OPTIONAL APPROACHES FOR THE CRAB BANK SCHEME

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I. BACKGROUND

A swimming crab is served as delicacy in the Southeast Asian countries and consumed as one of favorite dishes. Naturally, this trend drives fishermen competitive overexploitation of the resource. The fisheries authorities and institutions in the region have been expressed this phase as a matter of deep concern, but no effective measures to control the impetus have been in fact put in place. Meantime, the phenomenon of reducing the size of crab and the volume of catches has been witnessed on end in fishing communities of the region and the fishermen themselves have become to realize the possible risk of the resources extinction in foreseeable future. Under these circumstances, some leading fishermen groups initiated the actions to alleviate the trend in a few fishing communities of Thailand. Their approaches are described in this report, and further the effectiveness of systems and possible improvement measures are studies.

II. CRAB BANK SCHEMES

1. Approach in the ICRM-PD project operational area, Pakklong Sub-district, Chumphon Province

An attempt so-called "Crab Bank" to protect gravid swimming crab has been practiced by the Crab Trap Fishing Sub-group of the Pakklong Fishermen Group (PFG). The idea of the Crab Bank was originally introduced by the NGO Thai Environmental Institute under the project "Mangrove Conservation in Tungmaha Bay" in 2002 after conducting a study tour to the fishermen group in Trat Province. (In fact, this fishermen group has suspended the scheme due to the group management constraint.) Since then, it has been developed by crab trap fishermen in a way that all gravid crabs are deposited in cages until they have hatched. The crabs in the cages are normally checked once a month and those having spawned are removed from the cages and sold to the buyers. The leader of the group feeds the crab in the cages with trash fish every day.

Of the sales, 50% is saved as the credit scheme fund, 40% is used for installation and maintenance of cages and the rest 10% is for feed supply. The accumulated amount for the credit scheme accounts for as much as Baht 10,000 so far. This system has been successfully maintained with the 16 members of the crab trap fishermen by the very prominent leadership of the group. This is commendable as most other similar attempts in Thailand have been failed due to the poor group management skill.

Table 1. Record of Crab stock[1]

Month	No. of Crab (pc.) in cages			No. of crab Sold (pc.)	No. of crab lost/dead (pc.)	Survival rate (%)
	Remained	Deposited	Total			
April	129	829	958	425	433	54.8
May	100	713	813	450	216	73.4
June	147	770	917	350	238	74.0
July	329	1,068	1,397	500	678	75.4
August	219	734	953	300	427	-

[1] Source of data: Saivason 2006

↑Discharging gravid crab

↑ Crab hatching cages

2. Approach by the Bang Saphan Bay Pilot Project, located in Prachuap Khiri Khan Province

The Bang Saphan Bay Pilot Project (BSBPP) has been in operational in pursuing the community-based coastal fishery resources management concept since over 10 years by the DOF Thailand. They initiated the crab bank in a way of copying from the method employed by PFG in 2005. They constructed 2 cages for trial but an attempt to stock gravid crab as done in the PFG was discontinued soon after initiation due to its cumbersomeness of handling (daily feeding, repair and maintenance of cages etc.) as well as unfavourable sea condition. The coastal line of Bang Saphan is rather exposed to the open sea compared with the one in Phakklong.

After experiencing the negative trial as such, they started to challenge the batch system with hatching tanks. In this system, gravid crab in the last stage of spawning (with black coloured eggs) are kept in plastic tanks with the capacity of around 100 lit until eggs are hatched. A tank is equipped with an air-stone. The eggs hatched are kept in the tank for a few days and then those zoea are released into the sea. The mother crab after hatching are sold to the buyers by the fishermen who caught the crab.

↑ Hatching in plastic tanks

In this system, the project provides the fishermen with necessary facilities, equipment and electricity supply and each fisherman is responsible for transportation and looking after stocking and feeding. The transportation and discharging of zoea are carried out by the project. The main limitation factor in this system lies in that only gravid crab with matured eggs of black coloured can be protected but not all gravid crab.

3. Approach by the Settsu-Harima Fishermen Cooperative in Hyogo Prefecture, Japan

Aimed at enhancing the dwindling crab resource, a voluntary organization called "Gazami Fuyasou Kai (Swimming Crab Resource Enhancement Association – SCREA) was established in December 1986 in the Hyogo Prefecture, Japan with the following justification, approach and activity.

- The objective of this association lies in enhancing the crab resource in a way of protecting gravid crab.
- Under the normal environmental condition, a crab spawns 3 – 4 times from May to September a year. A gravid female crab hatches about 1.8 million (between 1 to 3 million) zoea each time.

- The SCREA purchases gravid crab from fishermen at the prices which differ depending on sizes and paints the red cross-marks on the carapaces and returns them back to the sea.
- When fishermen catch any crab with the red cross-marks on, they have to return them back to sea.
- Female crab are normally molded after hatching a few times. Then, the red cross-marks are disappeared. Then, those are allowed to be harvested.
- Crab under 12cm in carapace length and with soft-shells are not allowed to be harvested and to be returned back to the sea.
- The control season is limited for the spawning period of 5 months from 1st May to 30th September.
- The cost of purchasing gravid crab is borne by the fund contributed by the members of SCREA.
- Anyone can be a member of SCREA and half of them are not necessarily engaged in fisheries but ordinary people.
- Those who have become the member of SCREA are endowed the membership cards.
- The target number of members is 800 and the amount of annual contribution per a member is 1,000 yen equivalent 330 Baht.

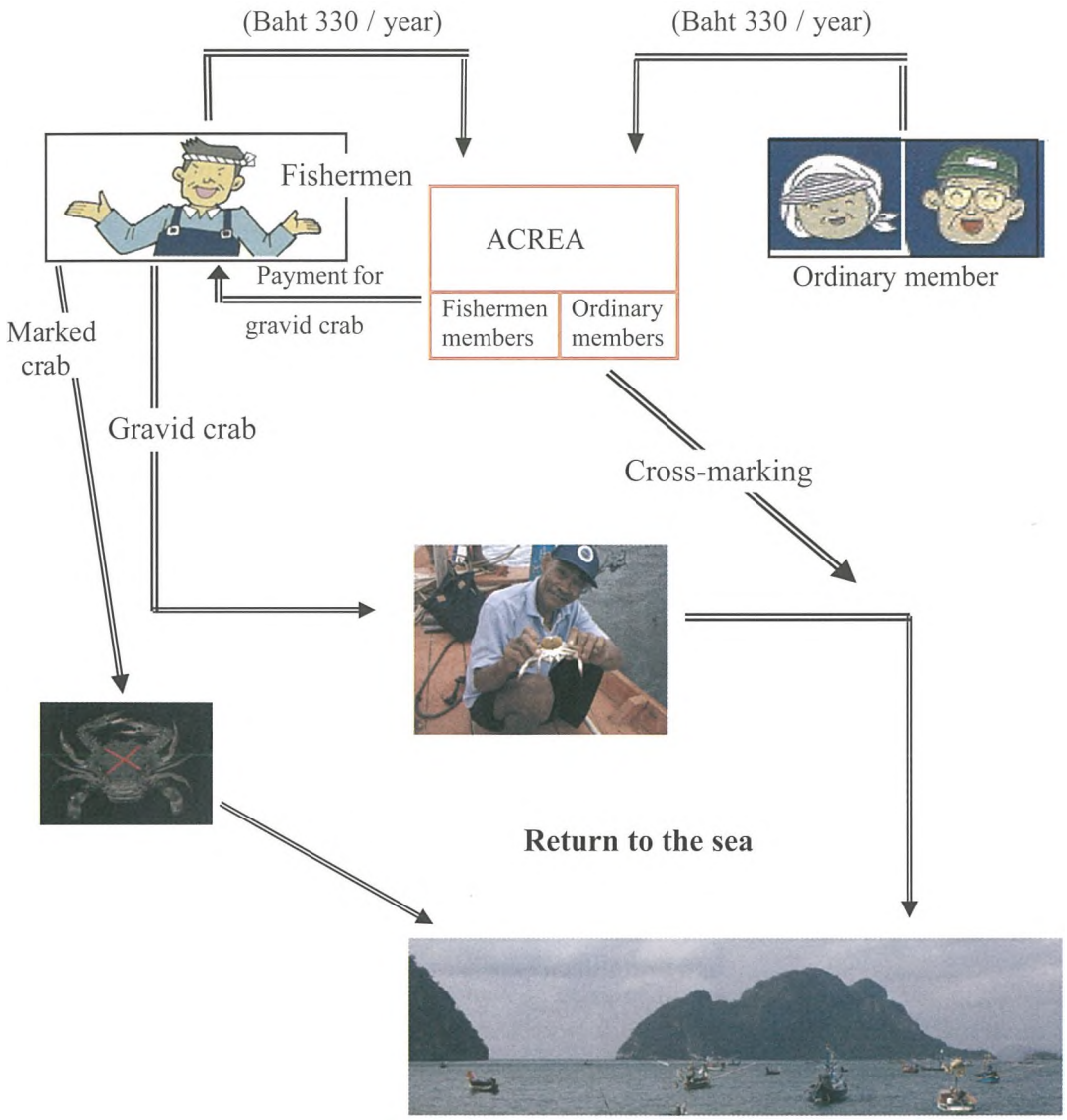
The system of this SCREA is depicted in the chart of Fig.1. The major advantage in this system lies in high survival rate of gravid grab and zoea compared with the cage or the batch systems in Thailand.

III. Discussion

Among the above three systems, there are certainly advantages and disadvantages as discussed in detail in the table 2.

As seen in the table, it is obvious the Japanese approach seems to be the most effective method thinking in terms of scientific recovery of the resources since gravid crab are returned to the natural environment where ensures the gravid crab and zoea higher survival rate and protected until the spawning seasons are over. Most gravid crab released are to spawn a few times more during a season. On the other hand, the gravid crab are protected only once in the systems that are employed in Chumphon and Bang Saphan. Also, the cost of initial investment and operational expenses are considerably higher compared with the Japanese system.

However, implantation of the concept in resources management among fishermen is crucial factors in evolvement of the crab bank scheme, and taking this point into account the approaches in Thailand are more reasonable than the one in Japan demonstrating a visible impact to all beneficiaries concerned. This is a sizable advantage.



IV. Conclusion and Recommendations

The scheme initiated by the self-motivation of fishermen in Chumphon is admirable and encouraging. This has been operated with purely voluntary spirits by the members of CB under the self-regulated resources management framework as the members are not expecting any direct return from offering a part of their catches but just through possibly happening benefit of utilization of loan in future.

Thinking in terms of technical as well as scientific effectiveness, however, there seems to be some room to be further improved. In this senses, one can say that a model would be the one prevailing in Japan. However, it seems to be too haste to introduce such a system in Chumphon now. Certainly, the visible impact by the crab bank in Chumphon induces the fishermen to participate in the scheme. It may take time for them to realize the natural mechanize that multiply the crab resource in the natural environment. Also, an expansion of the awareness level to the public is essential for the fund raising purpose like having been practiced in Japan. The efforts should be continuously exerted toward application of such a system in future.

Table 2. Comparison sheet in the three crab bank systems

Assessment / Sytem	Stocking in cages (Chumphon)	Stocking in tanks (Bang Saphan)	Releasing to the sea (Japan)
1. Survival rate of gravid crab	Low (about 50%)	High (only a few days stocking)	High (in the natural environment)
2. Survival rate of zoea	High (in the natural environment)	Relatively low (in air-agitating tanks)	High (in the natural environment)
3. Target gravid crab	All gravid crab	Only matured crabs before hatching (with black coloured eggs)	All gravid and potentially gravid crab (marked)
4. Operational season	During the calm seasons	All seasons	Spawning seasons
5. Cost of investment & operation **- Initial investment** **- Labour** **- feed** **- fuel** **- Maintenance**	 High (cages etc.) High (daily attendance at sea) High (one month at maximum) High (daily attendance at sea) High (repair of cages)	 High(shed, plastic tanks, air pumps ect.) Medium (daily attendance on land) Negligible (a few days at maximum) Negligible (combined with fishing) Negligible (repair of air pumps etc.)	 Nil Marginal (only marking) Nil Negligible (may rely on fishing trips) Nil
6. Income for the member fishermen	Nil (indirectly yes in the form of loan)	Sale of mother crabs after hatching	Sale of gravid crabs to the Crab Bank
7. Institutional support	Marginal	Need to some extent	Need to some extent (PR etc.)
8. Organization	Need a strong leadership and coordinator	Need a strong leadership and coordinator	Need a strong public awareness
9. Fund raising	Not necessary	Not necessary	Relying on fishermen as well as public contributions
10. Sustainability	Subject to the leadership	Subject to the leadership	Subject to the public awareness
11. Visibility of impacts	High	High	Low