Economic performance of fish culture in Seasonal pond - a On Farm Trial

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***Abstract*: An on farm trial was conducted to assess the growth, yield and economic performance of short duration seasonal pond through stocking of 25 mm, 50 mm and 75 mm fish seed at low input management system. There were three treatments each with two replications and each pond has stocking density of 8000 seed per hectare. Mixed culture of Catla, Rohu, Mrigal was conducted in six ponds with stocking ratio of 4:3:3. Rice bran and mustard oil cake were used as supplementary feed in combination with organic manure. The best growth and yield performance was obtained in T-3 which stocked with 75 mm fingerling was attained 165.75 gm individual weight and 1115 kg/ha yield in 211 days. The ponds stocked with 50 mm fingerling attained average weight 120.2 gm and 9450 kg/ha yield in 208 days. Whereas the pond stocked with 25 mm seed obtained weight of 90 gm and 215 kg/ha fish yield in 201 days. The seed survival was 29.94, 83.10 and 97.65 % in T-1, T-2 and T-3 ponds respectively and highest economic return was obtained in T-3(Rs. 60500) followed by T-2 (Rs. 45525)and T-1(Rs. 9730).**

***Keywords*: Seasonal pond, Fish yield, Survival rate, Economic return**

Introduction

The Chitrakoot district of bundelkhand agroclimatic situation receiving an average rainfall up to 650 ml/year in last 5 years and it was observed that number of rainy days also declining from 60 days/ year to 31 days in said period of time. The annual normal rainfall (1950-80) of the district is 980.1 mm. The maximum rainfall occurs during monsoon period is June to September having normal value of 876.8 mm. which is 89.46% of the annual rainfall. The average 20 years data reveals that the average rainfall varies between 939.5 mm (Mau) and 1059.2 mm. (Karvi). Average number of rainy days is 47.1. The climate of the district is sub-tropical. The monthly precipitation index (P.E.) i.e. 46.058. The government of India and state government pursuing to harvest rain water in small, medium and large impoundments for different purposes. The main objective of these water bodies are to harvest and conserve water for ground water recharge and micro irrigation in crops production system as well as utilization for their daily needs. The small water bodies are available in abundant numbers in the villages of Chitrakoot and have agreat potential of fish farming. During the monsoon period all these ponds of Chitrakoot are filled with rain water. Some village ponds were utilized for drinking water purpose. The majority of the villages are having 2 or more ponds from ancient and these water bodies are not been utilized properly for fish production due to non availability of inputs and relatively short period of water storage (5-6 months) traditionally. This is common that the seasonal pond cannot be useful and water only utilized in irrigation purposes and believes that fish cannot be cultured in these ponds. However, fish can be produced in any pond of any size, anywhere and any situation in india, provided that the water quality is good enough. A small (0.02-0.05 ha) pond with 1-1.5 meter water depth can be utilized for fry production that retains water hardly for two months. Relatively larger ponds up to the 0.25 ha with water depth of 2.0 meter can be used for fingerling production retaining the water for three to four months. The water body holding water more than 6-8 month may be used to marketable size fish production as grow out pond. Inland fish cultivation by using stunted fish fingerlings is a good venture in these village ponds which attains marketable weight within 5-6 months in the main pond/tank. Hence stunted fingerlings provide an opportunity for fish cultivation in any ponds which has water for at least 5-6 months. Small water harwesting structure like Khet talab construction has commenced inbundelkhand . Up to March 2018, about 2489 khet talab completed. That may be utilized in fish culture practices. Due to short period of water retention these ponds are not utilized for such income generating purpose.

1- Objective-

The main objective of the trial is to convert uneconomical water area/ structure to economic ones through fish farming by adopting the technology of stunted fingerling stocking in short duration seasonal ponds.

- To bring the available water area under fishery
- Increase revenue through fish farming
- Develop economic opportunity
- Employment generation
- Utilization of available water area under fish farming

2- Material and methods-

In rainfed area of bundelkhand farmers can get an additional income from short duration water bodies and generate an employment as well as livelihood security through stunted fish farming techniques. A on farm trial was conducted by KVK, Chitrakoot on 06 farmers field having the water storage up to 6-8 month at 6 different locations in Chitrakoot district. 03 treatment and two replication was designed to conduct the trial at Banwaripur,Kharseda, Augani lodhaura and ganiwan village. The area taken

for trial was varied from pond to pond that is ranging in between 0.24 to 0.80 ha. The water depth was falling in between 1.5 to 2.5 meter at the time of stocking. The water retention period varied from 185 to 211 days. The ponds were well prepared before stocking with cow dung, lime and chemical fertilizers of calculated quantities. Three sizes of seed were selected to stock these ponds. Treatment "T-1" ponds were stocked with 25 mm size seed (Fry), Treatment "T-2" ponds were stocked with 50 mm size seed (Fingerling) and Treatment "T-3" ponds were stocked with 75 MM size seed (Stunted Fingerling) at stocking density of 8000/ha each. Lime application @200 kg/hectare as per water test of soil and water pH • Manurer application @5000 kg/hectare/single dose was done at the time of pond preparation. The stocked fishes are feded with Rice bran and Mustard oil cake by hanging bag method. The farmers were advised to apply cow dung at 400 kg/h on monthly basis.

3- Result and Discussion-

Fisheries, is a well-established technology and economic activity in the world. It provides a dynamic source of food, employment, recreation and economic benefits both for present and future generations all over the world (FAO, 1995)[1]. It is estimated that only about 45 percent of the available area of 2.25 million hectares of ponds and tanks has been brought under fish culture This shows the potentiality of horizontal expansion of the sector in coming years. (Handbook of Fisheries and Aquaculture, 2006, ICAR publication, India)[2]. Economic growth can be accelerated by means of proper utilization of aquatic resources in an eco-friendly sustainable manner. Das, S.K. (2006)[3] revealed that a production of about 1800 kg/ha/yr could be achieved from small seasonal homestead ponds through integrated use of locally available biological resources. This implies an excellent opportunity for improving the rural economy through the development of small-scale fish culture enterprises .The role of fish farming in the state economic development is well known to generate employment and income; increases food supply reduces poverty, and maintains ecological balance between the system. The awareness on the potential of fish farming to contribute to domestic fish production has continued to increase in the country. The result of trial conducted by KVK, Chitrakoot was very encourageous. The pond were stocked with density 8000 seed per ha. The summery of trial conducted was presented in table A, B and C. The result indicated that in pond stocked with fry of 25 mm size gives the production of 215 kg/ ha fish in 201 days culture period with an average weight of 90 grams each fish (T-1). Whereas the pond stocked with 50 mm size seed (Advance fry) gave the production of 9450 Kg/ha in 208 days culture period (T-2) with an average weight of 120.2 Gm. The result of T-3 indicated that the fingerling of 75 mm size cultured for 211 days gives the yield of 1115 Kg/ha with average final weight of 167.75 gm. The average survival of stocked fishes were 29.94, 83.10 and 97.65 percent in T-1, T-2 and T-3 ponds respectively Although the need for raising fingerling in rearing pond system is fully realized, it is usually ignored by most of the fish culturists, who normally resort to stocking the ponds directly with fry (Hora and Pillay 1962[4]; Lakshmanan et al 1968[5]; Natarajan et al 1979[6]). As a result, young and delicate fry are exposed to different species of predators. This feature directly affects the survival of the seed (Tripathi 1990b[7]; Pillai and Pradeep K Katiha 2004[8]). The details are provided in table A and B. Fish farming business is a great source of employment. More than 1 billion people around the world depend on fish as their primary protein source. And most of this people are directly or indirectly involved with fish products or fish farming business. As a result, fish farming creates a great income and employment source for the people. The cost benefit ratio was observed highest for T-3 trial that was 2.30 with gross income of Rs. 60500/- per hectare in 211 days. Whereas T-2 observed the B:C ratio of 1.78 with Rs. 45525/- per hectare in 208 days culture duration. The Lowest B:C ratio was found in T-1 trial that was 1.08 with per hectare gross income of Rs. 9730/- .The results indicated that the seasonal water bodies with short water holding period may be feasible and profitable if they are used scientifically. The stocked fishes of these ponds are fed with supplementary feed which comprise rice bran and oilcake in1: 1 ratio at 2% body weight. The lime was used periodically with one month interval. This trial was conducted at low input management system. Prior to the trial these ponds not used for fish culture, now they are comes under fish farming and able to earn extra income and employment. Production of about 2319 to 2996 Kg/ha could be achieved from farm ponds and water storage tanks through integrated use of locally available biological resources (N. Manjappa, et al, 2017[9]).

Table-A Details of Trials-

Treatment	Area in ha	No. of seed stocked	Initial length(MM)	Initial Weight(Gm)
T-1	0.9	7200	25	0.28
T-2	0.36	2880	50	1.208
T-3	0.3	2400	75	8.0

Table -B Performance of growth and yield

Treatment	Average Initial length(MM)	Average Initial Weight(Gm)	Mean survival rate (%)	Final average weight (Gm)	Yield Kg/ha	Culture period (Days)
T-1	25	0.28	29.94	90	215	201
T-2	50	1.208	83.10	120.2	9450	208
T-3	75	8.0	97.65	167.75	1115	211

Table -C Economics of Fish culture-

Treatment	Culture period (Days)	Cost of Production / ha (Rs)	Income (Rs)/ha	B:C Ratio
T-1	201	9030	9730	1.08
T-2	208	25642	45525	1.78
T-3	211	26300	60500	2.30

Diagram-1 Performance of growth in short duration ponds of different size seed and duration

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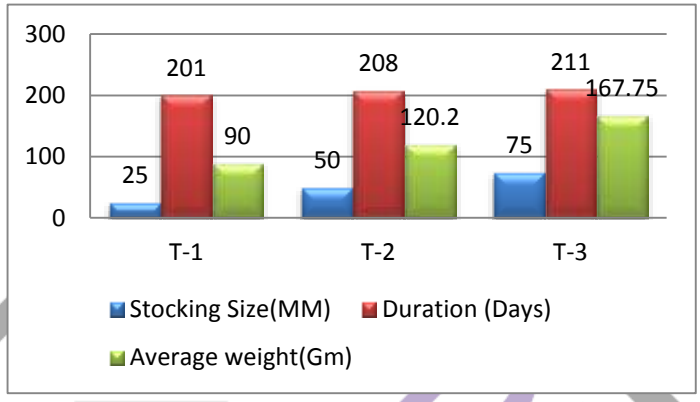


Chart 1- Fish Yield in seasonal ponds of different stocking size

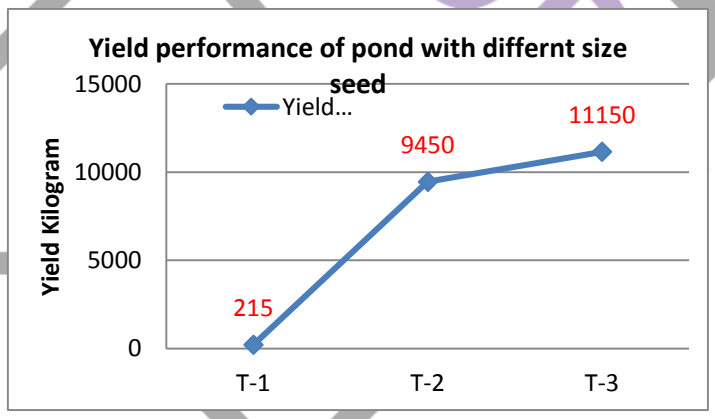
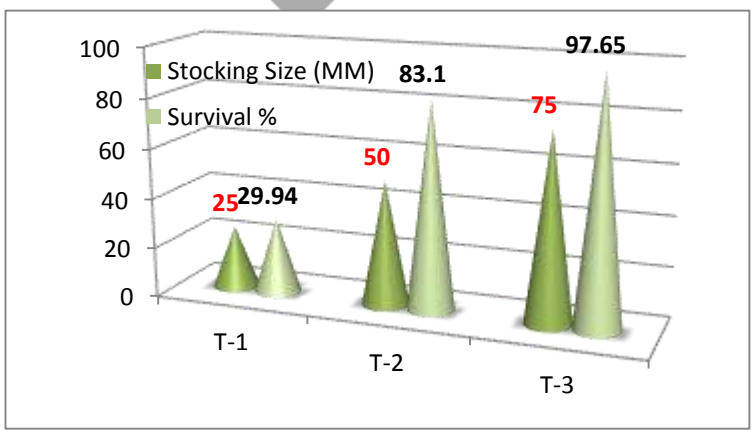


Diagram 2-Ratio of seed survival with stocking size-



Conclusion:

In bundelkhand of uttar Pradesh water holding capacity of small and medium ponds are very poor and they hardly able to retain water for 6-8 months. These ponds are not under fish culture but the techniques of large sized fingerling stocking and adoption proper scientific management practice make useful of these ponds and encourage for earning of extra income. It will also help to increase employment opportunity for rural youth. Large and stunted fingerling enhance production in less time period, Survivability is more, Diseases resistances, Better growth than small size fish seed like fry and fingerling. The main constraints behind this technology are non / less availability of good quality and size seed, less technical skill and management aptitude. This trial was able to motivate farmers to undertake fish farming activities to enhance their livelihood in short duration ponds.

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