Localizing PSP Monitoring in the Philippines: A management option

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SUMMARY:

Paralytic Shellfish Poisoning (PSP) is a public health concern in the Philippines since 1983. It is now a growing threat to public health and to the shellfish industry of the country. A total of 2,107 PSP cases with 117 fatalities have been reported since 1983 and enormous economic losses in the fisheries sector have been incurred. To avoid the occurrence of PSP and prevent economic losses monitoring program has been undertaken. However, the present monitoring and management system needs improvement to address effectively and efficiently the problems associated with the occurrence of *Pyrodinium* blooms and its concomitant PSP episodes.

Localizing the PSP monitoring system in the Philippines to better address the growing threats of PSP episode in the country is necessary. This paper presents the status and limitation of the current monitoring program and discusses the proposed system on localizing the PSP monitoring in the Philippines.

KEYWORDS: **Philippines, Paralytic Shellfish Poisoning (PSP) Monitoring, Localized PSP Program**

INTRODUCTION

Paralytic Shellfish Poisoning (PSP) is a public health concern in the Philippines since 1983. It is now a growing threat to public health and to the shellfish industry of the country. Almost all PSP syndromes in the Philippines are attributed to the recurrence of *Pyrodinium bahamense* var. *compressum*, a marine dinoflagellate that produces potent toxins, and shellfish accumulate the PSP toxins via food chain. Paralytic Shellfish Poisoning (PSP) in the Philippines due to *P. bahamense* var. *compressum* has apparently increased in severity in recent years.[1, 2)] A total of 2,107 PSP cases with 117 fatalities have been reported since 1983.[3)]

PSP is a great menace in the Philippines, particularly in coastal communities where people are dependent on shellfish as source of cheap protein and source of income. During PSP episodes, temporary bans on harvesting; transporting and marketing of all kinds of shellfish from contaminated areas are imposed resulting in the loss of income of shellfish farm workers, fish vendors and secondary processing industries.

To avoid the occurrence of PSP and prevent economic losses a monitoring program on shellfish toxicity and causative plankton concentration is undertaken. The Philippines, like any other tropical developing countries, is faced with problems in the implementation of effective and efficient PSP monitoring program. These problems include among others limited resources, lack of technical capability and a highly centralized management approach. The present monitoring system in the Philippines is being managed in a centralized approach. The National Red Tide Task force manages the implementation of the monitoring program of the entire country. The archipelagic nature of the Philippines composing of more than 7,100 islands compounded with logistical problems and inaccessibility of some local areas is a great impediment in the effective and efficient management of shellfish resources affected by the toxic red tide. The present monitoring and management system can be improved to address the problems brought about by the growing threats of PSP episode in the country, if a localized PSP monitoring system is implemented.

In this paper the status and limitation of the current monitoring program is presented, and a system on localizing the PSP monitoring in the Philippines was proposed and the merits of the proposed management option is discussed.

THE PARALYTIC SHELLFISH POISONING PROBLEM

The monitoring of shellfish as potential vectors of paralytic shellfish poisoning (PSP) in the Philippines and shellfish closures started in 1983. Figure 1 shows the distribution and spreading of PSP in the Philippines.

Fig.1 Geographical distribution of *Pyrodinium* (gray shade) and PSP cases (open circle) in the Philippines

Since 1987 annual recurrence of *Pyrodinium* in the coastal waters of the Philippines are observed. *Pyrodinium* recurs in 20 localities of the country (Fig. 1). There is an apparent expansion of toxic *Pyrodinium* and its concurrent PSP in the country over the last two decades. There are several hypotheses attributed to the apparent spreading of *Pyrodinium* and PSP episodes in the Philippines. Transfer of shellfish for aquaculture to increase production is believed to be the agent of dispersal of *Pyrodinium* in the coastal waters of the country. In Camiguin Province, it was suspected that seeding of green mussel spats collected from Samar province, the area where *Pyrodinium* blooms and PSP was first observed in 1983, had introduced *Pyrodinium* organism in the area. However, studies are needed to elucidate this assumption. Water current or circulation is another hypothesis in the spreading of HAB species in the Philippines. Blooms of toxic *Pyrodinium* with its concomitant PSP episode first occurred in Papua New Guinea in 1973 [4] and in Sabah in 1976 [5,6]. Subsequently, in 1983 the Philippines experienced the first blooms of toxic *Pyrodinium* and PSP in central Philippines [7]. *Pyrodinium* organisms from Sabah and Papua New Guinea might have been drifted/transported to the Philippines by water currents. Aerial observation during the 1983 *Pyrodinium* blooms in Maqueda Bay, Samar showed that water discoloration due to *Pyrodinium* cells were drifted to nearby coastal waters until it spread to the coastal waters of central Philippines [7]. However, this type of dispersal mechanism needs to be validated since results of the sediment study of Furio *et al.* revealed that *Pyrodinium* cysts were already present in Manila Bay prior to its first occurrence in 1988 [8]. *Pyrodinium* cysts in the bottom sediment of the bay already existed between 1958 and 1959[8]. Comparative studies between HAB species like *Pyrodinium* from the different areas of the Philippines and as well as from other neighboring countries in the region should be undertaken to determine the mode of dispersal of the organisms.

Increased monitoring of coastal waters and awareness on harmful algal blooms (HAB) may be another reason for the apparent expansion of shellfish poisoning episodes in the country. As more people are informed about PSP its symptoms and causes, PSP cases are now diagnosed and reported. Likewise, monitoring of the country's coastal waters is intensified and technical capability of personnel in HAB monitoring is also gradually upgraded thus HAB events and its associated ill effects are now documented and reported.

Since 1983 over 2,000 PSP cases with a total of 117 deaths attributed to the recurrence of toxic *Pyrodinium bahamense* var. *compressum* have been reported in the Philippines (Fig. 2).

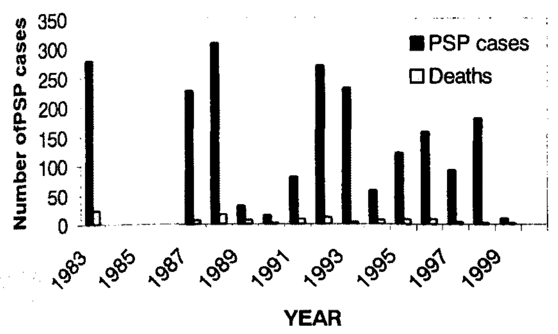

Fig. 2. Paralytic shellfish poisoning (PSP) cases in the Philippines, 1983-2000 (source: DOH-IACEH)

CURRENT MONITORING PROCEDURES

A national red tide task force is created to implement the country's red tide monitoring program. Monitoring surveys are conducted to determine the presence of causative red tide organisms in seawater and the level of PSP toxin in shellfish samples. The frequency and duration of the monitoring survey is dependent on the availability of budget. In Manila Bay sampling is conducted twice a week from at least over 20 sampling stations, while in provincial areas sampling is once a month, and in some other local areas monitoring is not on a regular basis and/or no monitoring at all. Shellfish samples for PSP toxin analyses are submitted to the central laboratory in BFAR Manila (Bureau of Fisheries and Aquatic Resources). Determination of shellfish toxicity is by mouse bioassay and shellfish closures are initiated when PSP toxin level is more than 40 μg /100g of shellfish meat. The regulatory level for paralytic shellfish poisoning is 40 μg/100g of shellfish meat. The policy on the issuance or imposition of shellfish closures during red tide outbreaks depends on the type of causative organism present in the area[9]. There is a separate criterion used in imposing and/or lifting shellfish ban for *Pyrodinium bahamense* var. *compressum* and *Gymnodinium catenatum*.

The current approach is to manage threatened shellfish resources through a centralized state-controlled monitoring program and harvesting restriction. With this kind of management regime, the response to the red tide problems is slow, confused and uncoordinated. It tends to reduce the authority of the local community and provides minimal role of the fishers to participate in the management of the resources; hence compliance to regulation is low or none at all. Relaying information from the local levels to and forth the national level takes a week or two with this kind of system. Action plan is reactive rather than proactive thus resulting to massive PSP cases and other negative impacts of toxic red tide. The monitoring program is beset with constraints that are critical in the management and decision-making. The constraints include weak technical capability, limited resources, and the mechanism/protocol in implementation of regulatory actions.

THE PROPOSED PSP MONITORING SYSTEM

A shift from a highly centralized state-controlled management system to a decentralized or localized PSP monitoring and management system is proposed. The decentralized management regime will be more effective in addressing the harmful algal bloom (HABs) problems in the Philippines since the local people and/or resource users will be empowered to manage their resources. Immediate response is assured since the local people and fishers are physically close to the area where HAB occurs thus confusion and non-coordination during HAB events will be prevented since they can make decisions without any impediments from the national government.

Figure 3 shows the process flow of the proposed system. The national government through the National Red Tide Task Force (NRTTF) should spearhead and facilitate the implementation of the decentralization of the PSP monitoring program. The role of the NRTTF is to oversee and coordinate the operation of the program.

Decentralization of the PSP monitoring starts with problem/issues identification and recognition by the resource users and/or stakeholders, open discussion about the problem, negotiation, consensus building and the development of agreement on a plan of action. Local Red Tide Task Force (LRTTF) will be formed through the Local Government Units LGUs) with the assistance from the NRTTF. The LRTTF will be strengthened and empowered to manage their resources affected by toxic red tides. They will serve as the core group for community participation and management. The BFAR in cooperation with JICA (Japan International Cooperation Agency) provides capability building and institutional support. The capability building component involves technical training of local staff in PSP toxin analysis and plankton identification and provision of equipment and reference materials, while institutional support component involves individual and organizational linkage development and institutional building or strengthening.

A national policy and guidelines on harvest restriction and standard on regulatory limit for paralytic shellfish poisoning should be formulated and adopted in all coastal localities of the country. Likewise, the national government should see to it that the LGUs and the local community are well equipped and prepared to carry out their respective tasks.

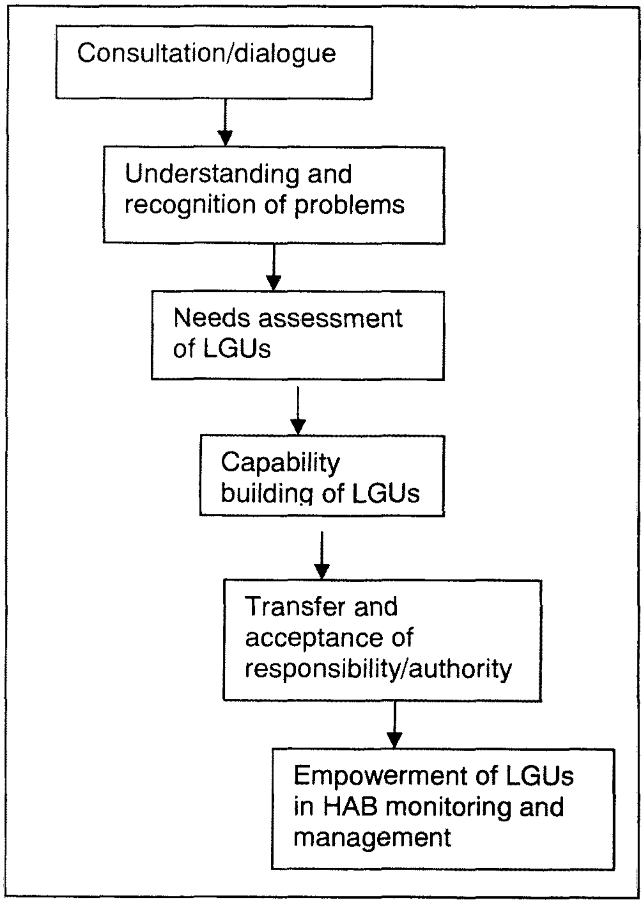

Fig. 3. Process flow of localized PSP monitoring system

ACKNOWLEDGEMENT

The assistance of the Japan International Cooperation Agency (JICA) in this project is greatly appreciated.

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