

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 RAZOR CLAM POPULATION

Population dynamic of razor clam at Don Hoi Lord from this study can be represented as follows:

- Density of razor clam through year round was  $5.71 \pm 2.49$  individula/m<sup>2</sup>, density of razor clam during daytime low tide was higher than density during nighttime low tide.
- Average razor clam weight from this study was  $2.14 \pm 0.33$  g/individual. In addition, razor clam weight in this study seems increase when it close to breeding season.
- Average of razor clam size from this study was  $4.15 \pm 0.90$  cm/individual. From Sunan Tuaycharoen and Phanit Voraingtara, (1991) reported razor clam can reproduce at size over 4.24 cm. from this study, razor clam population seemed to have a risk of population reduction because the average razor clam size cannot breed until its size reaches 4.24 cm. Therefore, it mean that the marketable size is in reproductive stage of population structure from this effect the population will decline in the near future.
- Population structure of razor clam, majority size class of razor in this study was 3-5 cm. Besides, size classes more than 5 cm are caught by local fisherman.
- Razor clam breeding season, can confirm that the breeding season is all year long but there are 2 peaks of breeding season during May-July and November to December.

Overall the of razor clam population seems to start recovering (when compare with Rangsimant Bauthong, 1997) from the inappropriate harvesting method from the past after local government released some regulations.

## **5.2 FISHERMAN BEHAVIOR AND IMPACT ON RAZOR CLAM RESOURCE**

Local fisherman behavior pattern in this study was based on monthly personal interviews and observations in the field study. The study indicated that their behavior depend on razor clam population density. They have their own perception in razor clam harvesting but they usually imitate other local fisherman when their harvesting rate is decreased. They communicate to each other about density, size and razor clam habitat occasionally. In addition, traders or razor clam buyers play role on density, size and habitat of razor clam as information distributor with local fisherman. However, local fisherman has additional job to make more income without only depending on razor clam harvesting.

Current local fisherman harvesting behavior can affect razor clam population of size classes over 4 cm because the regulation of local government allows only the dipping lime method. This method is a selective method; local fisherman can select razor clam in certain size and neglect small razor clam as a clam stock. Nevertheless, the effect of harvesting on razor clam population from local fisherman is occurred all year long because local fisherman goes to harvest razor clam every month.

## **5.3 MANAGEMENT GUIDELINE FOR RAZOR CLAM CONSERVATION FROM COLLECTIVE DISCUSSION**

Collective discussion among stakeholders was organized during RPG session and the main agreement provided a razor clam management and conservation should emphasis on mobile reserved area which described as scenario II in RPG and multi-agent simulation model. Furthermore, during the RPG session there are many suggestions on razor clam management and conservation from all stakeholders and these can be described and shown in figure 5.1

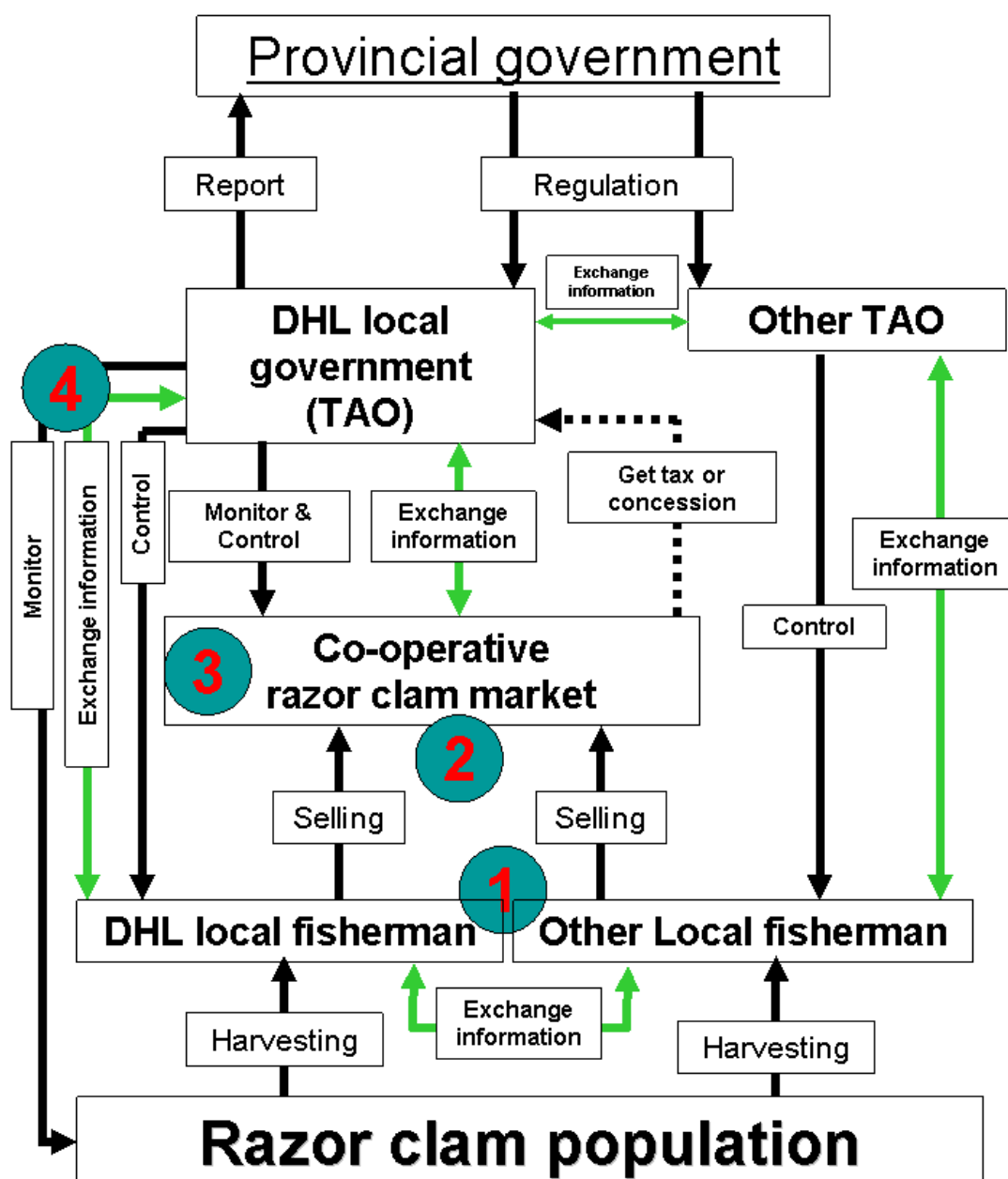


Figure 5.1 Razor clam management and conservation guideline from collective discussion

(\* TAO= Tumbon Administrative Organization)

Figure 5.1 there is a bottom up management guidelines and number 1-4 are the additional idea from researcher and stakeholders during discussion. The management guideline can describe as follows:

Razor clam resource is an open-access resource that local fisherman from everywhere can come and harvest razor clam from Don Hoi Lord area. The management guidelines purpose start from, the idea number 1; every local fisherman who come to harvested razor clam should be registered as a razor clam harvester in responsible to Don Hoi Lord TAO<sup>1</sup>. The idea number 2; local fisherman or trader should pay tax to Don Hoi Lord TAO or buy concession from Don Hoi Lord TAO. The idea number 3; Don Hoi Lord TAO should establish common razor clam markets that every trader and razor clam harvester do buying and selling at one place, this idea will make Don Hoi Lord TAO easier to monitor harvested razor clam production and exchange information about razor clam with others stakeholders. Finally, idea number 4; Don Hoi Lord TAO should monitor razor clam population in Don Hoi Lord by setting up a budget from tax or concession in order to monitor environment condition and razor clam population and report to provincial government.

In case of razor clam resource decline, provincial government must implement some strict regulation to control harvested razor clam production and cooperate with Don Hoi Lord TAO and other TAO which razor clam harvester belong to. In fact that TAO must control harvesting rate of local fisherman especially Don Hoi Lord TAO must control their local fisherman and have consistent monitoring for both of harvested razor clam production at common razor clam market and razor clam population in Don Hoi Lord area.

In case of razor clam population in Don Hoi Lord, the cooperation and responsibility of local fisherman must be monitored in order to achieve conservation and management, as well as to have a systematic database for the sustainable management.

---

<sup>1</sup> In actuary almost area of Don Hoi Lord area is belong to Bangjakreng district and small piece area belong to Bangkaew district but this study use Don Hoi Lord TAO for easy to understand.

## **5.4 RECOMMENDATIONS**

### **5.4.1 Razor clam conservation and management**

The razor clam management and conservation guidelines from collective discussion are reliable for razor clam resource from the researcher's point of view. But it should implement the management guidelines in the real situation as soon as possible.

From personal interviews of trader and local fisherman in terms of razor clam price and harvested razor clam production in each month, in some months the harvested razor clam was higher than the market demand so trader have to store surplus razor clam in refrigerator for selling later when market demand increased. Then, the price is reduced; it is a kind of risk due to capital lost. Thus, TAO should concern in this topic and explore market demand via traders and control local fisherman harvesting rate correspond to market demand. It can guarantee sustainable both of local fisherman income and razor clam population in Don Hoi Lord.

Finally, as a result from tourist interviewed in Chapter IV, there are many activities at Don Hoi Lord especially aesthetic value for having a meal and traveling to sand dune. TAO should control restaurants which are located on the coastal zone especially waste and garbage management in order to protect razor clam habitat. For traveling on sand dune activity, some tourists always left lime on the sand dune when they tried to catch razor clam. It can make impact on razor clam population even if there is no direct study or research on that topic but TAO and stakeholders at Don Hoi Lord should respond to this issue and launch campaign or provide knowledge and information to tourist.

### 5.4.2 Future studies

Razor clam population data in this study is output of one year study which can be rather short to study population dynamics. However, the study should have more field data collection for better understanding of razor clam population. Then, the model would be more realistic.

The RPG sessions were organized in two villages of local fisherman so the better understanding should be expanded to cover more stakeholders of Don Hoi Lord the study should include the following components:

- Local fisherman from other village who came to harvest razor clam
- Officers from Department of Fishery who direct respond to razor clam resource through in the game.
- Officer from other TAO which has razor clam harvester belong to.
- Other trader who play role mediation between local fisherman and markets

In addition, more RPG sessions should be conducted to observe local fisherman behavior, better understanding local fisherman behavior and justify the collective discussion for more effective razor clam management and conservation method.

Regarding multi-agent simulation, more issues can be included in the future studied:

- Natural mortality of razor clam in reality and in our model
- Dispersion of razor clam offspring and razor clam movement in reality and in our model
- Total area of Don Hoi Lord should be consider into current multi-agent simulation model

All of developments will made multi-agents simulation more implicated reality and become useful tool for long term of razor clam management and conservation in the RPG.