Effectiveness of Fish and Shrimp Seed Stocking Strategies on Inland and Aquaculture Production in Sri Lanka

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Abstract

Although there are a number of fisheries and aquaculture development programmes, the country has not yet reached the level of per capita fish consumption level of about 21 kg. To overcome this problem, Sri Lankan government has been given priority to produce fish seed as the main aquaculture development strategy. But all those seed stocking programe have not reached their expectation. This research is aimed to study how far the stocking programme effect production. Stocked amount of seed was considered as independent variable and recorded production just after stocking year was considered as dependable variable. The regression analysis was applied for the data of shrimp and fresh water fish for the duration of 2006 to 2012. The result revealed that fish seed stocking density was statistically significant on fish production variation but shrimp seed stocking did not show statistically significant impact on the shrimp production variation. The inland and aquaculture yield in metric tons (Y) was related to stocking fish seed million (S) found that $Y = (-9447.93) + 19795.41 \log S$. It is concluded that present shrimp seed stocking programme is ineffective. Therefore, it is recommended to re adjust the shrimp seed stocking strategy to gain more shrimp production.

Key words: Aquaculture, Inland fishery, Fish, Shrimp, Seed stocking.

Introduction

Sri Lankan fisheries industry expanded in vertically and horizontally with amelioration of technology, contributed to the economy of country by providing livelihood for more than 2.6 million coastal communities as well as supply more than 50% of animal protein requirement of the people. The sector being sharing nearly 3.2 % to the Gross National Production (GNP). The fish production of the country has gradually increased. Government has taken action to develop inland fisheries and aquaculture. Despite numerous programs, local food fish availability is not enough to full fill the present consumer demand. More over food fish supply has not been able to reach the Medical Research Institute (MRI) recommended per capita fish consumption of 21 kg. Compensation of consumer demand aquaculture development is the most sophisticate solution (Kithsiri, 2013).

Sri Lankan government has given priority to increase fish seed production than other management strategies to increase aquaculture production. As stocking density increases, fish grow at a slower rate with showing the graph parabolic curve on unit production (Amerasinghe, 1998: Wijenayake *et al.,* 2005). Freshwater fish seed are produced at main Aquaculture Development Centers (AQDC) in Udawalawa, Dambulla and Iginiyagala Main species of fish are the Chinese carps (silver carp and bighead carp) and the Indian carps (rohu, mirigal and catla). Pambala, Chilaw and Kahadamodara produce post-larvae of the freshwater prawn, *Macrobrachium rosenbergii.* Fry produced at these centers are sold to private pond operators and community-based organizations for rearing to fingerlings and sale to fisheries societies, provincial councils and non-governmental organizations for the purpose of stock enhancement and culture-based fisheries in perennial and seasonal tanks. The research problem is the fish and shrimp production has not gained corresponding to the fish and shrimp seed stoking increment. This study focused to find out how far seed stocking effects

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the on inland and aquaculture fish production. There were lack of quality fish seed, technology gap to grass root nurseries, unorganized seed marketing channel and unavailability of quality certification are the major constrains in this sector (Srirwardena, 2007).

Materials and Methods

The Sri Lankan fish, shrimp and seed production data was collected from National Aquaculture Development Authority of Sri Lanka (NAQDA) and Ministry of Fisheries and Aquatic Resources Development (MoARD). Seed production data were used as independent variables and fish and shrimp aquaculture production data were used as dependent variables for the regression analysis. The effect of the seed stocking was conceptualized to increase fish production in the following year. Hence stocking data were compared with following year production data. The data were analyzed using regression equations for both shrimp and fish for the duration 2006-2012. The regression curves were prepared for both fish and shrimp yield in metric tons in t +1 years (Y_{t+1}), intercept (a), Coefficient (b), is related to stocked fish seed million at t years (S_t) and error factor (€) $Y_{t+1} = a + b\ S_t + €$. This regression equation was prepared by confiding the stocked seeds are grown within one year and harvested in the year just after the stocking. Data were analyzed by using PASW 18 computer soft ware.

Results and Discussion

Using the above equation, national fish fingerling stoking and inland and aquaculture fish production data were analyzed and result shown in (figure 1.)

Fingerling stocking showed statistically significant positive relationship with inland and aquaculture production. Cumulative efforts of fish seed stocking

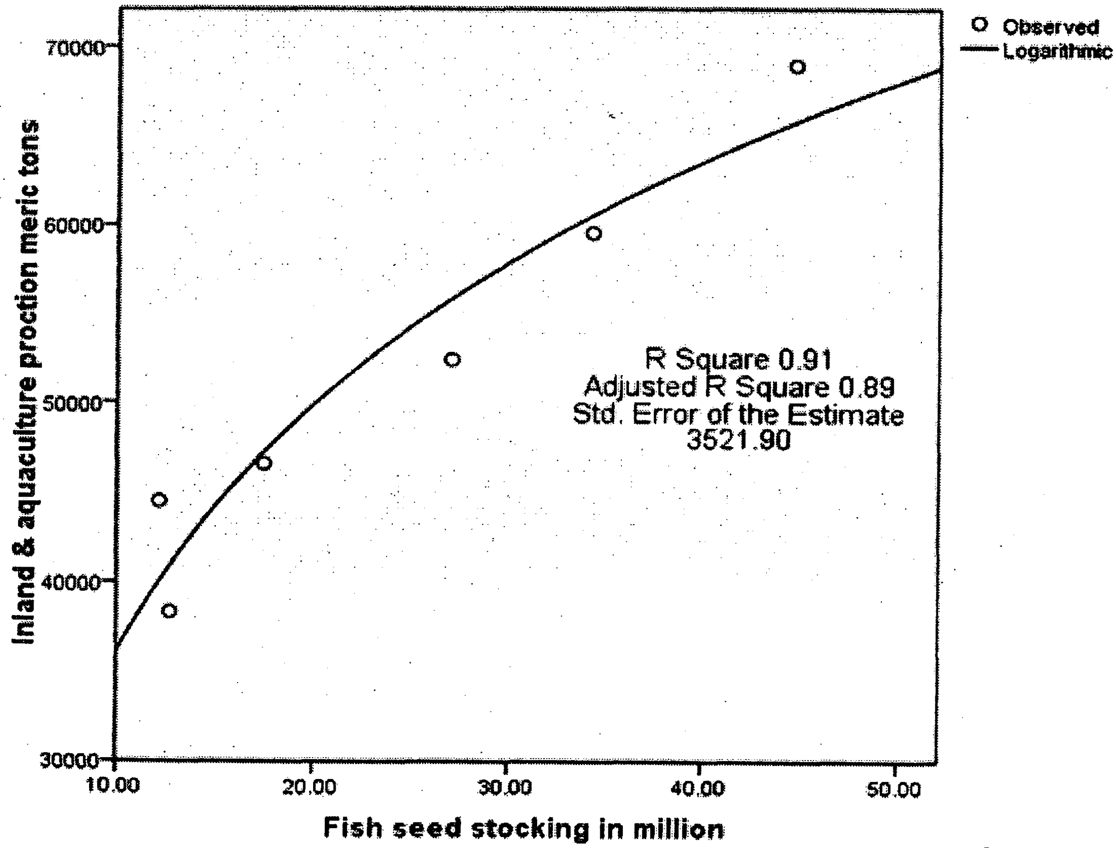

Figure 1. Fish fingerling stoking (2006-2011) with following year inland and Aquaculture fish production

strategies which were implemented from 2006 to 2012 gained successfully upshot on fish production. The inland and aquaculture yield in metric tons in just after the year the fish seed stocking (Y_{t+1}) is related to stocking fish seed million (S_t) found that $Y_{t+1} = (-9447.93) + 19795.41 \log S_t$. Similar results have been reported by Amerasinghe (1998) and Wiyenayake *et al.* (2005). Fish production showed a parabolic curve in selected tank. Recent research results which were revealed by Kithsiri (2013) further proved that aquaculture have more potential to increase fish production.

This study showed that shrimp post larvae stocking were not statistically significant on shrimp production. Wijenayake *et al.* (2005) further proved that although shrimp seed stocked, shrimp production was not resulted in some selected tank. Srirwardena (2007) has shown that good quality seed is needed for aquaculture development and there were no seed certification procedure in Asian countries. But in Sri Lanka, no independent seed certification mechanism has initiated to ensure good quality fish or shrimp seed.

It is recommended to do more research on fish seed stocking on different fish culture systems to find out stocking priority that produce higher yield. No further increase can be expected in shrimp production under the present shrimp seed stocking programme. It should be re adjustable to gain more shrimp production. It is recommended to conduct more research on shrimp farming to find out whether shrimp stocking has biological or management constraints on production.

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