

# Dissemination Of Fisheries Technologies Through KVK In Chitrakoot District Of Bundelkhand

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**Abstract-**As per NARP district chitrakoot is a part of bundelkhand agroclimatic zone. This zone receives erratic rain fall during last 20 years. The district has 663 villages and 339 panchayat spread in four tehsils viz. Karwi, Rajapur, Manikpur and Mau. The total number of fishing villages was recorded as 79 out of 387 pond bearing villages and more than 1500 khet talab added in it during last 5 years. KVK made survey of 59 villages to identify production problem and plan to solve them through mandated activities of KVK as per need by fulfill the gaps in between traditional and scientific practices. The KVK conducted training, demo, OFT and extension activities for 1598 farmers and studied the impact through personnel contact and questionnaire from 160 farmers. The result indicated that the fully adoption of technology through different activities was 35.7% and partially adopted by 22.22% farmer. 57.92 % farmers adopted the technologies partially or fully in the district to augment fish yield and solve the problems arises during culture period. The yield increase was observed in increasing order from Year 2000 to 2020. The yield was increased from 7.05 to 28.12 quintal/ ha/ year in adopted village. The ponds under fish farming were also increased in last two decades. KVK proves to be a store house of technologies by providing knowledge, developing skill and availability of critical inputs to the fish farmers in the district.

**Key words-** critical inputs, fish yield, Impact, technology adoption, training,

## 1- Introduction

The district Chitrakoot comes into existence after division of district Banda, which is a part of Bundelkhand region. The district is located in between longitude 25.2° and latitude 81.1°. The Chitrakoot is a rocky district and have small hillocks. Major soils types are silty clay (Kabar) sandy loam (Parwa), and sandy (Rakar) with an area of 70.00, 79.34 and 34 thousands ha, respectively. District has two major rivers viz. the Yamuna and Paisuni rivers. Besides several small rivers Paisuni River is known for religious purposes and also known as mandakini and District has earthen ponds and rajorvoires. Water resources of Chitrakoot district are mainly used for agriculture, drinking and irrigation purposes. These ponds and tanks are maintaining biodiversity and provide help for recharging of ground water. Village ponds are gradually disappearing due to humans activities and urbanization. The kvk Chitrakoot was established in 1992 by Bharat Ratn Nanaji Deshmukh under umbrella of Deendayal Research Institute. The district comes under bundelkhand agroclimatic zone of uttar Pradesh. The farming system is rainfed and production is depending upon monsoon pattern. Due to dryland situation majority of village possesses large to small ponds / water harvesting structures for water storage to meet the challenges of water requirements and these ponds merely used for fish farming resulted that they become non profitable in terms of fish production. Krishi Vigyan Kendra (KVK) in the district of Chitrakoot serves as a center of scientific knowledge that is useful to farmers for enhance their livelihood. KVK has disseminated various technologies since last two decades. The main role of KVKs in the context of fisheries extension is more of informative and scientific in terms of scientific knowledge. The KVK analyses the problems and bridges the gap in between science and farmers practices. The poor literacy hindered the adoption of technologies but from time to time farmer interest was increased day by day. Freshwater aquaculture shows their rapid growth in respect of production and employment generation in the country. There is much potential scope of fish production from large, medium and small water bodies in terms of fisheries developments in Chitrakoot. The

fisheries extension is still in very poor condition but aquatic body has great potential of employment, income and production opportunities but due to poor extension methodologies and adoption of scientific technologies limiting the fish productions at village level. These gaps can be minimized by farmer's friendly extension techniques and availability of easily acceptable scientific knowledge at farmer doorstep. The KVK now playing an effective role to disseminate the technologies by motivation through learning by doing and seeing by believing process developed by different research organizations. The extension methodology can play vital role in adoption of farmer centric technologies by farmers groups. The proper analysis of problem, Need, resources and choice are the key of success for adoption of technologies. The KVK do the same at initial stage and divided farmers based on resource rich and resource poor and made plan accordingly. The sustainability of the technology is much depends upon the risk bearing capacity, resource availability and knowledge level of entrepreneurs. The technology should be suitable for particular microclimatic situation and popularize only after testing at KVK or farmers field trial. Freshwater resources (e.g. villages ponds) are gradually declining due to humans activities and urbanization. Fishing activities have also created negative impacts on water resources and health of fishes (Singh & Khan 2014)<sup>1</sup>. The objective of the present study was to provide status of impact of KVK activities on fish farming of the Chitrakoot district of U.P. and assess role in increasing the fish production and income generation of farmers of the district. The gap between scientific and traditional system has been discovered at farmer's level.

## 2- Methodology-

Chitrakoot district has vast water resources which may be used for fish culture. Deendayal Research Institute, Krishi Vigyan Kendra, Chitrakoot has made proper plan to implement mandated activity as per farming situation of the district. At initial scientist organized family and PRA survey to know major thrust areas and identify the problems. The KVK planned to collect data and current situation of fish

farmers by adopting different extension tools. The survey made for 59 villages of all 5 blocks like mau, Ramnagar, Pahadi, Karwi and manikpur. Survey revealed that the farmers of chitrakoot were not able to bear technology

- I. Lack of awareness
- II. Lack of proper scientific knowledge and skill
- III. Poor input supply and availability
- IV. Water scarcity
- V. Poor pond management practices
- VI. No proper marketing
- VII. Pouching and uncertainty in production

KVK designed implementation plan to overcome these problems through knowledge and skill development by on and off campus trainings, Front line demonstrations of improved technologies, on farm trial's, and different farm advisory services i.e. mela, gosthie, field day and meetings. Scientist discussed with farmers about his problems and suggested possible solution. The farmers were adopted traditional farming system and yield was very low. It was 7-10 quintal/ ha /year without adopting scientific package of practices. The farmer collect seed from natural sources or from hatcheries and reared in their ponds for 8-10 months and gets production depend on local mgt. So, KVK planned

1. Gosthie and field days
2. Advance trainings
3. Technology demo
4. On farm testing
5. Establishment of fish seed hatchery

In the second phase we conducted field days on successful interventions. KVK planned to organize advance training on fish farming and water quality management practices. We also conducted front line demonstration on improved package of practices and on farm trials of new technologies developed from research institutes. KVK installed circulatory fish seed production center at KVK to meet out the challenges of availability of quality seed at local level and producing 2 lakh fingerlings and 20 lakh fry every year.

### 3.3 Third stage-

1. Gosthie , field days and awards
2. Advance trainings and Field visit
3. Demo on recent technology
4. On farm testing
5. IFS model and Hatchery at farmers field

After creating an awareness and digital connectivity, farmers were demanded the new production technologies and inputs to enhance fish production with cost minimization. The government started awards for successful farmers to motivate others. The success story of farmers also popularized through meetings and gosthies. Fishery based IFS model established and motivated farmers to adopt for higher income, yield and employments at KVK. Two Circular fish seed production unit also established at farmer's field for proper seed availability with the technical guidance of DRI, KVK. The krishi vigyan Kendra, Chitrakoot plays major role in fisheries development in the district. Most of the fish farmer stand connected with us for their requirements, knowledge and skill up gradation, inputs availability & as a problem solving center. KVK prioritize activity as per farmers need and demand by making close relation with them for

overload thus we planned to start technology intervention step by step. In first step we were collected information from farmers through survey and discussion. The following thrust areas were identified-

to popularize scientific technology by creating awareness, training and meetings in a proper manner. Stage wise programme implementation schedule was organized.

### 3.1 Initial stage-

1. Survey and awareness programme
2. Basic trainings
3. Conduct Demo
4. Input availability

During the initial stage KVK conducted awareness meetings, gosthies, melas and suggest farmers to adopt scientific package of practices to get maximum yield. Basic training about composite fish farming, pond management and demonstration of fishery technologies conducted on some progressive farmer field to create faith among farmers on KVKs. To fulfill the seed requirements KVK, Chitrakoot starts seed rearing unit at center to reduce cost and mortality of fish fingerlings after stocking.

### 3.2 Second stage-

promotion of aquaculture. The impact analysis is carried out by personnel contact with farmers and questionnaires filled by 160 farmers among 1598 activity beneficiaries randomly.

## 4- Result and discussion-

Chitrakoot district comes under Bundelkhand agroclimatic zone and central plateau & hills by planning commition. The district has 663 villages and 339 panchayat spread in four tehsils viz. Karwi, Rajapur, Manikpur and Mau. The total number of fishing villages was recorded as 79 out of 387 pond bearing villages. Overall district percentage of villages having fishing ponds was 12.52% (Jha et al 2015)<sup>2</sup>. Deendayal Research Institute Krishi Vigyan Kendra, Chitrakoot working for down trodden society and engaged in development of villagers through swavlamban abhiyan on the thinking of Bharat ratn Nanaji Deshmukh ji. The district is an aspirational district of India characterized by Rainfed, Low yield and resource poor population. The district Chitrakoot has 1092 (1108ha) community and 11(18 ha) private pond and 10 (4130 ha) reservoirs with total area of 5256 ha (Department of fisheries, 2013)<sup>3</sup>. The fish production of the adopted farmers was 7.05 q/ha during year 2000 and it has gone up to 28.12 Q/ha. There is relatively greater scope for the promotion of aquaculture activities in the state from the view point of both increasing production from existing farms and also by the expansion of area under farming as so far only 53% of the suitable area has been brought under aquaculture (UPFD, 2002)<sup>4</sup>. It is a well-known fact that improvements in efficiency are more cost effective than introducing a new technology (intensive fish culture), the farmers are not efficient in the use of the existing technology (Krishnan & Birthal 2002, Dey et al. 2005)<sup>5</sup> The fish species cultured like *Catla catla*, *Labeo rohita*, *Cirrhinus mrigala* and *Cyprinus carpio*. Some farmers were also culturing *Hypophthalmichthys molitrix* and *Ctenopharyngodon idella* in their ponds in improper ratio and density. Fish culture seems to be tertiary or subsidiary occupation among farmers and only some identified castes are engaged traditionally in fish farming like kahar, Kevat, Dhemar, mallah, nishad etc.

After getting survey findings KVK started work accordingly. The ponds were dried within 9-10 months due to poor water holding capacity. Pond management is not practiced in fish culture system. The fish production of the district is totally dependent on the rain water. In drought year, the production is very poor. The survey done in 59 villages and commenced the activity. The main role of KVKs in the context of fisheries extension is more scientific than general extension. KVK bridges the gap between the technologies developed by research institutes and its adoption at the field level by the farmers through various extension approaches. The KVK works with its mandate of technology assessment and demonstration for its application and capacity development. To implement mandate effectively all possible activities performed by KVK Chitrakoot time to time. KVK organized 135 on campus and off campus training to enrich the knowledge and skill of practicing farmers on composite fish farming, Integrated fish farming, Pre stocking pond management, post stocking management, water quality management, disease management, feeding management, intensive fish farming and seed rearing techniques for 1475 participants. To maintain the natural food in pond; water quality and fertility management are prime requirement. Pond water is a primary unit of inland fish production (Dwivedi *et al.* 2004)<sup>6</sup>. Wild ponds are rich in plankton biodiversity compared to managed ponds (Roy 2012)<sup>7</sup>. We trained the farmers to prepare quality fish feed by local available materials and they are saving the feed cost up to 15-20/- per kg. The main activity of KVK is to assess technologies developed by research institute at farmer's field through on farm testing. 15 technologies tested at 58 locations based on different problems like seed density, ratio, polyculture, monoculture, water quality mgt, feed mgt and stunted fish culture techniques. The result shows that the demo yield was 25-82 % higher than local practice. The impact study was done by KVK through personnel contact and questionnaire from 160 beneficiaries randomly among 1598 beneficiaries. The study indicated that these technologies were adopted by 57.92 % farmers at field level. The technology wise details is given in table:A. The fish farming techniques are totally dependent on scientific knowledge and status of fish farmers (Mishra *et al.* 2007)<sup>8</sup>. Front line demonstration is integral part of technology popularization, KVK conducted 18 front line demonstrations on 65 farmer's field on different component of fish farming to increase the fish yield. We saw that the technology further adopted by 57.92 % farmers at field level. The KVK, Chitrakoot provided advisory services to the farmers of the district and also in neighbor districts and resolves the farmers query in respect of fish farming. 467 farmers are in close contact of KVK directly and collecting information through SMS, Whatsapp groups, facebook and telephone calls. 700-800 calls/year attended by KVK from fisherman's and resolves their problems effectively. KVK conducted 175 Gosthies and 15 field days on different technology and issues arises time to time. It has been observed that 35.7% farmer fully adopted and 22.22 farmers partially adopting the technology at their own field. (Savita singhal *et al* 2017)<sup>9</sup> indicated in their study that 85 per cent beneficiary respondents had high to medium level of adoption of improved agricultural production technologies. While, only 15.83 per cent of the respondents had low level of adoption through KVK. The disease management was not common practice in the district but now they are applying preventing

measures fully by 55% and partially by 15% farmers. KVK tackled the problem of EUS (Epizootic Ulcerative Syndrome) in the farmer's ponds (Saha *et al.* 1992)<sup>10</sup>. To increase income per unit area KVK popularizing fishery based integrated farming model by unit establishment at center for skill up gradation of farmers through training and demo. 07 units run by farmers on fishery – poultry – vegetable base techniques. The result shows that the income was 34.12% higher than single enterprise of fishery. The ponds were also used for the cultivation of the *Trapa* sp (Singhara) with fish farming. To disseminate genetically improved fish variety of Jayanti rohu and amur carp among fish farmer KVK demonstrated it at center and studied the growth and yield performance to popularize the variety in the district. To meet out the challenges of quality seed requirement KVK produced 30 lakh/ Year fish seed through induced breeding of Catla (*Catla catla*), Rohu (*Labeo rohita*), Mrigal (*C. mrigala*), Common carp (*Cyprinus carpio*) and grass carp (*Ctenopharyngodon idella*) due to high demand of these varieties. Non-availability of quality seed creates greater problems for the development of freshwater aquaculture (Singh and Ahmad, 2003 )<sup>11</sup>. Fishing ponds were generally being used for culture of fish species like *Catla catla*, *Labeo rohita*, *Cirrhinus mrigala* and *Cyprinus carpio*. Some farmers were also culturing *Hypophthalmichthys molitrix* and *Ctenopharyngodon idella*. *L. rohita* was dominant fish species of the district for eating and marketing purposes both (DN Jha *et al* 2015)<sup>12</sup>. KVK also facilitated farmers to rear fish seed and made available to the fish culturists. Two circular hatchery and 10 rearing unit established in the district with the support of KVK with a capacity of 30 lakh fingerling and 50 lakh fry yearly resulted to increase in production, employment and income of farmers.

**Table-A: Technology adoption (160 Farmer)**

Name of technology	Farmers adoption	Farmers fully adopted (%)	Farmers partially adopted (%)	Adoption (%)
Composite fish farming	95	34.38	25.0	59.38
Density and species ratio management	115	35.63	36.25	71.88
Feed formulation and feeding	109	25.63	42.50	68.13
Pre stocking management	127	58.13	21.25	79.38
Post stocking management	113	55.20	12.50	67.70
Water quality management	133	36.25	46.88	83.13
Disease management	92	45.00	12.5	57.50
Stunted seed rearing	88	35.0	20.0	55.00
Integrated fish farming	58	25.0	11.25	36.25
Intensive fish farming	28	12.5	5.0	17.5
Fry and fingerling production	66	30.00	11.25	41.25
<b>Average</b>		<b>35.70</b>	<b>22.22</b>	<b>57.92</b>

**Table-B: Production of fishes in adopted pond of farmers**

Year	Yield qt/ha	Average Production Q/ha
2000-2005	7.05-10.10	8.58
2006-2010	10.10-15.20	12.65
2011-2015	15.20-20.15	17.68
2016-2020	20.15-28.12	24.14

## 5- Conclusion-

The study indicated the progressive development and technology adoption of aquaculture by farmers even in remote, resource poor and rainfed area is clearly visible. The availability of inputs are essential to solve the problems arises during culture period like feed, medicines and seeds. Quality seed and nutritionally balanced feed are considered to be most important requirements for practicing aquaculture created poor impact on production in seasonal ponds having water holding capacity up to 6-8 months. The annual fish yield of pond of district is very low. This yield is far away to the estimated fish yield of a pond i.e. for U.P. 4500kg/ha/year (DOF, UP)<sup>13</sup>. So, yield, income and livelihood of the farmers can be enhanced by adopting scientific package of practices by fish farmers of the district. It is concluded that the water resources of the district is sufficient but maximum ponds are rainfed and being dry after 6-9 months. These seasonal ponds are made usable for fish culture by stocking large size stunted fingerlings of IMC with assured water and feeding management. Financial scarcity can be managed by kisan credit card through banks.

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## Author Profile-

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