INNOVATIONS IN EXPERIMENTAL LEARNING PROGRAM – SHRIMP FARMING

[1]Rajeswari, C., [2]Vijay, K., [3*]Sudhan, C. and [4]Anushalini, S.V.

[1] PG Research Scholar, Department of Fisheries Environment, Fisheries College and Research Institute; Tamil Nadu Fisheries University; Thoothukudi; Tamil Nadu; India.

[2] PG Research Scholar, Department of Fish Processing Technology, Fisheries College and Research Institute; Tamil Nadu Fisheries University; Thoothukudi; Tamil Nadu; India,

[3] PG Research Scholar, Department of Fisheries Biology and Resource Management, Fisheries College and Research Institute; Tamil Nadu Fisheries University; Thoothukudi; Tamil Nadu; India.

[4] PG Research Scholar, Department of Fish Pathology and Health Management, Fisheries College and Research Institute; Tamil Nadu Fisheries University; Thoothukudi; Tamil Nadu; India.

Abstract: Shrimp (*Litopenaeus vannamei*) farming and frozen shrimp exports tends to be boon for aquaculture and act as a contributing factor in Indian gross domestic product respectively. This paper views about the innovations dealt in relation to shrimp farming for effective management practices learned from the farmers. There were six handy prepared instruments / gadget, namely, Steel scrapper, Pond Cleaner, Sheet cleaner, water sampler, depth viewer and catcha nets were prepared with the available low cost material in the field. The main aim of this paper is to bring out the traditional knowledge and related scientific innovations in the field of shrimp farming practices.

Key Words: Handy instruments, Traditional knowledge, Innovations, Shrimp farming.

1. INTRODUCTION:

An innovation of several handy instruments in shrimp farm will facilitate easy completion of work among the people that harbors a new dimension in the advancement of science and technology based on the indigenous knowledge. The source of information plays a vital role in disseminating ethical views and increasing the influence of traditional knowledge and the scientific linkage bond between these parameters. Shrimp continues to be the single largest commodity in value terms, accounting for about 15 percent of the total value of internationally traded fishery products in 2012. The demand and supply for vannamei shrimp exports were augmenting from US$ Million 3210.94 to 3709.76 in 2013-14 and 2014-15 respectively (Bureau *et al*, 2000; Tacon *et al*, 2002; Edward B. Barbier and Mark Cox, 2004; Wasielesky *et al*, 2006; Muangkeow *et al*, 2007; Karuppasamy, 2013; Danya Babu, 2014) . The top most candidate species (with higher meat yield ~ 66-68%) in mariculture, *Litopenaeus vannamei* (Penaeid shrimp) native to the Eastern Pacific coast were selected with Biosecurity measures; pre-stocking; Pond and feed management practices for experimental culture. PL8 stage seeds were stocked in different High Density polyethylene lined ponds for 120 days of culture. Based on the experience, this paper would discuss on the topic related to background of the shrimp culture and problems faced followed by the remedial measures for the sustainable aquaculture in India (Sudhan *et al.*, 2016).

2. MATERIALS AND METHODS:

Shrimp farm visits were made during experiential learning program from October 2014 to January 2015 in Thoothukudi district, Tamil Nadu. Based on the traditional knowledge learned from the farmers and labors from the field, the study was conducted in Maritech Research Centre (Tharuvaikulam, Tamil Nadu), Fisheries College and Research Institute (Thoothukudi, Tamil Nadu) forecasting the opinion analysis to predict the effectiveness and efficiency of the materials prepared by the farmers. The opinion analysis includes the general information, socio-economic profile, knowledge in shrimp farming, social affiliation, percentage marks allotted to the individual handy instruments from both student and labour side. Then, the results were pooled up to get the bond linkage between the traditional knowledge and the scientific linkage.

3. RESULTS AND DISCUSSIONS:

3.1. STEEL SCRAPPER:

The shrimp was proposed to be cultured in lined ponds with polythene sheets. Filtered water was used for the culture from the nearest sea water source. But, the filter was incapable of filtering the micro level larvae's and other minor crustacean group of organisms. These organisms enter into the pond and starts growing on the sheets. These organisms use the food and other parameters essential for the life from the pond. After the end of the culture, the attached organisms are very much difficult to remove. So, the steel scrapper was designed in such a way that, the organism present in every part of the sheets to scrap out by the labors employed (Fig – 01) in the field. The efficiency of the steel scrapper was used to scrap the organisms in the lined sheets found to be 85% based on the opinion analysis of the labors in the field.

3.2. POND CLEANER:

The iron rod (Fig – 02) has a template of square shaped design was taken and fishing net was tied around the square design of the rod. It was used to clean the pond bottom during the culture. The excess feed and uneaten feed accumulates in the pond bottom enabling ammonia gas to form. In order to avoid the ammonia, hydrogen sulfate formation and to enhance the activity of the cultured animal, this rod was operated during the culture period to disturb the pond bottom. The efficiency of the iron rod found to be 65% based on the water quality and opinion analysis conducted during the culture period.

3.3. SHEET CLEANER:

It was one of the commercially available materials (Fig – 03) used for cleaning. It was found to be highly useful in cleaning the sides of the lined sheet in and around the pond thereby sides of the sheets are cleaned by the labors not allowing the zooplanktons and other filamentous algae to settle on the sheets. The effectiveness was checked based on the color change from green (Filamentous algae or planktons) or pale brown (Uneaten feed) to the pale white color (color of the sheet). The efficiency was predicted to be 85% by the intensity of the color change observed.

3.4. WATER SAMPLER:

The wooden rod, bottle and mechanical stopper was taken in account to prepare the water sampler for bottom sampling. The wooden rod (Fig – 04) more than the depth of actual pond depth was placed parallel to the water 250 ml capacity water bottle in a vertical inclination to collect the water sample for water quality parameter analysis. The thread was tied as a mechanical starter with a weight of 15g iron. The water bottle was inserted into the pond in a closed condition to collect the water sample. Once the sampler reaches the bottom, the starter was released by hand to collect water sample. The efficiency was found to be 80%.

3.5. DEPTH VIEWER:

For any culture, the primary data required was considered to be depth of the pond. Hence, the water level may be fluctuating from one point of time to another point of time. There were several reasons like temperature fluctuation, high evaporation rate, water recycling, sludge removal and other parameters for change in depth of the pond during culture. The long wooden pole was taken and measured with scale intervals in terms of feet and centimeter on either of the sides. The efficiency of the depth viewer (Fig – 05) was found to be 70%.

3.6. CATCHA NETS:

The fishing nets were tied like bag to prepare catcha nets (Vernacular name in regional language – Tamil). It was designed to carry harvested shrimps from point of harvesting (from pond) to point of weighing (to sales / marketing). The efficiency of the catcha nets (Fig – 06) was found to be 65%.

4. PROBLEMS FACED:

1. Steel scrapper: It could cause injuries to hands.
2. Pond cleaner: It may not be clean effectively to the pond corners and the buoyancy of the cleaner was not static.
3. Sheet cleaner: As days passed, the sharpness of the brushes becomes blunt and easy breakage of the commercial products.
4. Water sampler: The buoyancy of the sampler was found to be not static during operation.
5. Depth viewer: It should be kept at the center of the pond to decide the depth level maintained. The stability of the depth viewer was affected by the water force and circulation of pond water caused by the aerators present in the pond.
6. Catcha nets: It can't hold the portion of harvested (shrimps) size due to the large mesh size during transportation.

5. MEASURES UNDERTAKEN:

1. Steel scrapper: Wearing hand gloves and slippers would reduce the injuries.
2. Pond cleaner: The nets tied up to the template / frame was made thicker and cement cubes (or Hollow block bricks) were tied at the centre of frame to increase the stability.
3. Sheet cleaner: Materials were changed frequently to avoid these problems without fail once in a month.
4. Water sampler: Iron rod was tied up to increase the stability of the sampler
5. Depth viewer: Hollow block cemented cube was tied with the help of cloth and netting to avoid the erosion of cement and to enhance the stability of the viewer.
6. Catcha nets: Mesh size of these nets was reduced to enhance the holding capacity of the shrimps.

6. CONCLUSION AND INFERENCE:

As the outcome of this paper, the opinion analysis and knowledge testing for both farmers and students were tested and the effectiveness of individual instruments were plotted in graph -01. By graph, the traditional knowledge and scientific information found to have some correlation between them. But, still the traditional knowledge could be applied to all aquaculture systems to improve the productions along with scientific notations would sufficiently supports and enhance the productivity and profit to the farmers at low cost investments.

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Graph – 01: Efficiency of the prepared handy instruments (in percentage) based on opinion analysis

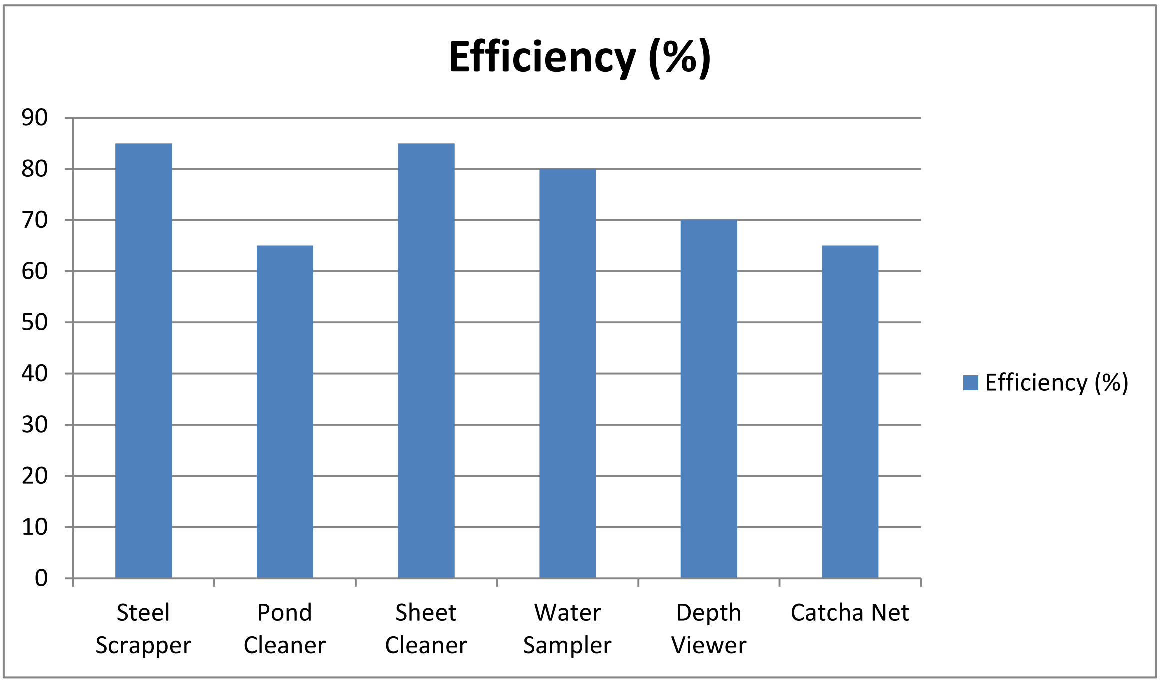

Fig – 01: Steel scrapper for cleaning pond (Desilting) 	Fig – 02: Iron rod with netting for cleaning pond sheets 
Fig – 03: Cleaning pond sheet 	Fig – 04: Water sampler 
Fig – 05: Depth Viewer 	Fig – 06: Catcha net for harvesting