

Impact on the Sardine Industries: Closed Fishing Season Policy, Zamboanga Peninsula, The Philippines

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Received May 15, 2017; revised and accepted December 26, 2017

Abstract: Since the Philippines is archipelagic with a lot of major fishing grounds of which many are considered ecologically threatened, a closed fishing season is invariably an expected recourse. The Department of Agriculture and the Department of the Interior and Local Government enforced a three-month fishing ban in 2011-2014 in Zamboanga Peninsula, intended to conserve the sardine species and sustain the operations of its industries. Since a closed fishing season entails not only benefits but also costs, its expiration in 2014 raised calls to empirically validate its outcome.

Premised on the meagre information on the impact of closed fishing season and fishing regulations in the country—this study assesses the effects of the Closed Fishing Season Policy on the sardine fishing and processing sectors by looking into the variation in sardine catch, sardine production and level of employment. Utilising a survey research design, the article contends that the fishing regulation had a favourable impact on the sardine industries; the commercial and municipal fishers grew their sardine catch, and the canning and bottling processors benefited from increasing production and rising number of workers. Sardine catch and production are expected to surpass the previous peaks in volume in the coming years, and the number of workers exceeded the previous highest level prior to the enactment of the closed fishing season. The findings debunk the zero-sum expectations and offer a promising prospect for justifying the continuation of the fishing regulation, the institutionalisation of the Policy, and its adoption in other parts of the country.

Key words: Closed fishing season, Philippines, sardines, sardine industry, Zamboanga Peninsula.

Introduction

Sardine (*sardinella* spp) is a key marine fishery resources of the country and the sardine industries are a major sector of the Philippine economy. Zamboanga Peninsula is the capital of sardine production, as the region contributes about 70 percent of the total output of the country in the last decade (PSA, 2015; see Figure 1 and Table 1). Its two constituent cities—Zamboanga city and Dipolog city (in Zamboanga Del Norte)—are

recognised as the centre of canned sardine processors and bottled sardine processors, respectively. The sardine industries in Zamboanga Peninsula comprise 12 canning factories, 25 active bottled sardine processors, 10 allied fish processors, four tin can manufacturers, 20 commercial fishing operators, 2,046 licensed municipal fishermen and 588 licensed vessels (DTI-9, 2013, DTI, 2014). The sardine industries employ about 35,000 workers per year (excluding those employed in ancillary industries), disburses about Php 245 million worth of

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Table 1: Total production volume of sardine by region (in metric tons) 2006-2015 (PSA, 2015)

<i>Region</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
Philippines	209,644	206,910	235,670	324,128	334,030	232,907	246,057	229,234	256,096	289,791
NCR	3,612	4,326	5,577	3,414	5,353	2,789	6,282	7,765	13,673	21,678
Calabarzon	14,329	18,272	13,536	13,240	14,016	8,784	6,639	2,875	3,918	7,115
Mimaropa	18,110	16,454	15,301	14,961	14,514	13,054	13,379	12,002	10,314	9,988
Bicol Region	8,519	11,478	12,995	14,021	15,730	16,802	17,997	15,254	13,463	11,436
Western Visayas	8,553	9,636	8,777	8,337	8,417	6,730	8,369	5,809	6,196	6,720
Eastern Visayas	10,246	11,355	13,267	11,300	10,804	10,686	8,383	5,599	4,539	4,945
Zamboanga Peninsula	112,057	98,517	126,256	222,271	223,255	132,600	143,319	135,552	161,824	181,918
Northern Mindanao	9,921	10,030	12,396	12,190	14,864	14,823	17,613	19,449	18,953	21,298
Caraga	3,865	3,694	4,809	4,425	5,004	5,080	5,118	4,694	4,475	4,637
ARMM	9,741	8,634	9,356	11,077	12,739	12,831	12,136	12,052	12,429	13,323

payroll per month (Valerio, 2015), and has four industry associations: In-glass Sardines of Dipolog Association (ISDA), Zamboanga City Cannery Association (ZCCA), Industrial Group of Zamboanga Inc. (IGZI), and Southern Philippines Association of Deep Sea Fishing (SOPHIL).

Sardine production in Zamboanga Peninsula has been increasing over the years (see Table 1). But in 2011, the volume of sardine production in the region took a sudden drop from 223,225 (in 2010) to 132,600 metric tons, resulting in a sharp decrease of 41 percent or 90,625 metric tons (PSA, 2015, BAS, 2014). This unexpected decline raised apprehension among stakeholders on the sustainability of sardine species in the fishing grounds of Zamboanga Peninsula. The sardine industries and the Bureau of Fisheries and Aquatic Resources (BFAR) (i.e., the principal agency looking after fisheries and aquatic resources in the country) were prompted to seriously assess the situation. As a countermeasure, the Joint Department of Agriculture-Department of the Interior and Local Government (DA-DILG) Administrative Order No. 1 series of 2011 (JAO-01 s.2011) or the so-called Closed Fishing Season Policy for Sardines in Zamboanga Peninsula was promulgated on 23 Aug 2011.

The fishing regulation is a globally recognised conservation measure for preserving fisheries resources, particularly in controlling overfishing and protecting the species during spawning season (see FAO, 1997; Sadovy et al., 2005; Arendse et al., 2007; Hargraves, 2011; Cohen et al., 2013; Chimba and Musuka, 2014). The Closed Fishing Season Policy is also a sanctioned fishing regulation under the Philippine Fisheries Code of 1998 or Republic Act [RA] 8550 (see Section 9), the principal law governing fisheries and aquatic resources

in the country. A seasonal fishing ban has been put into practice in the Philippines by BFAR since 1989 in the Visayan Sea and adjoining waters covering commercial fishing for sardines, mackerels and herrings via Fisheries Administrative Order (FAO) No. 167.

The Closed Fishing Season Policy established a conservation area on the fishing grounds of Zamboanga Peninsula where a non-fishing zone for harvesting sardines and other related species was enforced for three months per year for a period of three years starting December 2011 (BFAR, 2011a; BFAR, 2011b). It covers an area of 13,987 square kilometres comprising portions of East Sulu Sea, Basilan Strait and Sibuguey Bay, and encompassing the western municipal/national waters of Zamboanga Del Norte, the waters bordering south and eastern waters of Zamboanga city and southern part of Zamboanga Sibugay (see Figures 2 and 3). Before the fishing regulation's expiration in March 2014, DA-DILG Administrative Order No. 1 series of 2011 was promptly supplanted by BFAR Administrative Order Circular No. 255 Series of 2014 (BAC No. 255 s. 2014) extending its effectivity and expanding the coverage area to 22,260.36 square kilometres by including Sulu and Tawi-Tawi. This move is based on preliminary assessments which suggest that the fishing regulation had beneficial impact on sardines and other fish species of Zamboanga Peninsula.

The Closed Fishing Season Policy is intended to protect the species during spawning season, arrest the dwindling fish catch, and sustain the operations of the sardine industries in Zamboanga Peninsula (Brillo et al., 2016). In principle, the fishing regulation offers biological, ecological and industrial benefits (Campos et al., 2003; Mardle et al., 2004; Failler and Pan, 2007); it ensures the conservation of the sardine species and

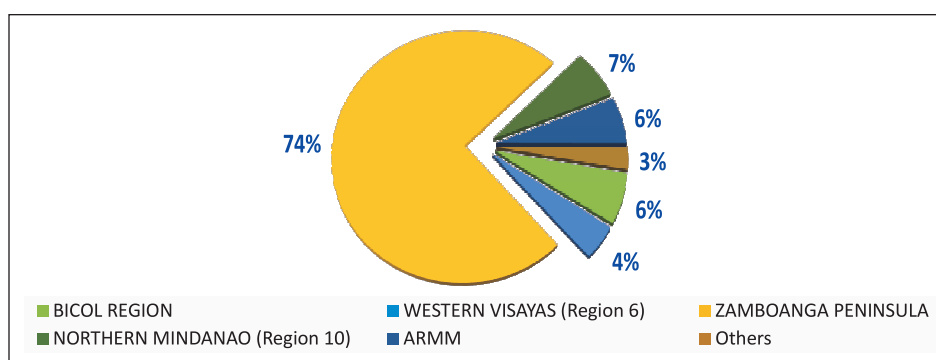


Figure 1: Top sardine producing regions in the Philippines. (PSA, 2015)



Figure 2: Zamboanga Peninsula. (Google Maps, 2016)

the viability of the whole sardine sector. But a closed fishing season entails not only benefits but costs since the fishing ban means reduced sardines catch and scaled down operations of the industries for three months per

year. Under this benefits-costs equation, the expiration of the maiden Closed Fishing Season Policy in 2014 raised calls for validating its impact—that is empirically verifying the consequence and outcome of the fishing

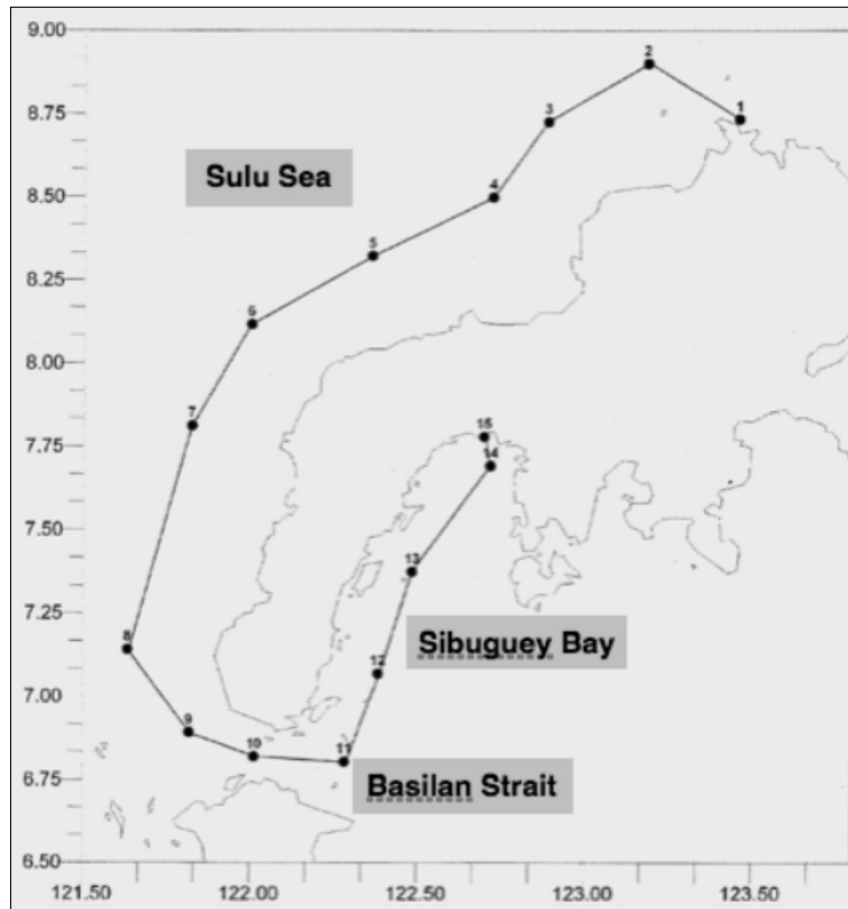


Figure 3: Coverage area of the Closed Fishing Season Policy for sardines in Zamboanga Peninsula.

regulation, particularly its effect on the economic well-being of the sardine businesses and workers in Zamboanga Peninsula. This issue is underscored by the fact that the empirical evidence (for or against the fishing regulation) is lacking, as only mostly anecdotal attestations currently exist.

The predicament is exacerbated by the extant deficiency of literature in closed fishing season regulations in the country, particularly on the aspect of measuring impacts (e.g., Sanchirico, 2000; Béné and Neiland, 2006; Evans et al., 2011; Attrill et al., 2012). Thus, predicated on the paucity of empirical studies on the impact of closed fishing season and fishing regulations in the country—this study looks into the effects of the Closed Fishing Season Policy from 2011 to 2014 on the major sardine industries in Zamboanga Peninsula—the sardine processing industry (i.e., canning and bottling processors) and the sardine fishing industry (i.e., commercial and municipal operators). Specifically, it assesses the impact of the fishing regulation by examining the variation in the volume of sardine production and the level of employment in

the sardine canning and bottling companies, and the volume of sardine catch in the sardine commercial and municipal fishing operators.

Methodology and Methods

The study employs a survey research design in looking into the effects of the Closed Fishing Season Policy on the sardine industries of Zamboanga Peninsula. The sardine industries are defined as comprising canning factories, bottling companies, municipal and commercial fishing operators. In the survey, 12 canning processors, 20 bottling processors and 14 municipal/commercial fishing operators were evaluated based on the changes in the volume of sardine production, the level of employment, and volume of sardine catch. The workers in the industries were also surveyed; in particular, 30 canning workers, 30 bottling workers and 30 commercial fishing crews were interviewed and identified using tracer methodology. The survey was supplemented by key informant interviews and documentary sources. This step was taken to provide

sufficient insights on the sardine processing industry and to better understand the surrounding context of the fishing regulation. The interviewees comprise the key representatives from the sardine industry associations in Zamboanga Peninsula (i.e., SOPHIL for the fishing operators, IGZI for the canning processors, and ISDA for the bottling processors) and the government agencies involved in the Closed Fishing Season Policy (i.e., BFAR and the local government units). The documentary data mostly came from PSA, BFAR, Maritime Industry Authority (MARINA), Department of Trade and Industry (DTI) and Department of Labour and Employment (DOLE), SOPHIL and Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD). The results of the study are outlined as follows: (1) the sardine processing and fishing industries; (2) impact on the volume of sardine catch; (3) impact on the volume of sardine production; (4) effect on the level of employment; and (5) conclusion and implications.

Results and Discussion

The Sardine Processing and Fishing Industries

The sardine canning and bottling companies of Zamboanga Peninsula constitute the sardine processing sector which is currently a PhP 3-billion industry and utilise about 80 percent of the total sardines caught per year in the region (PSA, 2015). Zamboanga city is the home of 12 big canning factories, namely: (1) Aquatic Food Manufacturing Corporation; (2) Permex Producer and Exporter Corporation; (3) Big Fish Food Corporation (formerly Mar Fishing Corporation which is the first canning factory in Zamboanga City); (4) Century Pacific Food Corporation (formerly Columbus Seafoods Corporation); (5) Goldstar Seafoods Manufacturing Corporation; (6) Ayala Seafoods Corporation; (7) Mega Fishing Corporation; (8) Southwest Asian Canning Corporation (formerly Asahi Food Manufacturing Incorporated); (9) Universal Canning Corporation; (10) Seacoast Top Choice Food Corporation; (11) Atlantic Food Corporation; and (12) Fortune Group Corporation. The main industry association is IGZI which counts as its members the four biggest canning processors (in terms of average monthly production volume: Permex Producer and Export Corporation [100,000 cases], Universal Canning Corporation [100,000 cases], Ayala Seafoods Corporation [110,000 cases] and Century Pacific Food Corporation [100,000 cases]). All in all, the canning companies have a monthly production

volume of 707,700 cases and employing 9,537 workers (see Table 2). Under normal operations, the volume of sardine production is about 4000-5000 cases at 100 cans per case or an equivalent of 400,000-500,000 cans per day. On an average, the canning production utilises around 14 million metric tons of fresh sardines a year and operates in two 12-hour cycles with about 500 workers per shift.

Zamboanga Del Norte is the home of bottling sardine processors that are mostly medium-sized and/or home-based companies or cooperatives. Among the more well-known sardine bottling producers are Montaña Foods Corporation, Mendoza Industries, Alenter Foods Incorporated, Zaragoza Foods Corporation, Tito Mike's Food Company and Tita Rosa Food Products. The main industry association is ISDA where 13 bottling processors are members, including Zaragoza Foods Corporation which is the biggest with an average monthly production volume of 57,600 (kilograms) and an average of 90 workers. On the whole, the bottling companies have a monthly production volume of 327,600 kilograms and employing 527 workers (see Table 3).

The municipal fishing operators and commercial fishing operators comprise the sardine fishing sector. In the Philippines, the two fishing operators are distinguished by the boat capacity and fishing ground. The municipal fishers use fishing vessels of three gross tons and below and operate within 15 kilometres of the municipal waters; while the commercial fishers use fishing vessels above three gross tons and operate outside 15 kilometres of the municipal waters (see RA 8550). Typically, the municipal operators supply the bottling sardine processors and the commercial operators supply the canning sardine processors. The municipal fishers contribute 12 percent while the commercial fishers account for the lion's share or 88 percent of the total volume of sardine catch in Zamboanga Peninsula. The sardine catch of municipal fishers mostly goes to Zamboanga Del Norte making up 64 percent while the sardine catch of commercial fishers is heavily concentrated to Zamboanga city with 92 percent (PSA, 2015). SOPHIL is the main industry association of the sardine fishing industry where fourteen commercial fishing companies are members. In aggregate, the fishing companies employ around 10,000 workers and have a total of 50 purse seiners (i.e., the mother vessel carrying the fish-catching net) which supply about 80-90 percent of the daily fresh sardine requirements of the 12 canneries in Zamboanga city.

Table 2: Profile of sardine canning processors in Zamboanga city (DTI, 2014; Survey, 2015)

<i>Company</i>	<i>Product lines</i>	<i>Average monthly production volume (in cases)</i>	<i>Average no. of workers (2015)</i>
Aquatic Food Manufacturing Corporation	Canned Tuna / Sardines	40,000	432
Permex Producer and Exporter Corporation	Canned Tuna / Sardines	100,000	1,183
Big Fish Food Corporation	Canned Tuna / Sardines	31,200	746
Century Pacific Food Corporation (formerly Columbus Seafoods Corporation)	Canned Sardines	100,000	1,000
Gold Star Seafoods Manufacturing Corporation	Canned Sardines	22,500	1,016
Ayala Seafoods Corporation	Canned Sardines	110,000	859
Mega Fishing Corporation	Canned Sardines	110,000	1,600
Southwest Asian Canning Corporation (formerly Asahi Food Manufacturing Incorporated)	Canned Sardines	9,000	528
Universal Canning Corporation	Canned Sardines	100,000	800
Seacoast Top Choice Food Corporation	Canned Sardines	40,000	694
Atlantic Food Corporation	Canned Sardines	22,500	179
Fortune Group Corporation	Canned Sardines	22,500	500
Total		707,700	9,537

Table 3: Profile of bottling sardine processors in Zamboanga del Norte (DTI, 2014; Survey, 2015)

<i>Company</i>	<i>Product lines</i>	<i>Average monthly production volume (in kilograms)</i>	<i>Average no. of workers (2015)</i>
Montaño Foods Corporation	Bottled Sardines / Bagoong / Bangus	6,000	80
Mendoza Industries	Bottled Sardines / Tuna	24,000	50
Alenter Foods Incorporated	Bottled Sardines	24,000	37
Zaragoza Foods Corporation	Bottled Sardines / Bagoong / Bangus	57,600	90
Fuentes Food Manufacturing	Bottled Sardines / Bangus	48,000	40
Dipolog Seaside Women's Association	Bottled Sardines / Bagoong / Bangus	19,200	58
Tito Mike's Food Company	Bottled Sardines	12,000	20
Etch Kiu Products Incorporated	Bottled Sardines / Bangus	14,400	15
Dipolog School of Fisheries Food Products	Bottled Sardines / Bangus	7,200	college student trainees
Tita Rosa Food Products	Bottled Sardines / Bangus	12,000	25
Gasol Food Products	Bottled Sardines	12,000	18
Dapitan City Food Products	Bottled Sardines	12,000	6
Jose Dalman Sardines Savers Association	Bottled Sardines	36,000	30
Manukan Sardines Savers Association	Bottled Sardines	24,000	10
Roxas Sardines Livelihood Association	Bottled Sardines	19,200	12
Palandok Agrarian Reform Beneficiaries and Agricultural Multi-purpose Cooperative (PARBFAMCO)	Bottled Sardines	No data	13
Monina's Sardines	Bottled Sardines	No data	No data
Adriatico Food Products	Bottled Sardines	No data	7
MM Cadag Food Products	Sardines sandwich spread	No data	4
Sindangan Spanish Style Sardines Producers Cooperative	Bottled Sardines	No data	12
Total		327,600	527

Table 4: SOPHIL member companies and corresponding number of catcher vessels (SOPHIL, 2015)

<i>Company</i>	<i>Number of purse seiners</i>
YL Fishing Corporation	4
Universal Canning Incorporated	7
Jordan Fishing Corporation	5
Mega Fishing Corporation	7
Nancy Fishing Corporation	8
Century Fishing Corporation	2
OLC Fishing Corporation	2
NCW Fishing Corporation	2
Oceanic Fishing Corporation	3
AMR Trade and Industrial	1
E and L Fishing	3
Zamboanga GMA Fishing Corporation	4
Golden Hook Fishing	1
Sunrise Fishing Corporation	1
Total	50

Impact on the Volume of Sardine Catch

Prior to the closed fishing season, the volume of sardine catch by commercial fishing in Zamboanga city was increasing from 2003 to 2005, decreased in 2006 to 2007 (–23.55 percent and 12.91 percent, respectively), peaked in 2009 to 2010 (197,489.72 and 197,015.49 metric tons, respectively), and then significantly

dropped in 2011 (–44.80 percent). During the three-year closed fishing season (i.e., 2012 to 2014), the volume of commercial sardine catch posted a slight increase (6.08) in the first year (i.e., 2012). However, the sardine catch unexpectedly decreased (–12.90) in the second year (i.e., 2013), an outcome that puzzled most of the industry stakeholders. In the last year of implementation (i.e., 2014) and in 2015, the sardine catch registered increasing trend (28.74 percent and 12.55 percent, respectively) (see Table 5).

Before the closed fishing season, the volume of sardine catch by municipal fishing in Zamboanga Del Norte was generally increasing (i.e., 2005 to 2015), except in 2006 and 2008 when the volume of catch posted a decline of 23.67 percent and 21.28 percent, respectively. During the three-year fishing season (i.e., 2012 to 2014), the volume of municipal sardine catch posted a consistent increase year by year (33.61 percent, 37.52 percent and 6.68 percent) (see Table 6).

In general, the trend in the volume of commercial and municipal sardine catch is increasing during and post-fishing ban (see Figure 4). Municipal sardine catch showed a more consistent growth, carrying over in 2015 where it registered the highest figures at 20,191.61 metric tons (see Table 6). Commercial sardine catch, which accounts for 88 percent share of the total volume of sardine catch in Zamboanga Peninsula, showed a steady growth (except for the unanticipated drop in 2013); if sustained, one can expect the commercial sardine catch to surpass its previous volume peaks (i.e., in 2009 and 2010) in the years to come. On the whole,

Table 5: Volume and value of commercial sardine catch in Zamboanga city (PSA, 2015)

<i>Year</i>	<i>Volume in metric tons</i>	<i>Value in P'000</i>	<i>Increase/decrease in volume (%)</i>	<i>Increase/decrease in value (%)</i>
2003	61,229.00	607,075.00		
2004	76,847.74	807,455.12	25.51	33.01
2005	112,628.69	1,153,939.12	46.56	42.91
2006	86,101.97	1,518,573.38	-23.55	31.60
2007	74,984.61	1,232,785.20	-12.91	-18.82
2008	106,116.45	2,236,607.86	41.52	81.43
2009	197,489.72	3,445,539.22	86.10	54.05
2010	197,015.49	3,957,921.90	-0.24	14.87
2011	108,752.06	3,285,389.61	-44.80	-17.00
2012	115,361.31	2,971,301.63	6.08	-9.56
2013	100,483.54	2,488,361.20	-12.90	-16.25
2014	129,359.88	3,275,366.88	28.74	31.63
2015	145,599.46	3,660,931.26	12.55	11.77

Table 6: Volume and value of municipal sardine catch in Zamboanga Del Norte (PSA, 2015)

<i>Year</i>	<i>Volume in metric tons</i>	<i>Value in P'000</i>	<i>Increase/decrease in volume (%)</i>	<i>Increase/decrease in value (%)</i>
2003	3,589.00	55,912.00		
2004	5,739.00	86,646.63	59.91	54.97
2005	11,471.01	125,229.74	99.88	44.53
2006	8,755.65	156,987.98	-23.67	25.36
2007	9,646.15	184,283.63	10.17	17.39
2008	7,593.00	225,780.91	-21.28	22.52
2009	7,692.07	191,645.96	1.30	-15.12
2010	9,783.69	186,010.25	27.19	-2.94
2011	10,081.62	234,205.59	3.05	25.91
2012	13,469.81	286,639.84	33.61	22.39
2013	18,523.61	319,996.12	37.52	11.64
2014	17,285.46	313,338.97	6.68	-2.08
2015	20,191.69	318,490.98	16.81	1.64

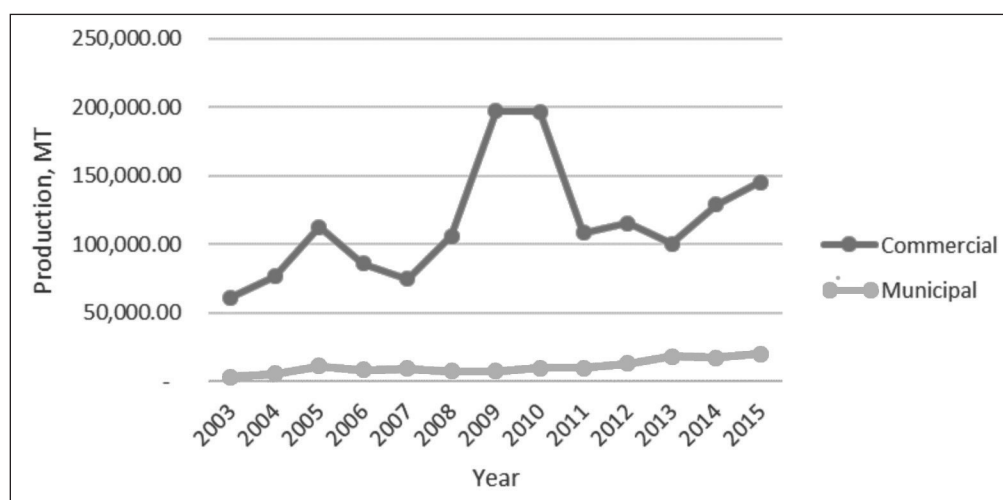
the data on the volume of commercial and municipal sardine catch indicate a favourable reading on the effect of three-month fishing season in improving the sardine catch in the region.

Impact on the Volume of Sardine Production

Since 2009 up to the implementation of the closed fishing season in 2011, the sardine canning production in Zamboanga city has been continually increasing (i.e., 91,865.70 metric tons of processed sardines in 2009 to 116,031.60 metric tons in 2011). The production incurred an expected dip in 2012 (i.e., 9,927.9 metric tons [-8.56 percent]) after the initial year of the closed fishing season and an unexpected decrease in 2013 (i.e., 106,103.70 metric tons in 2012 to 100,674.90 metric tons in 2013) following the unanticipated drop

(-12.90 percent, see Table 5) in the sardine catch on the same year. Since then, the volume of sardine canning production has been steadily increasing year by year (i.e., 100,674.60 metric tons in 2013; 106,014.60 metric tons in 2014; 110,603.75 metric tons in 2015 [or around five percent growth per year]) (see Figure 5). If the trend continues, the volume of canned sardine production is expected to breach the previous peak recorded in 2011 in the coming years.

The average cases produced by the sardine canning companies in Zamboanga city showed that there was a substantial increase of 50 percent prior and post the closed fishing season. In 2008-2010, the average aggregate production in a year is 4,014,613 cases only but in 2012-2015, it surged to 6,015,916 cases. Individually, all of the major sardine canning companies

**Figure 4: Volume of commercial and municipal sardine catch in Zamboanga Peninsula. (PSA, 2015)**

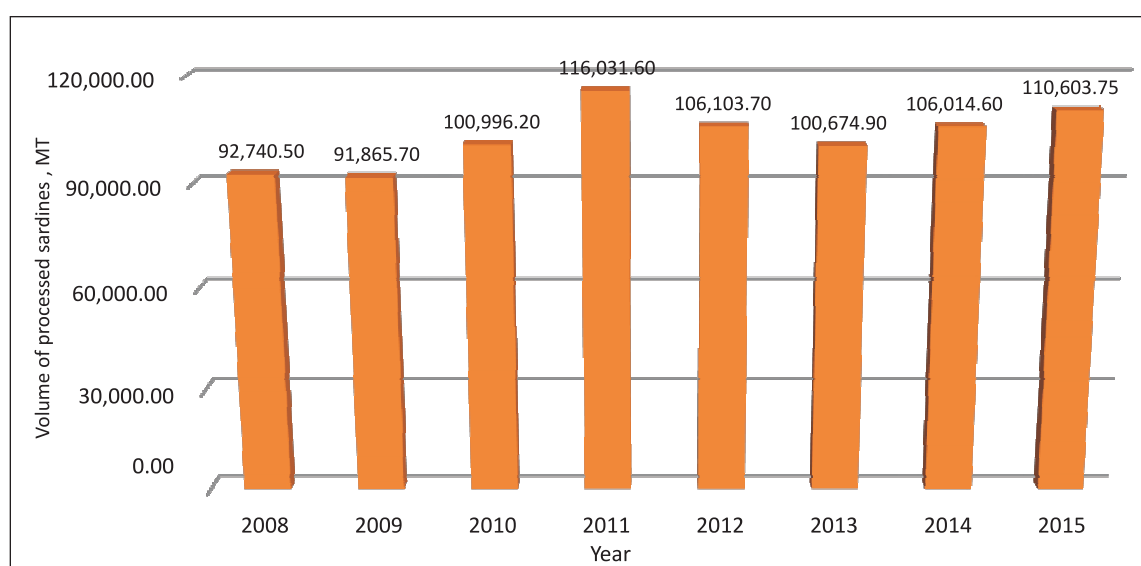


Figure 5: Volume of canned sardines production in Zamboanga city. (ACN, 2015)

registered significant increase in their average yearly output (see Table 7). Ayala Seafoods Corporation and Mega Fishing Corporation registered the highest canned sardine production with an average of 935,072 cases per year, closely followed by Century Pacific Food Corporation, Permex Producer and Exporter Corporation, and Universal Canning Corporation with an average of 850,065 cases.

In initial year of implementation of the closed fishing season, the sardine bottling production in Zamboanga

Del Norte suffered a modest dipped in volume from 4,087.70 metric tons in 2011 to 4,042.60 metric tons in 2012. Since then, the volume of sardine bottling production has been consistently increasing year by year. It peaked in 2015 when it reached 4,351.50 metric tons, a figure considerably above the sardine bottling production prior to the closed fishing season (see Figure 6).

The average cases produced by the sardine bottling companies in Zamboanga Del Norte showed an overall

Table 7: Average cases produced in a year by sardine canning companies (DTI, 2014; Survey, 2015)

Company	Average number of cases produced	
	2008-2010	2012-2015
Aquatic Foods Manufacturing Corporation	234,362	340,026
Atlantic Foods Corporation	131,828	191,265t
Ayala Seafoods Corporation	644,494	935,072
Big Fish Corporation	182,802	265,221
Century Pacific Food Corporation (formerly Columbus Seafoods Corporation)	585,904	850,065
Gold Star Seafoods Corporation	131,828	191,265
Fortune Group Corporation	131,828	191,265
Permex Producer and Exporter Corporation	585,904	850,065
Mega Fishing Corporation	644,494	935,072
Seacoast Top Choice Food Corporation	234,362	340,026
Southwest Asian Canning Corporation (formerly Asahi Food Manufacturing Incorporated)	52,731	76,506
Universal Canning Corporation	585,904	850,065
Total	4,014,613	6,015,916

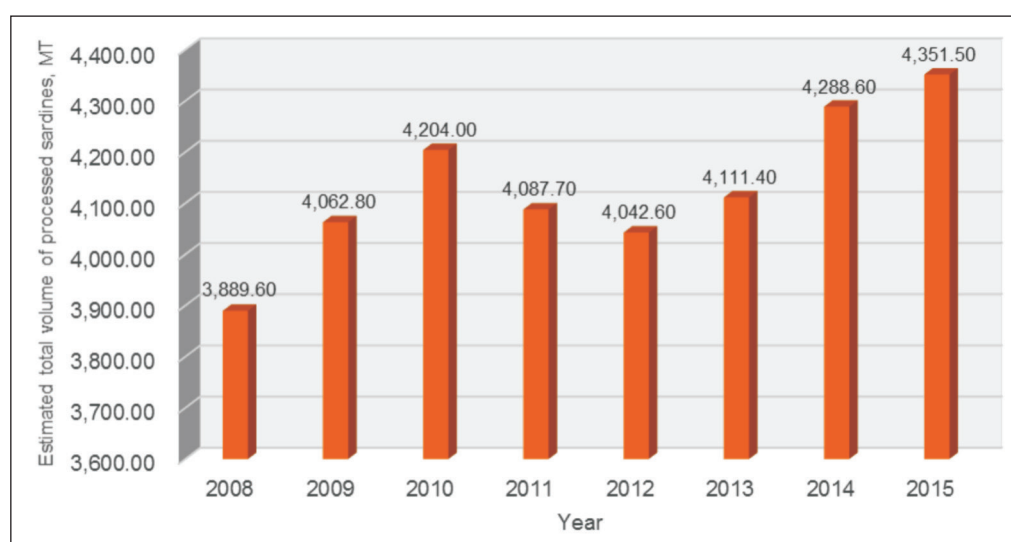


Figure 6: Volume of bottled sardine production in Zamboanga Del Norte. (Survey, 2015)

increase of 8.23 percent before and after the closed fishing season. In 2008-2010, the average aggregate production in a year is 297,740 cases, and in 2012-2015, it grew to 322,250 cases. Among the major sardine bottling companies, only Monina's Sardines (from 1,800 cases to 1,350 cases) had a lower volume, six processors maintained the same level, and the rest increased production (see Table 8). Montañó Foods Corporation,

Mendoza Industries and Zaragoza Food Products are the top bottling processors, producing 70,800 cases, 68,300 cases and 68,700 cases, respectively. Overall, the data on the volume of canning and bottling sardine production show consistency with the trend in sardine catch as well as give credence to the beneficial effect of the three-year closed fishing season in Zamboanga Peninsula.

Table 8: Average cases produced in a year by sardine bottling companies (Survey, 2015)

Company	Average number of cases produced	
	2008-2010	2012-2015
Montañó Foods Corporation	69,200	70,800
MM Cadag Food Products	200	240
Mendoza Industries	64,900	68,300
Alenter Foods Incorporated	48,000	50,000
Roxas Sardines Livelihood Association	-	1,440
Gasó Food Products	1,440	1,440
Monina's Sardines	1,800	1,350
Adriatico Food Products	-	6,000
Dipolog Seaside Women's Association	600	600
Jose Dalman Sardines Savers Association	1,440	1,440
Sindangan Spanish Style Sardines Producers Cooperative	1,440	1,440
Dapitan City Food Products	72	72
Zaragoza Foods Products	65,400	68,700
Etch Kiu Products Incorporated	480	480
Tito Mike's Food Company	720	1,200
Tita Rosa Food Products	42,000	48,700
Palandok Agrarian Reform Beneficiaries and Agricultural Multi-purpose Cooperative (PARBFAMCO)	48	48
Total	297,740	322,250

Effect on the Level of Employment

Before the implementation of the closed fishing season, the aggregate number of workers in the sardine canning companies has been consistently increasing year by year (i.e., 4,958 in 2008, 6,322 in 2009, 6,895 in 2010 and 7,003 in 2011; see Table 9). After the first year of the closed fishing season, the total number of canning workers dipped to 6,841 in 2012. Afterwards, the aggregate number of workers in sardine canning companies significantly increased each year (i.e., 8,406 in 2013, 9,643 in 2014 and 9,843 in 2015; see Table 9), even surpassing the number of workers employed prior to the enactment of the closed fishing season.

This pattern is consistent when comparing the average number of workers hired by sardine canning companies before and during the closed fishing season. The total average number of workers in 2008-2010 is 6,058, which substantially increased to 8,686 (42.39 percent increase) in 2012-2015 (see Table 10).

The aggregate number of workers in the sardine bottling companies in Zamboanga Del Norte is basically constant from 2008 to 2010. It surged during the implementation of the closed fishing season, becoming steady at 457 workers employed and reaching the highest level in 2015 (see Figure 7). The total average number of workers in 2008-2010 is 397, which increased to

Table 9: Number of workers in sardine canning companies (DOLE, 2015; Survey, 2015)

<i>Company</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
Aquatic Food Manufacturing Corporation	---	301	335	350	302	314	432	432
Permex Producer and Exporter Corporation	778	825	917	1,214	663	1,240	1,183	1,183
Big Fish Food Corporation	---	---	---	42	19	547	746	746
Century Pacific Food Corporation (formerly Columbus Seafoods Corporation)	658	698	775	910	995	947	1,000	1,200
Gold Star Seafoods Corporation	---	787	787	925	1,011	1,709	1,016	1,016
Ayala Seafoods Corporation	565	599	666	736	800	966	859	859
Southwest Asian Canning Corporation (formerly Asahi Food Manufacturing Incorporated)	347	368	409	481	796	500	528	528
Universal Canning Corporation	526	558	620	387	387	403	800	800
Seacoast Top Choice Food Corporation	526	558	620	480	539	424	800	800
Atlantic Foods Corporation	118	125	139	163	156	208	179	179
Mega Fishing Corporation	1,053	1,116	1,240	860	675	675	1,600	1,600
Fortune Group Corporation	387	387	387	455	498	473	500	500
Total	4,958	6,322	6,895	7,003	6,841	8,406	9,643	9,843

Table 10: Average number of workers in a year by sardine canning companies (DOLE, 2015; Survey, 2015)

<i>Company</i>	<i>Average number of workers</i>	
	<i>2008-2010</i>	<i>2012-2015</i>
Aquatic Food Manufacturing Corporation	212	370
Permex Producer and Exporter Corporation	840	1067
Big Fish Food Corporation	0	515
Century Pacific Food Corporation (formerly Columbus Seafoods Corporation)	710	1036
Gold Star Seafoods Corporation	525	1188
Ayala Seafoods Corporation	610	871
Southwest Asian Canning Corporation (formerly Asahi Food Manufacturing Incorporated)	375	588
Universal Canning Corporation	568	598
Seacoast Top Choice Food Corporation	568	641
Atlantic Foods Corporation	127	181
Mega Fishing Corporation	1,136	1,138
Fortune Group Corporation	387	493
Total	6,058	8,686

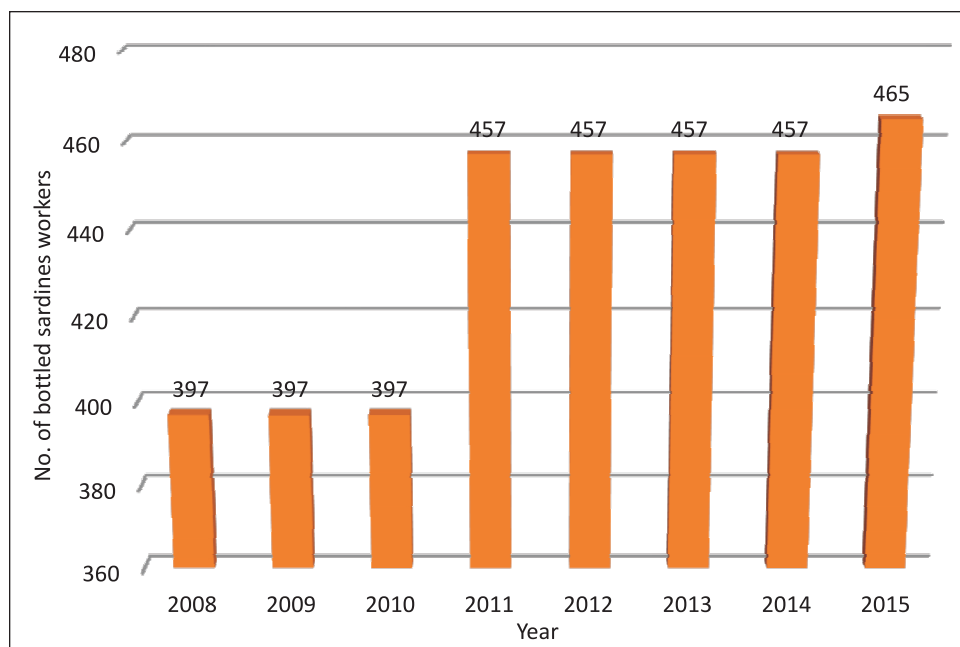


Figure 7: Aggregate number of workers in the sardine bottling companies. (Survey, 2015)

457 (15.11 percent increase) in 2012-2014 and 465 in 2015. Summing up, the data on the number of workers suggest a positive effect of the three-year closed fishing season in expanding the employment in the canning and bottling sardine companies of Zamboanga Peninsula.

Conclusion and Implications

On the whole, the study attenuated the existing lacuna in literature by augmenting the meagre data on fishing regulations in the country and by offering empirical evidence on the impact of the three-year Closed Fishing Season Policy on the sardine fishing and processing industries of Zamboanga Peninsula. In particular, the article delineated the fishing regulation's effect on commercial and municipal fishing operators' sardine catch, and on sardine canning and bottling companies' production and level of employment. The conventional proposition is that the closed fishing season has a negative effect on the volume of sardine catch and sardine production as well as on the level of employment among the workers. This has to do with the three-month fishing ban which reduces the period of work to only nine months in a year among the sardine industries. Ironically, the empirical evidence obtained by the study suggests otherwise—the closed fishing season has a favourable impact overall despite the reduction in work period. During and post fishing ban, the commercial and municipal fishing operators exhibited growing volume of sardine catch, and the

canning and bottling processors showed increasing volume of production and rising number of workers. The level of employment in the canning and bottling companies exceeded the prior highest level, and the volume of sardine catch and production are expected to surpass the previous peaks in the coming years.

Although viewed favourably, the fishing regulation creates incentive for the sardine fishing operators and sardine processors to increase operation/production to compensate for the work stoppage during the three-month fishing ban. Before the onset of the closed fishing season, the fishing companies usually increase the volume of sardine catch and the processing companies usually stocked up sardines (using storage facilities) to sustain their normal operation level of operations. These predispositions need evaluation since the unhindered operation/production of the sardine industries may defeat the purpose of the conservation measure. The fishing regulation also unexpectedly resulted in an aggregate growth of employment in the canning and bottling companies during and after the closed fishing season. This increase in the number of workers is significant since employment in the sardine industries is a main source of income for many workers. However, this surge of employment does not translate into an increase in the actual pay of the sardine industries' workers, as their earnings per year are less during the closed fishing season. In addition, the earnings of workers, before and after the closed fishing season, are still way below the per capita poverty threshold

(i.e., P10,338) of Zamboanga Peninsula in 2015 (PSA, 2015). This information suggests that an adequate safety net programmes for individual workers should be an evergreen feature of any closed fishing season regulation in the country.

In closing, the positive effect of the fishing regulation on the sardine fishing and processing industries in Zamboanga Peninsula augurs well for the conservation of the fishery species in the country. The Philippines is archipelagic with numerous major fishing grounds of which many are regarded as ecologically threatened, making a closed fishing season invariably an expected recourse in the years to come. A constant issue in utilising this fishing regulation is the resistance among stakeholders due mainly to the common notion that a closed fishing season has a zero-sum effect on their industry and livelihood. The study's findings debunk this expectations, as the data suggest otherwise—the closed fishing season practiced in Zamboanga Peninsula had a positive-sum effect to the sardine industries overall. This is a promising prospect for justifying the continuation of the fishing regulation in the region, in precipitating the institutionalisation of the Closed Fishing Season Policy, and in guiding the adoption of the conservation measure in other parts of the country.

Acknowledgements

This research project is funded by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) through the Socio-Economics Research Division (SERD). Special thanks for the field assistance provided by our collaborating implementing agencies—Western Mindanao State University (WMSU) and Jose Rizal Memorial State University (JRMSU).

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