

Rainbow trout fish farming in upland hilly regions

– A game changer for the small farmers

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Trout, a common name for a number of species of cold freshwater fishes is available and cultured in the upland catchments of many tropical and sub-tropical countries including India. Introduced in the country mainly to encourage sport fisheries initially, it also has lot of commercial value and being used as important table fish. Introduction of trout has helped the fish to become established in most of the cold water aquatic bodies of the country.

Keywords: Hilly region, Rainbow trout, Small farmers

IN trout farming, the farmers from Jammu and Kashmir, and Himachal Pradesh have done much better than most of their counterparts. Considering the larger picture, trout cultivation in the hilly regions of the country right from Jammu & Kashmir, Himachal Pradesh, Uttarakhand and also other Himalayan states can be a game changer for especially the poor small and marginal farmers. This is true, especially for those who can source supply of water in their farm land from the natural *nallahs* by constructing water channels.

Some of the essential as also limiting factors required for cultivating trout in the upland regions are as under.

- Requirement of higher dissolved oxygen content and temperature range between 10 and 20°C.
- Availability of clean, clear, cold and continuous flow of water is the most crucial deciding parameter for selection of site for setting up of the rainbow trout farm.
- Proper selection of site for trout farm is primary requirement as the

site should receive water which must be free from silt.

- Besides the water quality, the water flow rate in the trout ponds or raceways is also important. A minimum water flow of about 2-3 litres per second (lps) is required.
- Availability of adequate and timely supply of quality trout fish seed is important limiting factor coming in its success.
- While cultivating the trout fish, it is required to be given protein rich feed in the raceways.

Trout farming has proved to be a money spinner and boon for small farmers in the hilly regions of the country. For sustainable development of rainbow trout farming in the country, constant support and cohesion of policy makers, research organizations and concerned line departments is equally important. There is also a need to include more components in the existing scheme of the Government of India.

The distant hilly district of Mandi in the state of Himachal Pradesh is endowed with rich cold water

resources. Shri Rajeev Jaswal of village Shanan, a person in his mid-forties was unemployed and struggling to make his ends meet before the year 2000 (Fig. 1). Inspired by one of his close relatives, he utilized the natural water source flowing through his hilly farm land and started cultivating carp fishes. Initially, he started with a Chinese carp variety of fish called as common carp by cultivating them in rectangular *kutchha* pond. Soon he realized that the cultivation was not a success as the fish growth suffered due to intense cold temperatures. Jaswal did not lose heart and next year initiated cultivation of rainbow trout, an exotic cold water fish well acclimatized to the hilly regions of the Himalayas.

Trout, a common name for a number of species of cold freshwater fishes is available and cultured in the upland catchments of many temperate tropical and sub-tropical countries including India. Introduced in the country mainly to encourage sport fisheries initially, it also has a lot of commercial value and being used as important table fish. Introduction

of trout has helped the fish to become established in most of the cold water aquatic bodies of the country.

Taking support of the Department of Fisheries, Jaswal converted the rectangular carp fish pond into a raceway pond of $8 \times 2 \times 1.5$ m size and started cultivating rainbow trout in 2001. Besides the one-time cost spent on construction of raceway, major expenses were incurred on procuring 2,000 rainbow trout seeds and protein rich feed costing ₹ 45/kg. He could harvest a crop of about 250-300 kg of rainbow trout in 13 months giving him approximately an income of ₹ 55,000. Overwhelmed with this success and also subsequently the support received under various Government of India programmes viz. Rashtriya Krishi Vikas Yojana and the Blue revolution scheme, the farmer constructed thirteen cemented raceways of varying size in the next few years. At present, the farmer can produce about nine tonnes of rainbow trout from his farm comprising of 13 raceways constructed in an area of about 800 sq meter within 14-15 months. The farm gate price of the fish is presently more than ₹ 500/kg. To sum up, small farmers in upper hilly region can dream of earning a substantial amount of money from small pieces of land provided they utilize the water resources judiciously and by selecting proper economic activity like that of trout farming.

In trout farming, the farmers from States and UT like Jammu & Kashmir and Himachal Pradesh have done much better than most of their counterparts. Considering the larger picture, trout cultivation in the hilly regions of the country right from Jammu & Kashmir, Himachal Pradesh, Uttarakhand and also other Himalayan States can be a game changer for especially the poor small and marginal farmers. This is true especially for those who are having a good source of perennial water supply in their farm land from the natural nallahs by constructing water channels. Some of the essential points as also limiting factors required for cultivating rainbow trout (Fig. 2) in the upland regions are as given under.



Fig. 1. Rainbow trout Farm of Shri Rajeev Jaswal at Shanan, Himachal Pradesh

- It grows well in waters with a higher dissolved oxygen content and temperature range between 10 and 20°C. The fish may not survive at temperatures above 25°C, hence, it is imperative to culture the fish only in the higher hills. As the temperature rises and dissolved oxygen in the water decreases, fish begins to experience stress. Stress begins to set in well before the water temperature reaches the lethal limits (above 20°C).
- Availability of clean, clear, cold and continuous flow of water is the most crucial deciding parameter for selection of a site for setting up of the rainbow trout farm. The fish can be cultured only in flow through ponds popularly called as raceways. Continuous flowing water ensures clear and highly oxygenated waters in the raceways which is essential for the fish.
- Proper selection of site for trout farm is primary requirement as the site should receive water which must be free from silt. The water supply from the natural *nallahs*/ drains till the trout ponds or raceways can be channelized by constructing a cemented channel.
- Besides the water quality, the water flow rate in the trout ponds or raceways is also important. A minimum water flow of about 2-3 litres per second (lps) is required.

This also helps in maintaining the desired level of oxygen.

- Availability and timely supply of quality rainbow trout fish seed is very important for success of a trout farm. At present most of the trout seed hatcheries are located in remote areas of the hilly states and it often becomes difficult for the farmers to get quality trout seeds on time.
- Protein rich fish feed is the other essential input for the trout. Good quality, energy rich and nutritionally balanced feed is very essential especially when the size of the fishes are small.

The fish attains table size in about 12-14 months (about 250-300 gm). It is well adapted to supplementary feed and culture in raceway ponds. In recent years, farmers have shown greater interest in commercial rainbow trout farming. Requirement of technological advances in the form of improved feed having higher food conversion ratio (FCR), farm design with greater efficiency, optimization of stocking density, brood stock maintenance and hatchery practices are necessary for the future development of trout farming in India.

The fish although fetches a good farm gate price for the farmers (₹ 500-600 per kg), however, in future, with more farms coming up,

marketing network needs to be strengthened. Since farms are located in remote areas in the hills with poor transportation facilities, access to the market may be a challenge. Rainbow trout being a high value low volume fish and highly perishable commodity, the produce needs to be transported in shortest possible time under refrigerated condition to fetch good price. In the absence of cold chain facilities and reliable market linkage, expansion of rainbow trout farming on a commercial scale may be difficult. Value addition of the final produce may also be thought of in future to increase its sales and consumption.

Although rainbow trout farming activity is highly remunerative for the small as well as large farmers in the hilly regions, it is also fraught with some risks. Some of them are listed below:

- Timely availability of quality seeds for stocking
- Timely availability of quality feed in desired quantity
- Maintenance of clean and continuous water flow in the raceway
- Proper watch and ward facilities
- Arrangements for marketing of fish.

Rainbow trout farming in the upper hilly regions can be a highly remunerative activity and can easily be adopted by the small farmers. For



Fig. 2. Rainbow trout

this, the farmers need to be suitably trained from the respective Fisheries Departments on aspects related to raceway construction, seed stocking, feeding and rearing management. The rainbow trout fish requires a continuous flow of cold, clear and clean water. Timely availability of quality seeds in sufficient quantities and protein rich formulated feed are very important aspects of trout farming. Although, the farm gate price of the harvested fish is quite high, more number of farmers and production in the coming years may become a cause of concern. For promoting the culture of rainbow trout, even Government of India is providing fair amount of subsidy to the interested farmers.

Rainbow trout farming has proved to be a profitable venture and a boon especially for the small farmers of the hilly regions of the country. For sustainable development of rainbow

trout farming, constant support and cohesion of policy makers, research organizations and concerned line departments are equally important. There is a need to include some of the essential cost components like cost of construction of sedimentation tank, bird protection net, construction of channel from water source till raceway of the farmers etc. in the existing schemes of the Government of India.

This will be great incentive for the small and marginal trout farmers, as presently, they have to spend a lot of money on these components. The existing guidelines also compel the farmers to construct the minimum standard size of raceway viz. 51 cubic meters. In view of smaller land holding of the farmers and land being highly undulated, the farmers may be allowed to select the size of the raceway as per the land available with them. All these measures will go a long way not only in enhancing the production of the highly priced rainbow trout fish in the upland regions but also will turn out to be a major source of self-employment in the hilly states.

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