6	31.58	42	93.33
Government credit schemes	12	63.16	0	0.00
Inheritance/gift	1	5.26	3	6.67
Engine				
Own savings	6	31.58	42	93.33
Government credit schemes	12	63.16	0	0.00
Inheritance/gift	1	5.26	3	6.67
Fishing net				
Own savings	16	100.00	42	93.33
Government credit schemes	0	0.00	0	0.00
Inheritance/gift	0	0.00	3	6.67

Source : Linda Waty Zen, 1999.

Table 4. Number and percentage of respondents with various categories of job responsibility for driftnet and* Lampara *in West Sumatra.

Job responsibility	Driftnet		*Lampara*	
	No.	%	No.	%
Captain	14	31.11	31	56.35
Net specialist	13	28.89	8	14.55
Engine man	1	2.22	8	14.55
Crew	17	37.78	8	14.55
Total	45	100.00	55	100.00

Source : Linda Waty Zen, 1999.

Educational Attainment of Fishers

The level of educational attainment of the fishers influences their management and technological adoption capabilities. A large proportion (60%) of the sampled driftnet and *lampara* fishers attended schools only up to the elementary level (Table 6). The proportion of those who have attended junior high school was 33% and 20%, respectively, for the driftnet and *lampara* fishers.

Household Size and Sources of Household Income

The average size of the driftnet and *lampara* fishers' households in West Sumatra was 3.56 and 3.87 persons, respectively. About 93% and 90% respectively of the driftnet and *lampara* fishers' households were single income earner households. Fishing is the main source of income for about 80% and 85% respectively of the driftnet and *lampara* fishers' households. Other sources of household income were limited and included operating sundry stores and fish processing.

Fishing income in West Sumatra was calculated based on a system of sharing the net proceeds (i.e. total receipts minus the operating costs of fuel, food, ice etc.) from sales of the catch. The share systems for the driftnet and *lampara* fisheries were similar. Generally, the owner of the fishing assets shared 50% of the net proceeds. This share represented the return on owner investment in the fishing assets and maintenance costs of the fishing assets. The remaining 50% of the net proceeds was divided among the fishing crew. The number of shares varied according to the number of crew members onboard the fishing vessel and the job responsibility of each crew member. Generally, the net specialist received two shares, the captain and engine man received one and a half shares each, and ordinary crew members received one share each.

Table 5. Percentage of major species of fish caught by driftnet and* Lampara *in West Sumatra.

Species	Driftnet	*Lampara*
Yellowfin tuna	-	20.51
Eastern little tuna	21.24	35.90
Skipjack tuna	-	35.26
Indian mackerel	23.01	8.33
Spanish mackerel	39.82	-
Scad	15.93	-

Source : Linda Waty Zen, 1999.

Table 6. Level of educational attainment of driftnet and Lampara respondents in West Sumatra.

Educational attainment	Driftnet		*Lampara*	
	No.	%	No.	%
Elementary school	27	60.0	33	60.0
Junior high school	15	33.3	11	20.0
Senior high school	3	6.7	10	18.2
College/University	0	0.0	1	1.8
Total	45	100.0	55	100.0

Source : Linda Waty Zen, 1999.

Conclusion

The fisheries in West Sumatra are mainly small-scale and the dominant gear used consists of driftnet and *lampara*. Basically, the socio-economic characteristics of the driftnet and *lampara* fishers in West Sumatra are quite similar. However, they differ in terms of the ownership and characteristics of their fishing assets such as fishing vessels, engines and gears, as well as in their fishing operations.

References

Directorate General of Fisheries. 1994. Fisheries Statistics of Indonesia 1993. Departemen Pertanian Jakarta.

West Sumatra Fisheries Extension Services (Dinas Perikanan Sumatra Barat). Various issues. Fisheries Statistics of West Sumatry (Statistik Perikanan Sumatra Barat). Padang, Indonesia.

Zen, L.W. 1999. Technical Efficiency of the Driftnet and *Payang* Seine (*Lampara*) Fisheries of West Sumatra, Indonesia. Unpublished Master of Science dissertation. Universiti Putra Malaysia, Serdang, Selangor, Malaysia.

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