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## Status of Shrimp Farming In Cambodia

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### INTRODUCTION

In the South-Western part of the country, Cambodia has 435 km coastline in the Gulf of Thailand, which stretches between the Vietnamese borders in the South to the Thai border in the West.

The fisheries sector plays a vital function in Cambodia's food supply, particularly the poor. It is also important for Cambodia's national economy that most national incomes come from this sector through exploitation and exportation. According to the latest official data recorded by the Department of Fisheries (DoF), the total commercial fisheries production in 2002 was 424,400 metric tons, which included the small scale and family scale freshwater fisheries and aquaculture production, except crocodile culture (DoF, 2003). In this case, freshwater fish capture dominates the production, which accounted for 85% of the total production in 2002, while marine capture fisheries was 11%. The total aquaculture production represented only more than 4%. Even fish production increased in fish capture fisheries. The increasing production trend of the capture fisheries indicates overexploitation of fishery resources, hence, there is a need to restore fishery resources. To address this, local fishers need alternative jobs in order to enhance their livelihood and encourage them to minimize over fishing and also from destructive fishing practices. One of the options also is to promote aquaculture.

### FARMING OF PENAEID SHRIMP

Shrimp culture activity along the coastline of Cambodia is carried out in four different locations namely Kep, Kompot, Koh Kong and Sihanouk Ville. Farming of shrimp is a relatively new development in Cambodia. It began in the late 1980s and early 1990s, but never reached the level of inland aquaculture. Two species of penaeid shrimp (*Penaeus monodon* and *P. vannamei*) have been introduced for farming in Cambodia's coastal areas.

#### Farming of *Penaeus monodon*

*Penaeus monodon* is a native species in the coasts of Cambodia. Farming of this species started in 1989, and significantly expanded since 1991. It can be classified into two different culture methods: (1) intensive shrimp farming and (2) traditional extensive shrimp farming.

In Kompot and Sihanouk Vile, the shrimp farms are mostly extensive, using traditional methods, although there are two intensive farms in Kompot (one is 16 hectares and another is 30 hectares which is still under construction). These extensive farms rely on natural supply of feed and seed. With no feeding, fertilization, or stocking management, productivity remains low at less than 100 kg/ha/year. The shrimp ponds are often constructed in or close to the mangrove areas, with some farms leaving the mangroves in the ponds.

In Koh Kong, the shrimp farms are mostly intensive. Intensive shrimp farming system was introduced to Koh Kong province by a Thai shrimp farmer and businessman. The farms relied mainly on Thailand for the supply of most inputs, such as feed, seed, chemical and equipment, and also for market of harvested shrimps. The intensive techniques for shrimp farming in Koh Kong involve high stocking density, formulated feed, aeration, and regular water exchange. The main species for culture is *Penaeus monodon*. Pond yield was reported to be high, at 7 to 8 tons/ha/crop for new farms, and profits are attracting further investment. However, the industry in Koh Kong is facing disease problems common in intensive shrimp farming due to self pollution that caused farmers significant economic losses. Other problems include resource conflicts particularly with farms located in or near mangrove areas.



A private hatchery was established in Koh Kong in 1994, reportedly producing about 2.5 million post-larvae to supply their own need. The operation of this hatchery was irregular due to many factors such as technical constraints, the seed market and lack of broodstock.

Based on the survey on sustainable shrimp farming management conducted by NACA in 1995, it was concluded that the extensive farms had low pond yield of 32kg/ha/year and an overall national sale value of only \$25 million per year. In contrast, intensive farms had an average production of 7545kg/ha/year with a national sales value of \$42 million per year (Touch Sean Tana, 2002).

A review of this sector in 1995, showed that the intensive shrimp farms in Koh Kong Province increased up to 1 000 ha until the onset of white spot syndrome virus (wssv). This virus has been the most serious threat faced by the shrimp farmers in Cambodia and is probably the major cause of direct losses of up to \$14.5 million per year. Hence, the shrimp farming area declined to about 850 hectares in 2000, and decreasing gradually each year (Touch Seang Tana, 2002).

Shrimp production is shown in **Table 1** (in tons):

Year	Production by Province				Total Production
	Kep City	Kampot	Sihanoukvill	Koh Kong	
1993	0	0	0	500	500
1994	0	0	0	560	560
1995	0	0	1	730	731
1996	0	0	0	600	600
1997	0	2	0	264	266
1998	2	46	13	151	212
1999	1	5	6	50	62
2000	1	0	0	19	20
2001	3	50	60	30	143
2002	1	0	25	27	53
2003	2	8	53	27	90
2004	0	20	37	18	75

### Farming of *Penaeus vannamei*

*Penaeus vannamei* is not indigenous species in the coasts of Cambodia. *P. vannamei* postlarvae were first imported to the country from Thailand in 2000 for trial stocking by a private shrimp farmer in Otres of Sihanouk Ville, and later from Taiwan of China in 2003. Currently, there are two shrimp farms (6 ha) in Sihanouk Ville stocking this white shrimp (*P. vannamei*).



*P. vannamei* farm in Prey Noup District of Sihanouk Ville.

Since there are no shrimp hatcheries and formulated feeds, all these inputs have to be imported from Thailand or Taiwan. The pond yield ranges between 2 and 5 tons/ha/crop with harvest size ranging at 50-100 heads of shrimps/kg. Because of the small shrimp production produced by the shrimp farms, most of the production are marketed only within the country with an average price of about 8-10\$/kg for local consumption.

After the first trial of stocking white shrimp, shrimp farmers showed positive response and suggested some good reasons for the introduction of *P. vannamei* such as:

- *P. vannamei* has potential to grow faster than *P. monodon*
- *P. vannamei* is easier to culture in higher density as compared to *P. monodon*
- *P. vannamei* requires lower protein feed and
- *P. vannamei* is considered to be more disease resistant than *P. monodon*, especially to white spot syndrome virus (wssv).

### IMPACT OF INTRODUCING *P. VANNAMEI*

Since the introduction of *P. vannamei* to Cambodia, no information on catch is available; hence no clear evidence of this species causing any risks to Cambodian coastal areas. There is no report also from fishermen that escapes of *P. vannamei* have led to any negative impact on wild shrimp population. Hence, further ecological research is needed on *P. vannamei* in the wild and its impacts on native species. However, it is believed that *P. Vannamei* may cause some negative impact to economic and biodiversity, if *P. vannamei* find their way from shrimp farms into the surrounding environment during floods.

## **EXISTING POLICIES ON THE INTRODUCTION OF AQUATIC EXOTIC/ALIEN SPECIES**

Presently, Cambodia has no detailed guidelines or regulations for the movement/importation of aquatic animals for culture. However, environmental impact studies are being done and require fish farmers to meet environmental standards in shrimp farming. Under these conditions, the development of aquaculture raises the question of potential negative impacts of introduced exotic/alien species on native fish stocks. But there are a number of regional codes of practice and guidelines assisting in this process such as FAO Code of Conduct for Responsible Fisheries (FAO CCRF), World Organization for Animal Health (OIE), International Council for the Exploration of the Sea (ICES), etc.

## **RECOMMENDATIONS FOR CONTROLLING THE INTRODUCTION OF AQUATIC ANIMAL EXOTIC/ALIEN SPECIES**

In order to reduce or avoid the negative impact caused by the introduction of exotic/alien aquatic species into non-native areas, the following points should be prepared and considered:

- Establish the code of practice or guidelines on the importation/movement of aquatic animals;
- Have strict rules for importing of aquatic exotic animal species into the country. Allow importation only of species which have no negative impacts on the environments;
- Implement international codes of practice and guidelines;
- Release only indigenous species or aquatic animals during releasing/stocking ceremony
- Conduct risk assessment studies before allowing the introduction of new aquatic animal species;
- Establish quarantine systems to control the importation of aquatic animals;
- Develop national reporting systems for aquatic animal diseases;
- Conduct capacity building in risk analysis, procedures for monitoring and disease surveillance; and
- Enhance public awareness on negative impacts of alien species.