Assessment of the Industry-level Impacts of the Closed Fishing Season Policy for Sardines in Zamboanga Peninsula, Philippines [1]

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INTRODUCTION

What is closed fishing season policy?

Fishing regulation is a globally recognized conservation measures for fisheries resources preservation particularly in controlling overfishing and protecting the species during the spawning season (FAO, 1997; Sadovy *et al.*, 2005; Arendse *et al.*, 2007; Hargraves, 2011; Cohen *et al.*, 2013; Chimba and Musuka, 2014). The closed fishing season is just one of the many fisheries management approaches adopted by the state, local authorities and coastal communities to conserve and improve fish stocks and other marine resources. A seasonal closure and harvest of fisheries products have become an acceptable and implementable means of sustaining both ecosystem and livelihood (Colen, *et al.*, 2013). This system is established primarily due to the deteriorating coastal resources manifested by lower yield or fish catch which consequently resulted in significant social and economic impacts in the affected community.

In the Philippines, Republic Act 8550 better known as the Philippine Fisheries Code of 1998, the principal law governing fisheries and aquatic resources in the country, recognizes closed fishing season policy as a sanctioned fishing regulation. A seasonal fishing ban has been put into practice in the country by the Bureau of Fisheries and Aquatic Resources (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. In Zamboanga Peninsula, the closed fishing season policy for sardines was implemented through the Department of Agriculture-Department of Interior and Local Government (DA-DILG) Joint Administrative Order No. 1, series of 2011 (JAO-01 s.2011). The policy covers the period December 1 to March 1 to allow more production spawning season for sardines and address its declining fish catch. The policy establishes a conservation area on the fishing grounds where a non-fishing zone for harvesting sardines and other related species is enforced for three months, annually, for three years starting December 1, 2011.

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Why implement the Closed Fishing Season Policy in Zamboanga Peninsula?

Zamboanga Peninsula (ZamPen), Philippines is the center of the country's sardine industry producing between 60-70% of the country's annual total sardine production in the last 10 years (Table 1 and Figure 1). The sardine industry is based mostly in Zamboanga City and Dipolog City in the province of Zamboanga del Norte. Zamboanga City dubbed as the "Sardines Capital of the Philippines" has 20 commercial fishing operators, 12 canning companies and 4 tin can manufacturers. Meanwhile, Dipolog City is recognized as the "Bottled Sardines City" and has 25 active sardines processors, 2,046 licensed municipal fishermen and 588 licensed vessels (DTI, 2013-2014). The sardine industry employs about 35,000 workers per annum and disburses about Php 245 million per month (Valerio 2015) and has four industry association, namely: In-glass Sardines of Dipolog Association (ISDA); Zamboanga City Canners Association (ZCCA); Industrial Group of Zamboanga Inc. (IGZI); and the Southern Philippines Association of Deep Sea Fishing (SOPHIL).

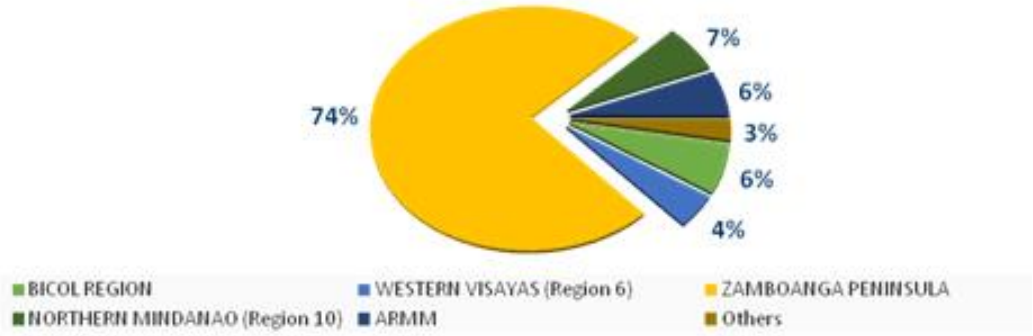

Fig. 1. Top sardine producing regions in the Philippines (PSA, 2015)

Sardine production in Zamboanga Peninsula has been increasing (Table 1). However, in 2011, the volume of sardine production in the region took a rapid drop from 223,225 metric tons (mt) in 2010 to 132,600 mt in 2011, resulting a serious decrease of 41% or 96,625 mt (PSA, 2015; BAS, 2014). The declining fish catch raised apprehension among stakeholders on the sustainability of sardine species in the fishing ground of ZamPen. This prompted the stakeholders and key players of the the sardine industry and BFAR to seriously assess the situation. As a countermeasure, the DA-DILG JAO-01 s.2011 or the Closed Fishing Season Policy for Sardines in Zamboanga Peninsula was promulgated on August 23, 2011.

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

Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
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

Source: Philippine Statistical Authority (PSA), 2015

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 km^2 comprising portions of East Sulu Sea, Basilan Strait and Sibuguey Bay, and encompassing the western municipal/national waters of Zamboanga Del Norte. The policy also covers the waters bordering south and eastern waters of Zamboanga City and southern part of Zamboanga Sibugay (Figures 2 and 3). Before the fishing regulation's expiration in March 2014, DA-DILG JAO-01 s.2011 was promptly supplanted by BFAR Administrative Order Circular No. 255, series of 2014 (BAC 255 s. 2014) extending its effectivity and expanding the coverage area to 22,260.36 km^2 by including Sulu and Tawi-Tawi. This move is based on preliminary assessments suggesting that the fishing regulation had beneficial impacts on sardines and other fish species in Zamboanga Peninsula.

Figure 2. Zamboanga Peninsula (Google Maps 2016)

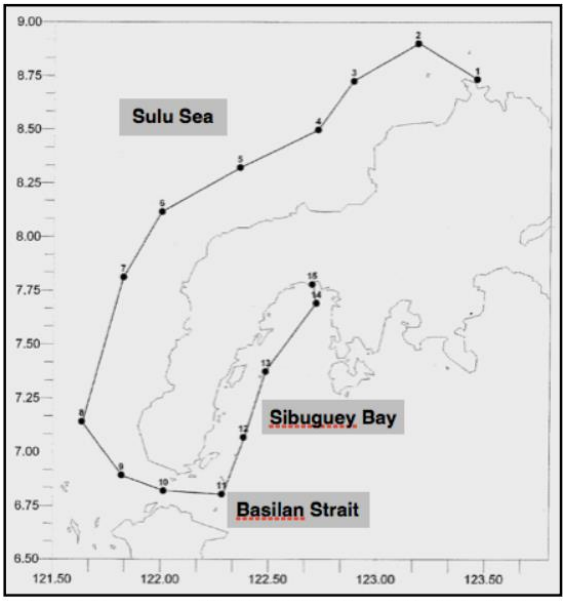

Figure 3. Coverage area of the Closed Fishing Season Policy for Sardines in Zamboanga Peninsula

This study finds its significance due to the lack of practical studies on the impact of closed fishing season and fishing regulations in the country. It looks into the impacts of the closed fishing season policy, from 2011 to 2014, in the major sardine industries in Zamboanga Peninsula. The sardine industries include the sardine processing industry (i.e. canning industries 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.

What happened upon implementation of the closed fishing season policy?

In principle, the fishing regulation offers biological, ecological and industrial benefits (Campos *et al.*, 2003; Mardle *et al.*, 2004; Failler and Pan, 2007) since it ensures the conservation of the sardine species and 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 benefit-cost 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 regulation, particularly its effect on the economic well-being of the sardine businesses and workers in Zamboanga Peninsula.

IMPACT ON THE VOLUME OF SARDINE CATCH

Prior to the closed fishing season, the volume of sardine catch by commercial fishing in Zamboanga City increased from 2003 to 2005, decreased from 2006 to 2007, peaked from 2009 to 2010 and then significantly dropped in 2011. During the three-year closed fishing season from 2012-2014, the volume of commercial sardine catch posted a slight increase of 6.08% in 2012. However, the sardine catch unexpectedly decreased by 12.9% in 2013, an outcome that puzzled most of the industry stakeholders. During the last years of implementation, 2014 and 2015, the sardine catch registered increasing trend of 28.74% and 12.55%, respectively (Table 2).

Table 2. Volume and value of commercial sardine catch in Zamboanga City (PSA, 2015)

Year	Volume in metric tons	Value in P'000	Increase/ decrease in volume (%)	Increase/ decrease in value (%)
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

Before the closed fishing season, the volume of sardine catch by municipal fishing in Zamboanga Del Norte was generally increasing from 2005 to 2015, except in 2006 and 2008 when the volume of catch posted a decline of 23.67% and 21.28%, respectively. During the three-year closed fishing season (2012-2014), the volume of municipal sardine catch posted a consistent annual increase at 33.61%, 37.52% and 6.68% (Table 3).

In broad-spectrum, the trend in the volume of commercial and municipal sardine catch is increasing during and post-fishing ban (Figure 4). Municipal sardine catch showed a more consistent growth, carrying over in 2015 where it registered the highest figure at 20,191.61 mt shown in Table 3. Commercial sardine catch, which accounts for 88% share of the of the total

volume of sardine catch in Zamboanga Peninsula showed a steady growth, except for the unanticipated dropped 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. Overall, the data on the volume of commercial and municipal sardine catch implied that the three-month closed fishing season provided favorable effects in terms of improving the sardine catch in the region.

Table 3. Volume and value of municipal sardine catch in Zamboanga del Norte (PSA, 2015)

Year	Volume in metric tons	Value in P'000	Increase/ decrease in volume (%)	Increase/ decrease in value (%)
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

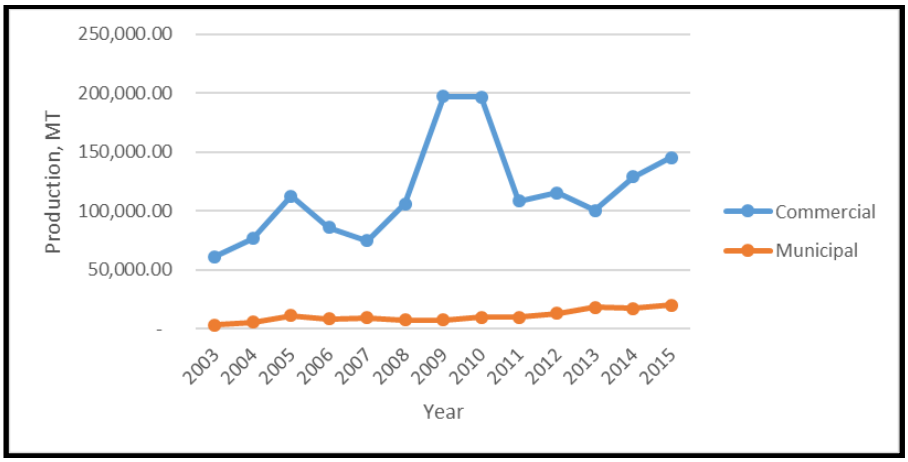

Fig. 4. Volume of Commercial and Municipal Sardine Catch in Zamboanga Peninsula (PSA, 2015)

INDUSTRY-LEVEL IMPACTS

Effects on the canning and bottling 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 from 91,865.70 mt of processed sardines in 2009 to 116,031.60 mt in 2011. The production incurred an expected decline of 8.56% or 9,927.9 mt in 2012 after the initial year of the closed fishing season and an unexpected decrease of 106,103.70 metric tons in 2013 following the unanticipated drop in the sardine catch on the same year. Since then, the volume of sardine canning production has been steadily increasing annually (Figure 5). If the trend continues, the volume of canned sardine production is expected to breach the previous peak recorded in 2011.

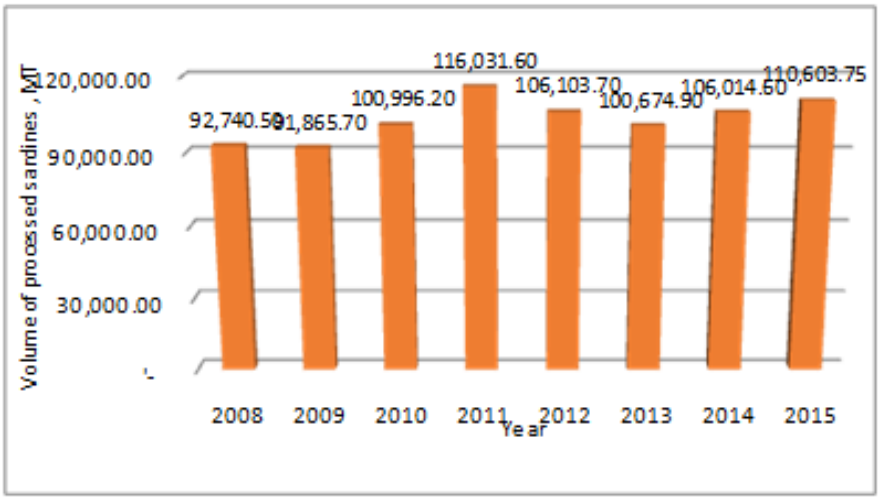

Fig. 5. Volume of canned sardines production in Zamboanga City (ACN, 2015)

The average cases produced by the sardine canning companies in Zamboanga City showed that there was a substantial 50% increase during the closed fishing season. In 2008-2010, the average annual aggregate production 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 registered significant increase in their average yearly output

In terms of the sardine bottling production in Zamboanga Del Norte, during the initial year of implementation of the closed fishing season, the industry suffered a modest decreased in volume from 4,087.70 mt in 2011 to 4,042.60 mt in 2012. Since then, the volume of sardine bottling production has been consistently increasing, annually. It peaked in 2015 when it reached 4,351.50 mt, a figure considerably above the sardine bottling production prior the implementation of the closed fishing season policy (Figure 6).

The average cases of sardines produced by the sardine bottling companies in Zamboanga Del Norte showed an overall increase of 8.23% during the closed fishing season. In 2008-2010, the average aggregate production in a year was 297,740 cases while in 2012-2015, it grew to 322,250 cases.

In general, the data on the volume of canning and bottling sardine production showed consistent trend in sardine catch as well as provided credence to the beneficial effect of the three-year closed fishing season in Zamboanga Peninsula.

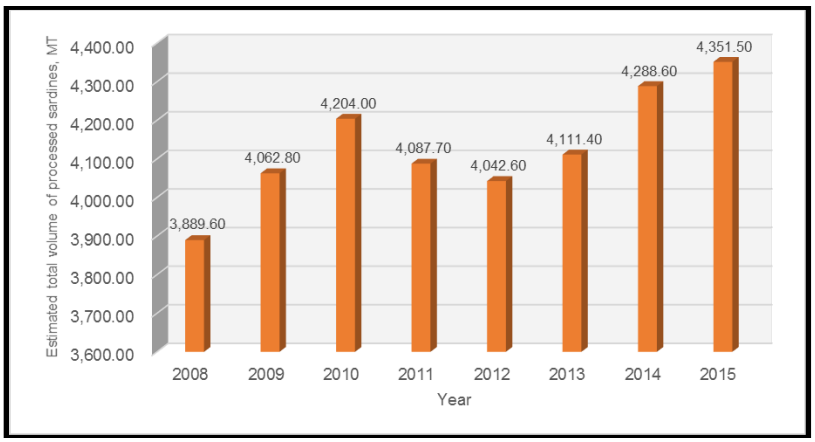

Fig. 6. Volume of bottled sardine production in Zamboanga Del Norte (DTI Survey, 2015)

Effects 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, annually. After the first year of implementation of the closed fishing season, the total number of canning workers decreased to 6,841 in 2012. Afterwards, the aggregate number of workers in sardine canning companies significantly increased each year, 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% increase) in 2012-2015.

In terms of the aggregate number of workers in the sardine bottling companies in Zamboanga Del Norte, it was observed that it has remained 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 of 465 workers in 2015 (Figure 7). The total average number of workers in 2008-2010 was 397, which increased to 457 (15.11% 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, both in the canning and bottling sardine companies in Zamboanga Peninsula.

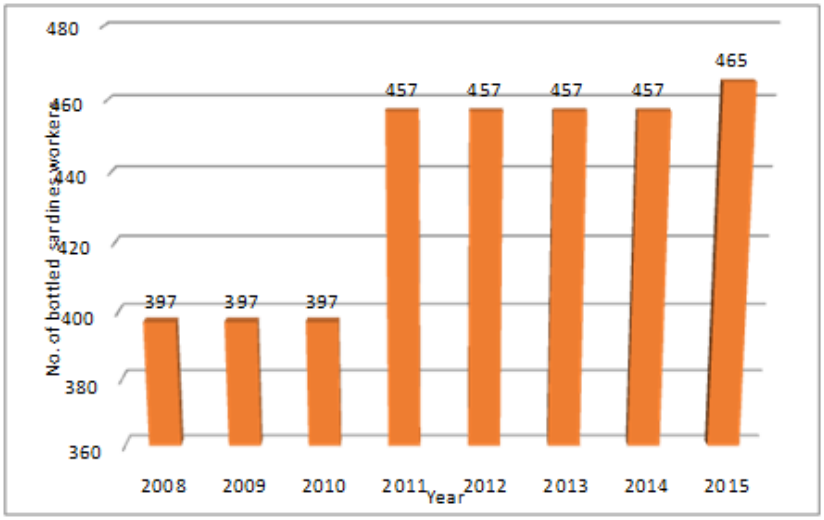

Fig. 7. Aggregate number of workers in the sardine bottling companies (DOLE Survey, 2015)

Effects on Income of Industry workers

Table 4 presents the level of income of the various key workers of the sardine industry. Before closed fishing season, workers in the canneries earned an average annual income of Php 64,871 for working in 11 months or an average monthly income of Php 5, 897. During closed fishing season, workers earned an average annual income Php 57,116, income level for working only in 9 months, or an average monthly income of Php 6,346. While the average monthly income indicated an increase during the implementation of the closed fishing season, total annual income of workers reduced by about 12% due to the non-involvement of workers in the canning industry for two months.

Workers in the bottled sardine industry earned quite lower compared to canneries. They earned an average annual income of Php 45, 287 or an average monthly income of Php 5,032. Other companies hire workers for 11 months even during closed season for sardines to process bangus, squid and other marine products. During the closed fishing season, workers earned a lesser average annual income of Php 43,488, about 4% less than the income before the closed fishing season period.

Tin can workers seem to earn a higher income compared to the other sectors in the industry. Their average annual income is Php 68,835 before the closed fishing season or an average

monthly income of Php 6, 258. Meanwhile, their annual income during the closed fishing season period was Php 65,247, on the average, for working 9 months a year.

The fishing crew earned higher income during the closed fishing season, from an average annual income of Php 40,137 before the closed fishing season to an average annual income of Php 61,598 during the closed fishing season. The higher income during the closed fishing season is due to the incentives received by the fishing crew for the increase in actual catch in addition to their minimum wage.

Table 4. Average annual gross income of sardine industry and allied industry workers, by period

Industry workers	Average annual gross income, PhP	
	Before Closed Fishing Season Policy (2008-2010)	During Closed Fishing Season Policy (2012-2015)
Canning	64,870.70	57,116.18
Bottled sardines	45,287.33	43,488.11
Tin can	68,834.83	65,246.67
Fishing crew	40,136.50	61,598.10

Source: Household survey, 2015

SUMMARY AND POLICY IMPLICATIONS

The study provided significant information to narrow the existing gap in literature by supplementing the insufficient data on fishing regulations in the country and by offering practical evidence on the impact of the three-year implementation of the closed fishing season policy on the sardine fishing and processing industries in Zamboanga Peninsula. In particular, this paper highlighted the fishing regulation's impact 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 workers. This was associated 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 policy has a favorable overall impact 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 highest level of employment during the policy implementation and the volume of sardine catch and production are expected to surpass the previous peaks in the coming years.

Results showed that the fishing regulation creates incentive for the sardine fishing operators and sardine processors to increase production to compensate for the work interruption during the three-month fishing ban. 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. The effect is reflected in the increase of income of fishing crew from an average annual of Php 40,137 before the close fishing season to average annual income of Php 61,598 during the closed fishing season. This explains the increase in the volume

of catch, during the period of the closed fishing season, as fishing crew gets additional incentives from the increase in actual catch, aside from their minimum wage. 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 (2012-2015). This increase in the number of workers is significant since employment in the sardine industries is the main source of income for many workers. However, the surge in 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 of Php 10,338 in Zamboanga Peninsula (PSA, 2015). This information suggests that an adequate safety net programs for individual workers should be an evergreen feature of any closed fishing season regulation in the country.

Finally, the positive effect of the fishing regulation on the sardine fishing and processing industries in Zamboanga Peninsula foretells well for the conservation of the fishery species in the country. The Philippines is surrounded 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 utilizing 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. This study provided empirical evidence to strongly support that the closed fishing season practiced in Zamboanga Peninsula had a positive-sum effect to the sardine industries. This is a promising prospect for justifying the continuation of the fishing regulation in the region, in precipitating the institutionalization of the Closed Fishing Season Policy and in guiding the adoption of the conservation measure in other parts of the country.

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