

Component 7 Stock enhancement

Stock enhancement of tiger shrimp *Penaeus monodon* in the Philippines

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The Component 7 of the Coastal Area Capability Enhancement (CACE) Project of RIHN focuses on the Community-Based Shrimp Stock Enhancement Project (SSEP) in collaboration with Philippine partners – SEAFDEC Aquaculture Department and the Aklan State University (ASU). The main objective of this component is to evaluate prospects for tiger shrimp *Penaeus monodon* stock enhancement in the New Washington Estuary (NWE), province of Aklan, in terms of fisheries and social aspects.

The fisheries aspect of this component deals with site-specific assessments and on site experiments to identify various technical requirements for rearing and releasing of tiger shrimps in NWE. Six trials of intermediate rearing of shrimps were conducted from 2013 to 2015. Out of the six intermediate culture trials, three were successful to produce shrimps for release. The second trial in April 2014 had 4% survival, releasing 15,000 shrimps. Trial tagging experiment using plastic wire tags was done for 100 shrimps. The third trial in July, 2014 released 120,000 shrimps (44% survival) with 240 tagged. The 4th trial in November suffered very high mortality as caused by series of typhoons affecting the site. The 5th trial yielded the best success in producing an estimated 250,000 shrimps (51% survival) of desired size in 30 days and were released in May (250 tagged). The latest run (June 2015) was not successful because of typhoons and prolonged rains were again experienced earlier than expected causing mortalities of bigger shrimps.

On the other hand, the social aspect primarily involves socioeconomic profiling of stakeholders and further periodic monitoring surveys. Socioeconomic evaluation in NEW was done through meetings with the LGU and local communities in the island barangay of Pinamuk-an in New Washington. A baseline socioeconomic survey of 200 households in Brgy Pinamuk-an was done in March 2013 involving four target groups: 1) fishers without organizational affiliation, 2) fishers who are members of fishery organization, 3) community members in fishery-related livelihoods; and 4) fishers with gears owned and located in NWE. The baseline survey mainly showed low levels of understanding and experience on stock enhancement but willingness to participate in activities. Another survey was conducted in November 2015 to understand the effect of shrimp stock releases on a number of socioeconomic parameters of the target project beneficiaries by comparing from the 2013 baseline survey. Initial results showed that daily minimum catch volume barely increased from 1.50 kg in 2013 to 1.53 kg in 2015. In contrast, Daily maximum catch volume decreased from 8.25kg in 2013 to 6.43 in 2015. Meanwhile, monthly income from all sources, including fishing, increased by 13.4% from PhP 4,053 to PhP 4,597. Perceptions about resource condition generally improved specially for shellfish, crustacean and mangrove, but less for seagrass and fish. Perceptions about participation in community and fisheries affairs also improved. However, perceptions about leadership capacity in the

community declined while LGU financial support increased but not significant. Awareness about stock enhancement was mainly due to meetings (56%), community members (19%), LGU and SEAFFDEC/AQD staff (9.2%) and less from participation in the project (3.4%) and the PSFA (6.7%).

Only 10.3% of the 195 respondents caught tagged *P. monodon*, mostly using active gear (65%) and 35% used passive gear. About 33% think that the *P. monodon* caught was from the project (SSEP), 37% think otherwise, and 29% cannot determine. Nonetheless, 32% understand the SSEP, 31% believe SSEP will contribute to increased catch and income; while 37% have no idea and 1% not yet convinced. Unfortunately, the community's interest to participate in SSEP declined from 96.9% in 2013 to 81.5% in 2015. The interest in the project was mainly due to expectation of improved livelihood and income (67.9%) and knowledge (7.5%). There was also a decline in expectations about SSEP benefits in terms of catch and income; and the willingness to regulate harvesting declined from 80% in 2013 to 73% in 2015. Those who favored: 1) seasonal regulations slightly declined from 25 to 24% from 2013 to 2015; 2) regulation of illegal gears declined from 66.7 to 55.9%; 3) size limit of shrimp catch pieces also declined from 71 to 54%; and 4) the establishment of sanctuary also favored by 29.7% during the 2015 survey.

Actual catch monitoring is continuing, primarily using 20 fixed stations with "tigbakol" or fish corral/set net. Baseline data from monitoring showed that from Jan-Dec 2013, the combined tiger shrimp catch from all 20 stations was only 13 pcs for the whole year. On the average, only 1 pc of *P. monodon* was caught by 20 *tigbakol* per month in 2013, and increased to 6.75 pcs per month in 2014, while initial results in 2015 showed 8 pcs monthly average catch for the same set of gears. Alternatively, this study also monitors shrimp catch fish traders in immediate island of Pinamucan. From the batch released in May 2015, 15 out of 250 tagged shrimps were captured so far. Initially, this directly translates to 6% recovery which can be considered as good. In Japan, shrimp release and recovery are often <5% (Kitada and Hamasaki, 2006).

Immediate increase in catch after rearing and release activities can clearly be seen, indicating very active fishing pressure in the area. Unfortunately, good catch were not sustained and steep decline in tiger shrimp harvest were evident afterwards. This suggests that there is a need to mitigate impacts of overfishing, through some fisheries management intervention like catch regulations. In view of this, the social aspect of this study initiated a series of consensus-building discussions in October 2015 with the local government units (LGU); the Pinamuk-an Small Fishermen's Association (PSFA) and the Aklan State University. The discussions aimed to implement local action plans that will enhance societal benefits from the release of shrimp juveniles, including regulations and alternative livelihoods options. Therefore, stock enhancement activities need to be coupled with effective fisheries management and enforcement to maximize success, both in terms of fisheries and social impacts.