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Who is to be blamed?

Socio-cultural notes on blast fishing in the Spratly Islands

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Abstract Blast (explosive or dynamite) fishing is a common fishing method carried out around the Spratly Islands, in the southern portion of the South China Sea. Being destructive, not only to coral substrate but also juveniles of different species, environmental conservationists point to the immorality of fishermen who do not understand the importance of ecology. This fishing method has also been prohibited by Philippine acts of law such as the PD 704 passed in 1975 and Republic Act 8550 of 1998. However, blast fishing is still rampant in the Spratly Islands. Fishery fleets from southwestern Philippines frequents the area. Some 18 to 20 fishermen engage in 2-month fishing expeditions with each trip costing at least five thousand dollars. The whole operation is funded by fish traders in western Mindanao. The catch is often limited to *Caesio* spp. or what is locally called *sulig*. Fishermen do not consume the dynamite-fished products; they fish exclusively for commercial purposes. The catch is processed into salt-preserved dried fish. The dried product is shipped and traded at Mindanao where the inland plantation farmers produce dollar-earning crops such as coconut, banana, and pineapple. Those farmers depend on dried fish, caught by this destructive method, for their animal protein. These fishermen also occupy a low social status. They are refugees from the conflicts in the 1970s between the Muslim rebellions against the central government. This paper examines the history and marketing characteristics of the dried fish industry in the southern Philippines and analyzes some problems related to blast fishing in the Spratly Islands. Also, the paper discusses socio-cultural aspects of resource exploitation among the fishing communities in the Philippines, which support destructive fishing.

Keywords reef fisheries, blast fishing, Spratly Islands, dried fish consumption, socio-cultural background

Introduction

This paper ethnographically explores blast fishing in the Spratly Islands, South China Sea. With growing global concern over environmental protection, there has been increasing criticism of destructive fishing methods such as trawling, blast fishing and cyanide fishing. Some have blamed fishermen engaged in such activities as selfish or ignorant. However, no studies have paid attention to the socio-economical and cultural aspects of these fishermen's lives and means of earning a livelihood. In this short article, based on my own fieldwork among the Sama fishermen in the Philippines, I wish to show that blast fishing is not only a concern for the fishermen but also a national problem. In other worlds, contrary to the global environmentalists' criticism, blast fishing should be understood as a domestic as well as global issue. After explain the national socio-economical structure of the Philippines in which blast fishing is embedded, I will call for an alternative view to conserve coral reef.

1 Blast fishing in the Spratly Islands

1-1 Research site

I carried out field research on a small island, which I will call A Island, in the southern Palawan Province, which is located near the border between the Philippines and Malaysia. According to the *National Census of the Philippines* in 1995, the population of A Island was 6000 of which 95 percent were Sama and the rest were the Visayan peoples who had migrated from the central parts of the Philippine Archipelago. The flow of Sama migrants started right after martial law declared by late President Marcos in September 1972. Their original homeland was T Island in the Tawitawi Province of the Sulu Archipelago, the southernmost of the Philippine Islands. The conflict between the Moro National

Liberation Front (MNLF) and the Armed Forces of the Philippines (AFP) occurred in T Island in June 1974. Most of the residents left T Island at this time and migrated to A Island while others left for islands in Malaysia. According to the *National Census of the Philippines*, the population of A Island rose from 225 in 1970 to 2429 in 1975.

Residents on A Island depend on all kinds of their daily commodities being imported from Zamboanga City and Puerto Princesa City in the Philippines as well as from Kudat in northern Sabah, Malaysia. Trade across the national border is active and it has brought prosperity to A Island to the extent that almost everything can be bought on the island, except cars, which are not needed on a small island.

1-2 Fisheries carried out by A Islanders

Most of the fishermen of A Island go to the South China Sea for blast fishing or collecting holothurian (Akamine 2001). Blast fishing expeditions take about 60 days and those to collect holothurian 40 to 45 days. The former consists of about 20 crew men and the latter about 15 crew members. One blast fishing expedition costs around 200 000 pesos (equivalent of 4750 USD in 1998, one US dollar being equal to 42.15 pesos in that time) while the holothurian gathering around 70 000 pesos. The fishery in the South China Sea is year-round. Most of the male islanders above 16 years of age have experienced either blast fishing or holothurian fishery in the South China Sea.

Characteristics of fishing activity carried out by A Islanders can be summarized as follows: (1) blast fishing by A Islanders targets only *Caesio* spp. and the catch is processed into the salt-dried fish, (2) the vast majority of the dried products are traded and consumed in Mindanao, (3) the domestic distribution of salt-dried fish is well established and the middlemen often invest capital to finance blast fishing.

1-3 The Spratly Islands

There are four groups of islands and islets in the South China Sea. They are Pratas Islands, Paracel Islands, Macclesfield Bank and the Spratly Islands. The whole Spratly Islands are claimed by China and Vietnam while parts of them by the Philippines, Taiwan, Malaysia and Brunei. Apart from Brunei, each country occupies some territory. In 1978, the Philippine Government named parts of the islands *Kalayaan* (lit. freedom) and annexed them into the Palawan Province. Since then, the Philippines have occupied seven rocks and islands.

1-4 *Caesio* spp.

The Sama generally calls *Caesio* spp. *sulig* and sub classifies it as Table 1 below.

Table 1. Sama names given to the *Caesio* spp.

Sama	Scientific name	English translation
sulig abu-abu	*Caesio sp.*	ash *caesio*
sulig anduhaw	*C. caerulaureus*	-*
sulig killap	*C. tile*	lightning *caesio*
sulig papan	*Caesio sp.*	board *caesio*
sulig pilik-pilik	*C. diagramma*	goose *caesio*
sulig sowasowa	*C. pisang*	snake *caesio*
sulig tanaq	*Caesio sp.*	soil *caesio*
sulig ubal	*C. lunaris*	-*
sulig ulan-ulan	*Caesio sp.*	drizzle *caesio*

Source: Akamine(Fieldnotes).
*: No translation was found.

As can be seen in the above table, there are numerous species of *caesio* with the two most common being "ash" and "lightening" *caesio*. However, no distinction is made between them when traded. All *caesio* is simply called *sulig*. In August 1998, the salt-dried *caesio* was sold for around 30 pesos per kilogram at the brokerage. On the other hand, the retail price of salt-dried *caesio* at Zamboanga market was 60 pesos per kilogram, with about 15 to 16 pieces per one kilogram.

1-5 Blast fishing in the Spratly and trading of the catch

A history of the development of blast fishing in the Spratly Islands can be summarized as follows. Before they started to migrate to A Island, the Sama sometimes traveled from T Island to the Spratly Islands and practiced blast fishing as early as the 1960s. They went fishing on wooden boats equipped with 7 to 8 HP engine together with a sail. At that time one trip lasted about two to three weeks. In addition to blast fishing, they gathered trochus (*Tectus niloticus*) and pipe sea urchins (*Heterocentrotus mammillatus*) and giant clams. Those were easily collected by hand walking around the shallow waters during low tide.

On their return to T Island, they stopped off at A Island and there they dried their catch. During drying on A Island, they lived on their fishing vessels. From A Island, they traded their salt-dried fish at Zamboanga City after sailing cross the Sulu Sea. Having sold their products at Zamboanga, they returned to T Island.

It was in the 1980s they began to concentrate on blast fishing. This concentration was because of the

introduction of ANFO (ammonium nitrate fuel oil), an explosive compared to other explosives, which is both safe when handling and cheap to buy. I have no information on how they made explosives themselves before ANFO was obtained, but the Islanders have told me that they did indeed. However, there were many accidents while making these explosives and also during blast fishing itself. Since the employment of ANFO explosives, there have been few accidents.

Blast fishermen buy ammonium nitrate at Kudat in Malaysia. In 1998, its price was 500 pesos per 25 kilogram in A Island. The ANFO explosives are put into empty 620ml beer bottles. Guiness Stout bottles are preferred because of its "stocky" shape and empty Guiness Stout bottles, which are imported from Malaysia, are sold for one peso. Fishermen make about 50 bottles of ANFO explosives out of 25 kilograms of ammonium nitrate. During a two-month expedition, they usually use 875 kilograms of ammonium nitrate.

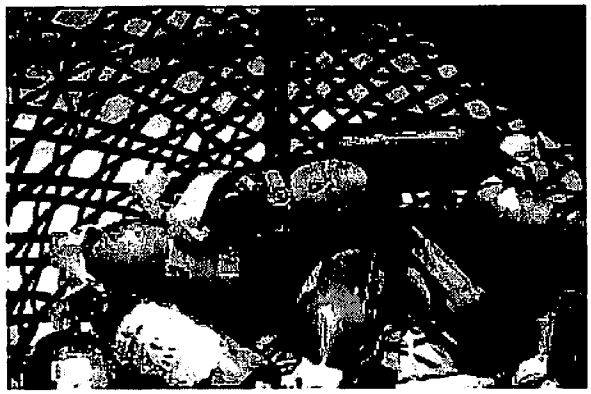

Fig. 1. AMFO explosives are usually put into Guiness Stout bottle.

For successful blast fishing, they have to calculate the length of the fuse according to the depth of the fishing ground. For example, when a school of fish is found at a depth of 9 meters, the fuse should be 2 inches long, when 18 meters depth 3inches. The fishermen have a number of different sized iron sinkers that they can select depending on the depth of the water at which the fish are swimming. They use an iron bar attached to the bottle in order to make it sink quickly. Since the mid 1990s fishermen have used compressors in order to collect those fish that have not floated to the surface and to retrieve the iron sinkers for reuse.

2 Process of salt-dried fish

According to the A Island coast guard, in August 1998 there were 40 vessels over 10 gross tons. Of these 15 to 20 were engaged in blast fishing around the Spratly Islands. I will present the case of P's fishing vessel below.

2-1 P's case

P (born in 1952) went fishing at the Spratly Islands for the first time in 1969. At that time they fished at the Spratly Islands and brought their catches to Zamboanga City before returning to T Island. Immediately after martial law was declared in September 1972, P's family moved to A Island. During the 1970s, he practiced blast fishing as well as trochus fishery around the Spratly Islands. In 1989 he purchased a 64 HP engine boat. In 1994 he changed to a 110 HP engine and in 1998 to a 165 HP engine.

P goes to blast fishing with a crew of 17 men. According to P, he left A Island on May 19, 1998 and returned to A Island on July 14, 1998. During his expedition of 56 days, they traveled past the Half Moon Shoal and Sabina Shoal until they reached Southern Bank where he began blasting. After the Southern Bank, they operated at the Amy Douglas Bank, the Nares Bank, the Flat Island, the Jackson Atoll, the 2nd Thomas Shoal, and the 1st Thomas Shoal before coming back to A Island. They fished 3 to 4 days at the same shoals and banks. During this expedition, they fished equivalent of 17 tons of dried *caesio* and 2.5 tons of dried mackerel.

2-2 Processing of salt dried fish

Salt-dried fish is made by the Islanders as follows: (1) scales are removed, (2) the back of the fish is cut open, (3) the fish is washed with seawater, (4) the fish is stored at the hold covered with salt. After arriving at A Island, the salted fish is washed with seawater to remove any wastes and dried under the sun. During drying process, the fish are not placed directly on the sand but are laid on coconut leaves. If the fish is headless, it is considered inferior and sells for a low price. Therefore they are dried carefully to keep them intact. The salt dried fish is sold in bamboo basket.

P arrived from the Spratly Islands on July 14, 1998 and started the processing the following day. I observed the drying process on July 21 and July 22. The work progressed as below. At 7: 30 in the morning they began to work. The crew as well as their families prepared the fish for drying. The crew men took the salted fish from the hold and washed them with seawater. The women first placed the fish so that it was skin-side down. Later they fish was turned over. The drying process rarely takes longer than five hours and on average takes three to four. Packing is done by the men after their families have gone home.

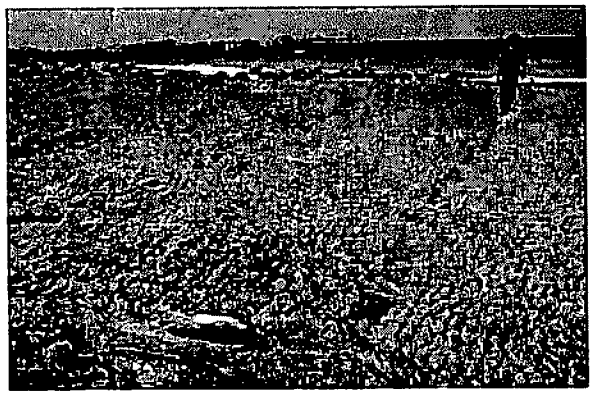

Fig. 2. *Caesio* is dried the belly side first.

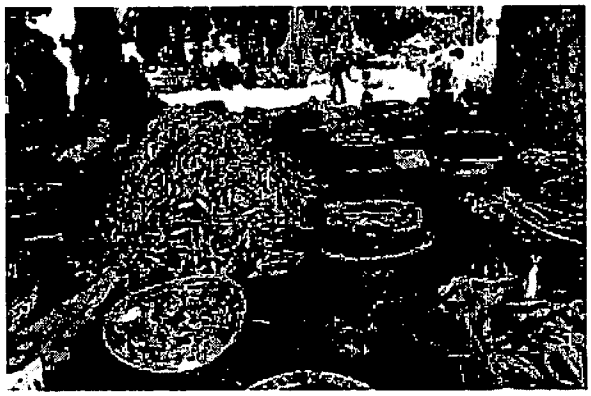

Fig. 3. The dried *caesio* are placed into the bamboo basket.

The drying and packing process took place over 8 days from July 15 to July 22. During this time P and his crew made 212 baskets and dried 17 tons of *caesio*. On the afternoon of July 23, they washed their vessel and the following day, they put their cages on board and prepared to depart. At 8 o'clock in the morning of July 25, they left for Zamboanga City. They reached at Zamboanga, which is 480 kilometers east of A Island, after 40 hours of travel.

Fig. 4. Dried *caesio* at the Zamboanga Market.

The Sama mainly fished for *caesio* but they also caught some mackerel, called *tamaron* in Sama language. While the dried mackerel cost 12 pesos at Zamboanga, the Kudat market offered 1.6 ringgit, which was equal to 16 pesos. Therefore, the dried mackerel was all shipped to the more profitable market at Kudat. P sold his dried mackerel to middlemen for 16 pesos on A Island. He earned 39 840 pesos from 2 490 kilograms of salt-dried mackerel.

The salt-dried *caesio* was all sold to a middleman whom I will call C at Zamboanga. He financed P's running costs on the condition that P sold all his catch of *caesio* to him. When P bought his own fishing vessel in 1989, he borrowed an amount of capital from C and since then he has sold his catch to C.

2-3 Major operational costs

One round trip needed 200 000 pesos of capital. P bought necessities at Zamboanga and Kudat. Table 2 shows item and volume and prices of what P bought at Zamboanga during one trip from May to July in 1998. P was able to buy these commodities by borrowing cash from C.

Table 2. Major operational costs A

Item	Price (PHP)	Volume	Total (PHP)
Diesel	P2 500	17 drums	P42 500
Gasoline	P1 800	2 drums	P3 600
Kerosene	P1 300	4 drums	P5 200
Ammonium nitrate	P500	750 kg	P15 000
Water	P30	20 drums	P600
Rice	P18	1000 kg	P18 000
Total			P84 900

Source: Akamine (Fieldnotes).
Price as of August 1998.

Table 3 indicates what P purchased at Kudat. He paid in advance for all the goods and he was repaid this amount after his return from the fishing expedition.

Table 3. Major operational costs B

Item	Price (PHP)	Volume	Total (PHP)
Salt	P160	14 MT	P44 800
Fuse	P1 300	15 boxes	P19 500
Fuse (coil)	P450	12 reels	P5 400
Weight	P135	10 pcs.	P1 350
Total			P71 050

Source: Akamine (Fieldnotes).
Price as of August 1998.

2-4 Other expenses and share

Aside from the expenses shown in Table 2 and 3, there were 40 000 to 50 000 pesos worth of expenses for seasonings, instant noodles, biscuits, coffee, and sugar. In total, the expenses amounted to 228 000 pesos.

Gross sales were 539 840 pesos with the sale of dried mackerel 39 840 pesos and dried *caesio* of 500 000 pesos. Therefore the net income was 311 840 pesos. One pay had been calculated, the net profit was divided by a total of 21 (the number of crew members, which was 18, plus 3 for the following pieces of equipment: vessel, engine and compressor. The respective owners of each piece of equipment receive the equivalent of one crew member's share. P happened to be the owner of all three of the above pieces of equipment and, therefore, received a total of 4 shares). Therefore, each crew got 14 850 pesos. Since P owned vessel, engine and the compressor, he got 4 units of pay resulting in a total of 59 400 pesos.

Table 4 summarizes the business transaction of the vessel owners on A Island who sold their salt-dried *caesio* at Zamboanga during 20 days from July 27 to August 15, 1998. The average number of crew members is 18.2, their average production of dried *caesio* was 17 tons and their average pay was 10 000 pesos.

Table 4. Boat owners in A Island and their operation

No.	Age	Volume of dried *caesio* (MT)	No. of Crew	Pay (PHP)	Middle-man
1	43	17	19	4 700	D
2	36	15	19	12 600	B
3	40	18	17	13 000	B
4	32	17	17	16 000	C
5	46	17	18	14 850	C
6	*50	18	18	3 650	A
7	50	17	20	3 000	E

Source: Akamine (Fieldnotes).
* is a suspected age.

The reason the rewards of vessels 1, 6, and 7 are relatively small is that their engines experienced mechanical trouble during the trip and they had to pay for the repairs out of their sales.

Aside from this two-month operation, they worked for the preparation of the expedition and also drying and packing. The above salary represents this three-month period of work. Most of the fishermen felt that their pay was not enough. This is understandable because prices on A Island are not cheap as almost everything had to be imported. A family with five needs at least 100 pesos for a day. If so, 10 000 pesos provides only basic living expenses in A Island.

2-5 A short history of changes in fishing practices

In order to gauge the changes that have occurred in blast fishing during the last 30 years, we must look at the way boat engines have changed since the tonnage of fishing vessels is not known. According to the fishermen I interviewed, in the 1970s, around 20 HP engine was the most popular. In the 1980s, 50 to 60 HP became common and in the early 1990s, engine with over 100 HP became favored. In 1998, when I visited A Island, ships with 165 HP represented the largest group of vessels. Table 5 illustrates the changes in engines over time of three boat owners (A, B, and P).

Table 5. Transitions in engines by HP

Year	A	B	P
1974	22	N/A	N/A
1978	45	N/A	N/A
1981	68	54	N/A
1989			64
1993	110		
1994	retired	retired	110
1998			165

Source: Akamine (Fieldnotes).

According to the fishermen, the boat owners increased their boat and engine size in the 1980s, enabling them to operate all year, even when the northeast monsoon was strong (from October to February). However, they needed more diesel and more fishing days resulting in higher operational costs. In the 1990s, the increase in operational costs became more dramatic. Moreover, the depreciation of peso was so severe. During the final three years of the Marcos regime (1983~1986), the value of the peso depreciated by over 30 percent against the US dollar. This depreciation of the peso continued into the 1990s, albeit at a slower pace.

3 Middleman in Zamboanga

I was unable to ascertain the number of middlemen of dried fish that were operating in Zamboanga City. According to the fishermen on A Island, there are three leading middlemen A, B, and C, with many other small-scale middlemen in Zamboanga, most of whom are Chinese.

Arriving in Zamboanga, the salt-dried *caesio* are repacked into wooden boxes 34 centimeters high, 50 centimeters wide, and 23 centimeters deep. The wooden

box must be kept in a cold storage, even though the fish is salt-dried. If they are stored in an ordinary storage, they would go rotten within 10 days. Middleman C maintains his cold storage at 12°C.

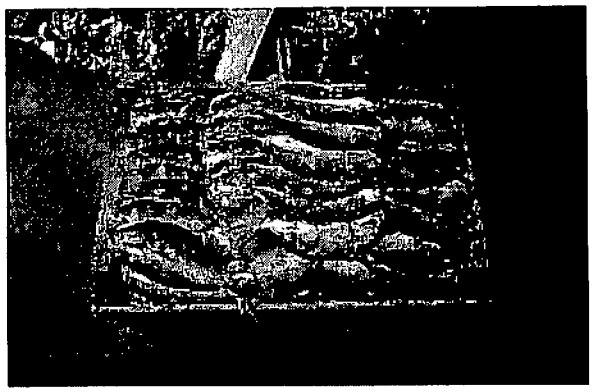

Fig. 5. Dried *caesio* is rearranged in a wooden box and stored at the cold storage.

Among the top three middlemen in Zamboanga, the one who has been operating the longest is A and C is the most recent to enter the business. While C is based only in Zamboanga, both A and B have branches in Davao City, which is home to the largest dried fish market in the Philippines. Table 6 summarizes the business activity of the middlemen A, B, and C.

Table 6. Dried fish middlemen in Zamboanga City

	Established year	Dealings (MT/year)	Construction of cold storage	Fresh fish business
A	*1956	2 100	1962	1985
B	1976	480	?	1989
C	1983	250	1995	1985

Source: Akamine (Fieldnotes)
*: In 1974, the current owner succeeded in his father.

A established his business in Davao as well as in Zamboanga in 1956. This is because A foresaw Zamboanga's potential as a dried fish entrepot. Zamboanga has long been a good fishing port. However sea-lanes down to the Sulu Archipelago had not yet been established for commercial. In the early 1970s, *agal-agal* (sea weed) cultivation began in the Sulu Archipelago and at this time the large steel vessels started to run connecting these islands to Zamboanga. Also, the Philippine government tried to attract foreign tuna and skip jack fishery vessels. At present, the port has developed as an international vessel running between Zamboanga and Sandakan, Sabah of East Malaysia.

Only two years later B began his business is worth noted. Although I have direct testimony from B, I believe it is likely that he sought to take advantage of the increase in fish production on A Island brought about by the flow of refugees, many of whom were fisherman, from T Island.

These three companies started as dried fish business and expand into the fresh fish business in the mid 1980s. They now own their own fishing vessels and currently concentrate on the fresh fish side of their businesses more than dried fish. They not only sell fresh fish but also can the surplus in their own canning factory.

4 Conclusion

This paper has reported on (1) the socio-cultural background of the fishermen who engaged in blast fishing in the Spratly Islands and (2) how the catch is processed and traded in the Philippines. *Caesio* forms schools at the edge of coral reefs. This is the reason blast fishing is the one of the most efficient methods to catch them. Furthermore, dried *caesio* is popular among the southern Mindanao people, which is why the Sama target *caesio* using blast fishing. However, it needs considerable capital to practice this kind of fishing. The Sama could not engage in blast fishing without loans from middlemen. These loans are necessary for purchasing new vessels as well as repairing and up-grading their engines.

I would like to point out some changes in the relationships between the Sama fishermen and the middlemen. The strong economic ties between the fishermen and the middlemen arose after the Sama began to concentrate on blast fishing in the 1980s. They had engaged in blast fishing for long time but it was never their main activities. They sometimes gathered trochus shells, sea urchins, and giant clams. Also, they used home-made explosives containing gunpowder which were extremely dangerous. Around the 1980s they learned about ANFO explosives that were cheap and safe to use. As a result, on A Island, there are many fishermen who engaged solely in blast fishing around the Spratly Islands. Now only a few fish around A Island.

How has the role of the middlemen changed? While the Sama became dependent on blast fishing, the leading dried fish businessmen diversified their business. In particular, they started to engage in the fresh fish business. They not only catch fish, mainly sardines, but they also can the surplus. These dried fish businessmen have been influential in local domestic fresh fish distribution. This is a niche business since the Philippine Government concentrates on export resources such as tuna and skip jack and not ordinary fish, which

consumed by local Mindanao inhabitants.

This kind of export-oriented development is common in Philippine modern history. The characteristics of the Mindanao economy have been the exporting of hemp, copra, banana, pineapple and other agricultural products produced in the huge plantations. The residents in Mindanao are integrated in the world system as the producers of such cash crops. The huge population working in such plantations requires salt-dried *caesio* as a source of animal protein. This is the main reason the Sama can continue blast fishing.

If we look at the Philippine economy, we notice that there exists an invisible chain that binds the producers of the dried *caesio* and those that consume this fish. The Sama, refugees from the armed struggle between the national army and the MNLF, are the producers. The consumers of *caesio* are the poor plantation workers who grow cash crops for export to the international market on which the Philippine economy is dependent. The dealers who connect the two ends of this chain are the wealthy middlemen. They also play a central role in maintaining blast fishing by not only providing loans but also by supplying fuse and fuse coil to the fisherman. I have not been able to ascertain where these middlemen obtain their supply of fuse and fuse coil, but without this supply blast fishing would probably cease.

I do not intend to discuss the immorality of businessmen who would do anything for money. However, I wish to emphasize that blast fishing is an integral element in the contemporary Philippine economy. Therefore even if environmental conservationists claim that blast fishermen are ignorant or selfish people who never care about our common heritage, I would disagree with the environmentalist's view. It is not a matter of uneducated nor self-centered. It is clear that blast fishing in the Spratly Islands results from the Philippine economic policy that exclusively pursues export dollar. In this sense, if anyone should be blamed for destroying precious corals, it is the Philippine government or the current world capitalist system in which we live.

Acknowledgement

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