J Krishi Vigyan 2020 (Special Issue) : 168-171 DOI :10.5958/2349-4433.2020.00106.3

Introduction of Carp Polyculture for Effective Utilization of Waterbodies in Tribal Villages of West Godavari District, Andhra Pradesh

A Devivaraprasad Reddy[1*], T Vijaya Nirmala[1], E Karuna Sree[1], Ch Balakrishna[2], K Venkata Subbaiah[1], G Shali Raju[1], R V S K Reddy[3] and B Srinivasulu[3]

[1]Krishi Vigyan Kendra, Dr. YSR Horticultural University, Venkataramannagudem, West Godavari District, Andhra Pradesh
[2]Krishi Vigyan Kendra, Acharya NG Ranga Agricultural University, Amadalavalsa, Andhra Pradesh
[3]Dr. YSR Horticultural University, Venkataramannagudem, West Godavari District, Andhra Pradesh

ABSTRACT

The tribal villages of Buttaigudem and Polavaram Mandal of West Godavari District, Andhra Pradesh culture semi intensive carp polyculture of species of Indian major carp (IMC) i.e. *Catla catla (catla), Labeo rohita* (rohu) and *Cirrhinus mrigala* (mrigal) together with the exotic carps (EC) *Ctenopharyngodon idella* (Chinese grass carp*)* and *Cyprinus carpio* (common carp*)* in ponds. The underutilized water bodies for improving their livelihood of tribal people were chosen for this activity. Scientific management practices were adopted for improving productivity. Organic manures were used for enrichment of natural plankton. In addition to this, artificial pelleted feed was also used to meet the feed demand of the fish. The yield of the pond varied from 950 kg per pond to 2560 kg per pond and this reflects in the gross income generation as about Rs. 1,14,000.00 to 3,07,200.00 with the average price of Rs. 120.00 per kg. The fish yield of the pond varied with the extent of area and management practices followed. This indicated the suitability of the semi intensive carp polyculture practiced through adoption of technology and can improve the livelihood and socio-economic status of the tribal people.

Key Words: Carp polyculture, Fish culture, Income generation, Technology adoption, Tribal villages.

INTRODUCTION

Carp fish polyculture of Indian major carps and exotic carps (catla, silver carp, rohu, mrigal, common carp) is the well-known practice adopted from 1980's onwards in the state of Andhra Pradesh. This carp polyculture is followed either by integration of 3 to 6 species combination during culture as per the interest of the farmer and demand of fish variety. The ratio of these species selection depends on the water resources at surface, column and bottom strata within the pond. Carp polyculture of fishes is ideal solution for utilization of resources available in the pond ecosystem (Reddy *et al,* 2017). West Godavari District of Andhra Pradesh is very much progressive in inland aquaculture and occupies majority of the share in the state fish production. However, the upland areas show entirely different scenarios, where they have not adopted the fish polyculture practice.

In 2016, Krishi Vigyan Kendra, Dr. Y.S.R. Horticultural University, Venkataramannagudem has surveyed the tribal villages for the existing ponds and culture practices and observed that the existing ponds are underutilized for fish culture. Cashew is the predominant crop in this area followed by maize, paddy, cotton, tobacco, vegetables etc. In West Godavari district, the mean average rainfall was 1078 mm with a standard deviation of 275 mm and the maximum rainfall of 1698 mm was recorded and the minimum was 463 mm (Rao, 2013; Reddy

*Corresponding Author's Email: prasad8reddy@gmail.com; drprasadreddy@kvkvrgudem.ac.in

et al 2018). Due to heavy rains during the monsoon season the water goes waste as runoff. To store the rainwater, percolation tanks were made, which can be used for utilized irrigate their crops in critical stages of crop growth. KVK intervened with the introduction of fish culture in these small water harvesting ponds for giving additional income to these tribal families. Conservation of water and land resources gives creditable solution for alleviating and improving the livelihoods of rural poor (Reddy *et al,* 2017).

MATERIALS AND METHODS

Area of selection and stocking of fish fingerlings

The inland freshwater fish ponds located at Buttaiahgudem and Polavaram Mandals of West Godavari district of Andhra Pradesh were selected for the introduction of carp polyculture. 39 ponds were selected under this study. The water holding capacity of these ponds varied from 0.5 acre to 2.0 acre. These ponds were under-utilized and being used for the storage of water for agricultural activities during summer season and filled during raining season. Under ICAR-Tribal Sub Plan and with the support of Department of Fisheries, Government of Andhra Pradesh has implemented the carp fish polyculture in the tribal villages. The ponds were made free of weeds; sun dried for about 15 days and then lime was applied at the rate of 200 kg per ha for buffering capacity, eliminate pathogens and also to nullify the pH alterations.

Carp fish fingerlings of *Catla catla* (catla), *Labeo rohita* (rohu), *Cirrhinus mrigala* (mrigal), *Ctenopharyngodon idella* (Chinese grass carp) and *Cyprinus carpio* (common carp) in the selected fish ponds without any additional aeration were stocked at the rate of 10,000 numbers of fish fingerlings per ha of area. The equal size, good quality and disease-free fish fingerling stocks were selected for stocking. Fish fingerlings was stocked in the ponds in the dawn or dusky time and kept in 2% salt solution bath for 1-2 minutes and then acclimatized before releasing in the pond. The mean initial weights of catla, grass carp, rohu, mrigal and common carp species were 22.6 ± 2.02g, 25.2 ± 1.21g, 24.5 ±1.25 g, 26.2±1.55 g and 27.3 ±1.3 g respectively. Random sampling of fish was done using cast net to monitor the growth performance of fish by using the formulae.

Average Body Weight (ABW) = Sample weight / Number of fish

RESULTS AND DISCUSSION

Semi intensive carp fish polyculture was comprised by selection of surface, column and bottom feeder fishes *i.e.,* catla, rohu, mrigal and common carp in the ratio of 30, 40 and 30 per cent, respectively. Krishi Vigyan Kendra has trained the farmers on the better management practices (BMPs) in important culture aspects like method of feeding, time of feeding, feed ration adjustment, nutrition requirement of fish, health management, partial harvesting etc. BMPs were followed to improve the higher productivity and reduced the cost of production. Colour of the pond water was observed visually and based on that the application of manure was done. Manuring by using organic manures like dried cow dung, poultry excreta, goat dung, vermi-compost etc. were used for the production of plankton in the pond. Due to continuous fertilization, the phyto plankton and zoo plankton were produced to meet the requirement of fish. Along with this the fishes were fed with rice bran mixed with commercial pelleted protein rich feed having 24% protein feed (sinking type of 2-4 mm diameter) to meet the feeding requirements of fish. The feed ration was adjusted based on the average body weight sampled for every month.

Partial harvesting of fish was done using the drag nets after 8 to 10 months of culture duration and complete harvesting was performed at the end of 10 month. After complete harvesting the pond were allowed for sun drying for the next crop. Among the fishes stocked, maximum growth and size was observed in catla fish followed by grass carp, rohu, mrigal and common carp (Fig. 1). The performance

of the catla was high may be due to the presence of zoo plankton and grass carp may be because of availability of marginal plants/grasses around the pond dykes. However, composite fish culture in multilocation trail conducted in Surguja district of Chhattisgarh, India found that silver carp and catla has maximum growth rate (Pradeep, 2019).

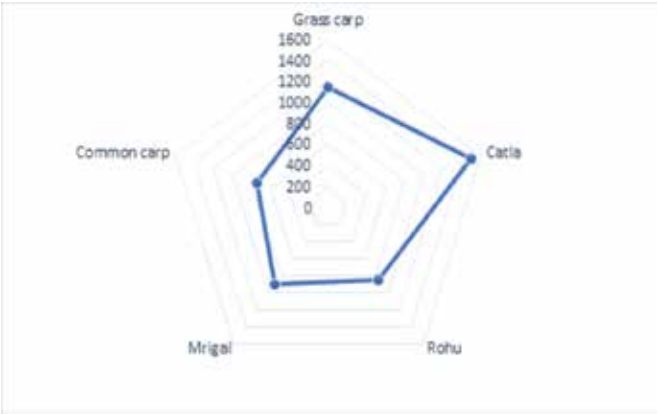

Fig. 1: Maximum size of fish attained during the culture operation

Regular sampling was done using the cast net to monitor the health status of the fish, growth performance and feed ration adjustment. Partial harvesting was done after 8 months of stocking of fish and the harvesting either by weekly or fortnightly was done using the drag nets based on the demand of fish by the locals. Regularly fish catch was harvested around 100 to 200 kg per time and sold at the rate of Rs. 120.00 per kg and generating around Rs. 12,000.00 to 24,000.00. The total fish production varied from 950 kg per pond to 2560 kg per pond and this reflected in the gross income generation as about Rs. 1,14,000.00 to 3,07,200.00 with the average price of Rs. 120.00 per kg. The cost of production of fish varied from Rs. 60.00 per kg to 75.00 per kg from pond to pond due to the management practices of the pond. The net income varied from Rs. 64,000.00 to 1,48,000.00. The similar results were also recorded by the Das *et al* (2014); Chakrabarti *et al* (2014) and Reddy *et al* (2017). Fisheries based integration of farming generates income to the farming community in tribal areas studied by Reddy *et al.* (2019). In rice cum fish cultivation, common carp (*Cyprinus carpio*) was found to be most preferred variety (Baruah and Singh, 2018).

CONCLUSION

The present study on semi intensive carp polyculture focused on the technology adoption by the tribal people for improving their income generation, socio-economic status and effective utilization of water bodies/ponds. This fisheries-based intervention increased their income levels there by improving the standard of living and respect in their village/community.

ACKNOWLEDGEMENT

Authors are thankful to the Director of Agricultural Technology Application Research Institute (ATARI), Hyderabad and Vice-chancellor, Dr. YSR Horticultural University for financial and physical support under Tribal Sub Plan (ICAR-TSP). Thanks to Project Officer, ITDA, KR Puram and Department of Fisheries, Government of Andhra Pradesh for support for cooperation extended.

REFERENCES

Baruah D and Singh N D (2018). Rice-Fish cultivation of Apatanis: A high altitude farming system in Arunachal Pradesh. *J Krishi Vigyan* **7**(1): 195-198.

Chakrabarti A, Amitava Dey and Dharmendra Kumar (2014). Livestock cum fishery integrated farming system. Krishisewa. (Source: http://www.krishisewa.com/articles/livestock/402-livestock-fishery-integrated-farming.html; Accessed on 24.07.2017).

Das A, Munda G C, Azadthakur N S, Yadav R K, Ghosh P K, Ngachan S V, Bujarbaruah K M, lal B, Das S K, Mahapatra B K, Islam M and K K Dutta (2014). Rainwater harvesting and integrated development of agri-horti-livestock-cum pisciculture in high altitudes for livelihood of Tribal farmers. *Int J Agri Sci* **84** (5): 643–9.

Pradeep K S (2019). Comparative study of composite fish culture and local practices of fish culture in Surguja district of Chhattisgarh. *J Krishi Vigyan* **7**(2): 36-39.

Rao P N (2013). Ground water brochure West Godavari district, Andhra Pradesh (AAP 2012-13). Central ground water board, ministry of water resources, Government of India. PG No. 25.

Reddy A D, Karunasree E, Reddy R V S K, Nirmala T V, Subbaiah K V, Raju G S and Prasad JV (2017). Under-utilized water bodies for poly culture of fish in high altitudes for livelihood of tribal farmers. *J Pharmacognosy Phytochemistry* **SP 1**: 869-871.

Reddy A D, Karunasree E, Nirmala T V, Reddy R V S K, Subbaiah K V, Raju G S, Deepthi V and Prasad JV (2018). A case study of integrated farming system (ifs) in agency areas of West Godavari district of Andhra Pradesh. *Multilogic Sci* **8** (issue special E): 61-62.

Reddy A D, Nirmala T V, Karunasree E, Subbaiah K V, Raju G S, Deepthi V, Reddy R V S K, Srinivasulu B, Prasad JV and Prasad YG (2019). Diversification in agriculture through fisheries based integrated farming system for doubling farmers income in agency areas of West Godavari district of Andhra Pradesh- A case study. *Int J Chem Stud* **SP 6:** 930-932.

Received on 26/06/2020 *Accepted on 20/08/2020*