IMPACT ASSESSMENT OF TRAINING PROGRAMMES ON FISH PRODUCTION IMPARTED BY K.V.K., SONAMUKHI, BANKURA

A Thesis
Submitted to the
West Bengal University of Animal and Fishery Sciences
In partial fulfillment of the requirements for the award of the degree of

Master of Fishery Science
In
FISHERY EXTENSION

By

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Dedicated To Beloved Kaku

And My Family

It is with my deepest gratitude and warmest affection that I dedicate this thesis to my Grandparents, Father, Mother, Uncle, Aunt, Brother and Sister, Who have been a constant source of Inspiration in my life.

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CERTIFICATE

This is to certify that the work embodied in the thesis entitled ***"Impact Assessment Of Training Programmes On Fish Production Imparted By K.V.K., Sonamukhi, Bankura"*** *submitted by* ***Miss. Priyanka Chowdhury*** *in partial fulfillment of the requirements for* ***the degree of Master of Fishery Science (Department Of Fishery Extension)*** *in the Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, is the faithful and bonafide research work carried out under my supervision and guidance. The results of the investigation reported in this thesis have not so far been submitted for any other degree or diploma. The assistance and help received during the course of investigation have been duly acknowledged.*

(Prof. S. S. Dana)

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APPROVAL SHEET

APPROVAL OF EXAMINERS FOR THE AWARD OF THE DEGREE OF MASTER OF FISHERY SCIENCE

(Fishery Extension)

We, the undersigned, have been satisfied with the performance of **Priyanka Chowdhury,** in the Viva-Voce Examination, conducted today, the ..19.th..Nov:....., 2014, recommended that the thesis be accepted for the award of the Degree of Master of Fishery Science in Fishery Extension.

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3. Dr. S. K. Das Member of the Advisory Committee	---------- 19.11.2014
4. Dr. N. A. Talwar Member of the Advisory Committee	----------

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Date: 30.10.2014.

Priyanka Chowdhury

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(Priyanka Chowdhury)

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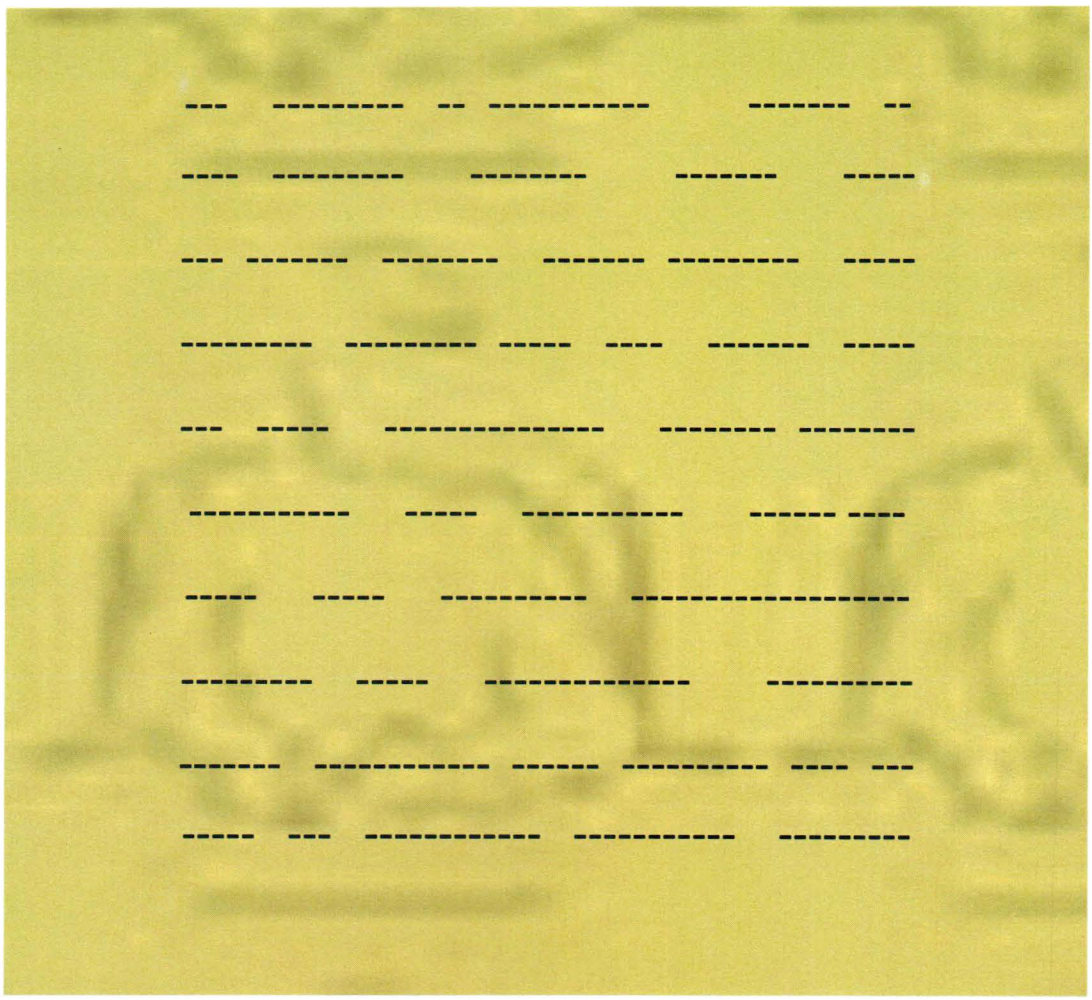


Introduction

1. Introduction

"The only thing that interferes with my learning is my education".

..... Albert Einstein

When we are celebrating the hundredth anniversary of Einstein's revolutionary contribution to science, it is worth thinking about the challenges we face to spread scientific spirit in rural India where 70% Indians live and that too many more with poverty and ignorance. It is the task before Officers in Fisheries/ Technocrats to make a paradigm shift in knowledge of rural farmers with an innovative extension strategy.

Indian agricultural sector is vast and has continued to be the backbone of our economy. It supports 70 per cent of the country's population which contributes 30-35 per cent of GDP and generates about 20 per cent of export earnings (Mehta, 1998). It provides employment for approximately 62 per cent of the workforce (Singh, 2000). It is indeed heartening that during the 55^{th} year of India's independence, we could reap a record harvest of 208 million tonnes of food grains (Anonymous, 2002).

A definite approach to craft India as developed nation in the shortest possible time is realized by a rapid agricultural growth. To accomplish the admired dream of father of nation, Mahatma Gandhi, we have to work with commitment in taking over newer information and technology to our millions of farmers who work hard vigorously in the sun to feed the nation (Anonymous, 2000). The world is shifting very rapidly. Technology of today becomes outdated tomorrow and agriculture is not exception to this. Agriculture plays an imperative role in Indian economy. The recent advances in agriculture and animal husbandry have demonstrated potential for maximization of agricultural and milk productivity. Today the new developments and techniques have taken over the old ones. However, reality is also that expected numbers of the farmers still do not adopt such recently innovated technologies.

Latest technological development in fishery sector offers better prospect for all section of rural people particularly for those who have poor land base and abundant labour force. Although there is recent advances in the production technology but its rate of adoption at field level is low. Different studies indicated that poor planning had resulted low adoption of technology.

The present age has been rightly termed as an "Information Age". People want adequate and authentic information as early as possible. Farmers as human beings are also anxious and become more desirous with the advancement in science and technology to know what is happening in the field of agriculture. Farmers have enthusiasm to obtain knowledge, particularly in the field of modern agriculture to become psychologically strong and favourable with necessary capacities to adopt modern methods of agriculture. To fulfil the expectations of the farmers, an efficient transfer of technologies is the sole solution.

The frontline extension system of the Indian Council of Agricultural Research (ICAR) presently includes a network of 638 farm science centers commonly known as Krishi Vigyan Kendras (KVKs) and 10 Trainers Training Centers (TTCs). The activities of the KVK, which were initially confined to farmer's training and On Farm Demonstrations (OFDs), have been further extended to cover in-service training of extension personnel, so as to upgrade their skills in new technologies and the vocational training of farm youths (Chauhan, 2013).

Krishi Vigyan Kendra (K.V.K) is an admirable project of ICAR for testing and transmitting agricultural technology to link the space between production and productivity and to increase self-employment opportunities among farming communities. Krishi Vigyan Kendra is the grass root level vocational training institute dedicated for bridging the gap between the available technologies at the one end and their application for increased production at the other end. It provides a strong training support for bringing about production breakthrough in agriculture. Each K.V.K is free to develop its specific objectives to gear up the immediate as well as long term needs of the operational area (Chauhan, 2013).

The present growth rate of population in India demands production of additional 5-6 million tonnes of food every year for ensuring food security at the household level. This is a major challenge for the policymakers, planners, administrators, agricultural scientists and extension workers of the country. These calls for the reassessment of the existing roles, mission and strategies related to technology generation, technology assessment and refinement and dissemination in the field of agriculture and allied sectors. Considering the major challenges in agriculture including the need for enhanced productivity and enhanced profitability there is a need for greater thrust for technology dissemination without any transmission loss. To increase the food production at the rate of at least three per cent per year the efforts of government organizations alone is not sufficient. Indian economy is predominantly rural and agriculture oriented where the declining trend in the average size of the farm holding poses a serious problem. In agriculture 84 per cent of the holding is less than 0.8 ha. and majority of them are dry lands and even irrigated areas depend on the vagaries of monsoon. In this context, the socio-economic status of farmers is low because of inherent social hierarchy and economic deprivation. To ameliorate the poor socio-economic conditions of the farmers by raising the level of farm productivity, income and employment with application of agricultural innovation generated at research station, an innovative extension education institution i.e. Krishi Vigyan Kendra (KVKs) was introduced by Indian Council of Agricultural Research (Dubey *et al.* 2008). The Indian Council of Agricultural Research (ICAR), during the fifth five year plan, launched an innovative project for imparting training in agriculture and allied areas to the farmers, school drop-outs and field level extension functionaries in the country by establishing Krishi Vigyan Kendras (KVKs).

Krishi Vigyan Kendra (KVK) is an Institutional Project of the Indian Council of Agricultural Research (ICAR) to demonstrate the "Application" of Science and Technology input of agricultural research and education on the farmers field and in the rural area with the help of a multi-disciplinary team of Scientists. It is, therefore, also called as a front-line transfer of technology or extension system in the country. The agricultural technology is transferred through imparting vocational training to the farmers, farm-women, rural youths and grass-root level extension

workers in broad-based agricultural production. The emphasis is given to provide critical skills so that the participants may confidently use on their farms to increase agricultural productivity and also become economically self-reliant through gainful self-employment. The other important activity, the KVK is to plan and carry out is on-farm testing/ research to verify, test, validate and refine location specific technologies developed by the Zonal Agricultural Research Station (ZARS) of State Agricultural Universities (SAUs). The objective is to have an appropriate technology which may be economically profitable, ecologically sustainable, technically feasible and culturally compatible. This, many times, calls for synthesizing or blending of the indigenous technology knowledge (ITK) of local farmers with the package of technology evolved by the Scientists. The front line demonstrations of major crops like Paddy, Cotton, Sweet orange and other related commodities constitute another potent activity of the KVK to disseminate the agricultural technology.

The basic approach was to serve the farming communities, who were mostly illiterates and without much modern knowledge and technical know-how. The programmes of the KVK's were expected to be need-based identified after a through survey of the district in which they were located and designed to work. Thus the programmes had to be flexible varying from one day to mostly 2-3 months, though; there were no restrictions on even longer vocational training courses if situations demanded. The latter was essential especially for young rural entrepreneurs. The concept of training by 'learning by doing' mode was suggested; latter on in order to re-enforce this idea, the concept of "teaching by doing" was introduced by Dr. C. Prasad, the then Deputy Director General (Agricultural Extension) 1997. The KVK's were to be innovative always looking forward for values and ideas which could train and motivate the farmers, farm women and young farmers for efficient farming raising productivity, production, income and employment. The training programs were made skill-oriented and practical in tune with the teaching by doing concept, the KVKs where recommended to develop live demonstration units on the KVK campus in the subject-matter areas relevant for the district crops, horticulture, fisheries, livestock, etc.

The success of KVKs at many locations created a great demand for establishment of more KVKs in the remaining districts of the country. Accordingly,

the Planning Commission further approved 74 new KVKs to be established during the period 1992-93. Again in the Eighth Plan (1992-97), 78 new KVKs were approved and the same were established in the country, making total number of functional KVKs by the end of the Eighth Plan to 261. The number of KVKs increased to 290 during Ninth Plan with the establishment of 29 KVKs. On the occasion of the independence Day Speech on 15th August, 2005 the Hon'ble Prime Minister of India announced that by the end of 2007 there should be one KVK in each of the rural districts of the country.This has resulted in establishment of 551 KVKs at the end of Tenth Plan which include 371 under State Agricultural Universities (SAU) and Central Agricultural University (CAU), 40 under ICAR Institute, 88 under NGOs, 33 under State Governments, 3 under PSUs and the remaining 16 under other educational institutions.

At present, 631 Krishi Vigyan Kendras (KVKs) are functioning full-fledged in the country in the service if Indian farming. During recent year, these KVKs have given benefits to 6,10,000 farmers and farmwomen, 1,30,000 rural youth and 68,708 in-service personnel by organizing total 30,517 training programmes. To accelerate dissemination process, kisan melas, discussion, farm advisory services and diagnostic film shows were arranged. The KVKs also took up on farm testing (OFT) of 607 farm technologies. A total of 32,340 front line demonstrations (FLDs), covering 1,19,260 ha of area, were conducted to demonstrate the potential on newly released production technologies on oilseeds, pulses and other crops, besides this, they also carried out 3,337 demonstrations on livestock production and management. At KVKs 7,490.73 tonnes seeds of cereals, oilseeds, pulses and vegetables, spices, medicinal and aromatic plants, ornamental and plantation crops and forest species and 958670 livestock strains were produced and made available to the farmers. Advisory services were also provided to 3, 42,634 farmers and other users. Significant impact of K.V.K technological interventions is also visible in villages in terms of rainwater harvesting, empowerment of rural and tribal women through income generation activities, dairying as sustainable enterprise for women, reclamation of sodic land, off-season vegetable production, backyard poultry and revival of ginger cultivation in different states (Anonymous, 2005).

KVK's have been playing a vital role in technology transfer, technology refinement and dissemination of information with a view to improve land productivity, income, knowledge and empowering farm women, small and marginal farmers. Now the KVKs have been participating in the process of assessment and refinement of technology on location specific basis. Emphasis is also on employment generation to bring equality in opportunities for socio-economically deprived class of farmers and traditionally constrained areas in the country, including dry land areas. Krishi Vigyan Kendra (K.V.K) is an institutional extension project of the ICAR to demonstrate the 'application' of Science and Technology inputs of agricultural research and education on the farmers' field and in the rural area with the help of a multi-disciplinary team of Scientists with a view to increase food productivity and there by food security. It is also referred to as the first line technology or extension system in the country. The agricultural technology is transferred through imparting vocational training to the farmers, farm-women, rural youths and grass root level extension workers in broad-based agricultural production. The emphasis is given to provide critical skills so that the participants may confidently use them on their farms to increase agricultural productivity and also become economically self-reliant through gainful self-employment.

There is a transition going on from family farming to surplus farming and finally commercial farming (Proceeding of 1st National Conference on KVKs, 2005).

To make the agriculture more farmers' friendly, their ideas must be taken into account by the scientists to develop technology for better adoption fitting to their farming situations (Samanta, 2006). Considering the above facts in view, Indian Council of Agricultural Research (ICAR) has implemented its first line extension system through Krishi Vigyan Kendra.

Before adopting the villages for K.V.K activities, a detailed survey of a village is to be conducted to identify the problem and cause of the problem related to agricultural and allied fields. A problem can be identified by direct observation in farmers' field, PRA and formal surveys, "yield cut" survey, exploratory trials, previous studies. Now-a-days, Participatory Rural Appraisal (PRA) tool is being used

to conduct the survey in which village people are actively involved in the process. Through PRA survey problems and cause of the problem are identified by the farmers. Based upon the survey future strategic plan of work is chalk out and depending upon the requirement different activities is undertaken in different areas by K.V.K scientists (Goswami, 2006).

To achieve K.V.K mandate along with the view of objectives, the K.V.K undertaken the following achieving in the adopted villages On-Farm Testing (OFT), Front Line Demonstration (FLD), Training for Practicing Farmers and Rural Youth, Training Programme for Extension Functionaries.

Even after the laps of about half a century (45 yrs.) of the KVKs came into being in different regions of the country, there have been gaps to be abridged between the potentiality of the resources and the actual production.

A chunk of the farming community has been trained up by the KVK scientists. The trained individuals have dual roles-they themselves adopt the acquired technologies and knowledge and also they would influences motivate and train up others beneficiaries to adopt the new technologies in their farming operation.

To meet changing needs, it is essential to create a cadre of "Technology Agent" from the unemployed youths, who are better trained, equipped and committed to serve our farming community, while generating self-employment for them. Some KVKs of India have already trained unemployed youths in vocational activities such as sericulture, mushroom production, poultry production, vermicomposting, fruits and vegetable processing, sheep and goat rearing, bio-technology, net and green house management, tissue culture, nursery management etc. it is believed that integration of science with rural development activities would enhance the functional capability and required impact of extension activities. Hence, the integration of KVKs, both for human resource development and frontline demonstration of technologies at the district level would add value to the process of technology transfer on a system made (Anonymous, 1999).

Thus, Krishi Vigyan Kendra is an institutional project of the ICAR to demonstrate technology generation, technology assessment, technology refinements and dissemination in the field of agriculture and allied sectors. The KVKs have been charged now to take up the responsibilities of technology evaluation and impact assessment, demonstration of technology on the farmer's field and update of the knowledge and skill for the farmers.

Training is an important mechanism for transfer of technology and human resource development. To know how effective the KVK to cater the needs of farmers, a study was conducted to have ideas and knowledge as to how effective is the KVK training for the trainees and also the roles played by the trained youths in the interest of the farming communities. Keeping these facts in mind the study was undertaken in Sonamukhi Block under the KVK domain of Sonamukhi KVK, CADC, in Bankura, West Bengal.

Objectives of the study:

The specific objectives of the study are-

i. To study socio-economic profile of the trainees.
ii. To investigate the extent of effectiveness of training programme on fish production in terms of utility of topics taught.
iii. To study the impact of training programmes imparted by K.V.K on knowledge level of respondents.
iv. To study the impact of training programmes imparted by K.V.K on adoption level of respondents.
v. To study the constraints which are encountered by fish farmers in adoption of improved fish farming practices.

SCOPE OF THE STUDY:

In the present study an attempt was made to study the impact of trainings conducted by Krishi Vigyan Kendra, Sonamukhi, on composite fish farming practices.

The results of the study are hoped to provide a clear picture regarding the socio-economic profile of the trainees, the extent of effectiveness of training programme on fish production, impact of training programmes imparted by K.V.K. on knowledge level of respondents, adoption behaviour of respondents, constraints faced by farmers in adoption of improved fish farming practices. The findings of the study would be an important document which would be of practical use to the KVKs to conduct further trainings.

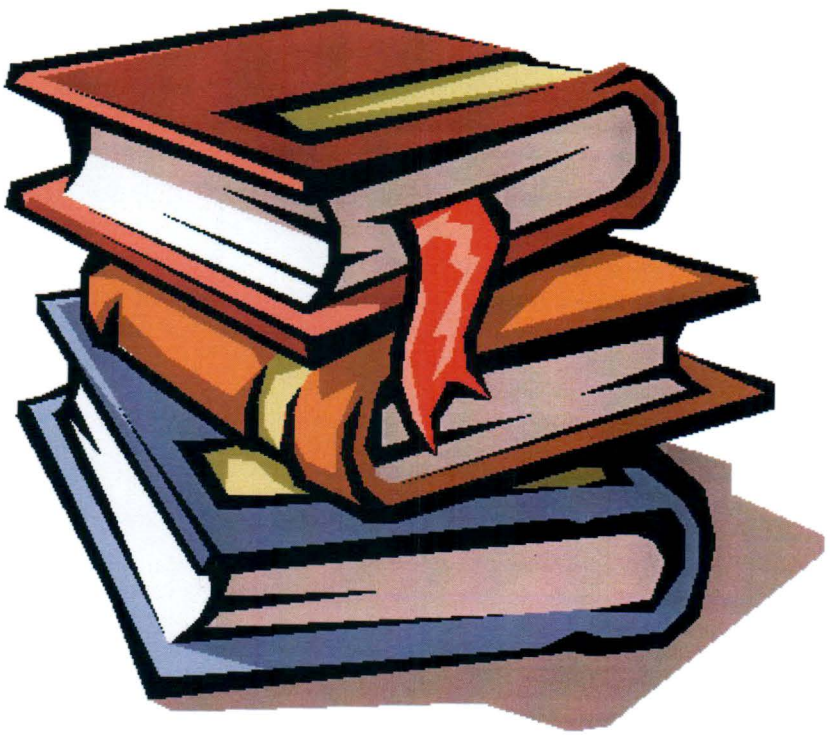
The knowledge of constraints faced by farmers in adoption of improved fish farming practices and also helps to modify and rebuild the existing training programmes as well design new training programmes.

LIMITATIONS OF THE STUDY:

Since the present study is a part of the student's research program, the constraints of time, money and other resources were inevitable. This limitation determined the restricted purposive selection of farmers who were in the jurisdiction of Krishi Vigyan Kendra, Sonamukhi, to study the impact of trainings. Hence, the generalization of results in the wider context should be applied only where similar situations prevail.

With the above limitations, the study would bring out findings, which will be of much help in building up the body of knowledge as the topic has been hardly dealt through research.

Chapter - 2



Review of Literatures

2. Review Of Literatures

Research is a continuous process and review of literature helps to channelise and motivate the efforts of the researcher in the desirable direction, apart from determining the work done in the past, assisting in delineation of insight and procedures. It provides a basic theoretical framework. An attempt has been made here to review the relevant available literature having a direct and indirect bearing on the present investigation. It is to make a special point to note that this study has been a maiden effort as for as evaluating Krishi Vigyan Kendra, Sonamukhi under our State.

2.1 Personal, socio-economic and psychological characteristics of the respondents
2.2 Knowledge of the respondents
2.3 Adoption of recommended practices by the respondents
2.4 Relationship between selected characteristics of respondents with adoption of recommended practices
2.5 Constraints faced by the respondents
2.6 Suggestions given by the respondents

2. 1 Personal, Socio-Economic and Psychological Characteristics of The Respondents

2.1. 1 Age

Hagre (1991) reported that 52.70 per cent of the Orange growers were from middle age group, whereas 36.44 and 10.83 per cent from young and old age group, respectively.

Yadkikar (1991) found that more than half of the respondents at KVK were from middle age category, while 24.00 per cent were from young age category. Thus, meager percent (12.00%) of the respondents were observed from old age category.

Shirsat (1992) reported that majority (62.50 %) of the respondents were belonged to middle age category.

Reddy and Ratnakar (1993) mentioned that the maximum number of mango growers (56.00 %) were in the young age group followed by middle age group (34.00 %) and old age group (10.00 %).

Wakle (1994) indicated that 56.67 per cent of the banana growers were in middle age category, followed by 25.33 per cent old and only 18.00 per cent of the banana growers were young age category.

Ingle and Kubde (1995) observed that relatively higher proportion of KVK trainees were young in age *i.e.* upto 25 years age (30.30 %) and in 26 to 35 years age group were 33.33 percent.

Desai *et. al.,* (1977) indicated that the majority of KVK trainees were young in age of upto 35 years (75.5%).

More (1997) mentioned that majority of the KVK beneficiaries (55.00 %) were from middle age group followed by young (24.29 %). It was also observed that only 18.33 per cent beneficiaries were from old age category.

Kamble (1998) found that majority of the respondents who participated in the KVK training programmes were of young age (80.00 %) followed by middle age (18.33 %) and only 1.66 per cent respondents were in old age group.

Saxena and Gour (1999) made evident that half of the KVK respondents were in young age group (i.e. 18-22 years.)

Wase (2001) observed that majority of chilli growers (52.50 %) were in the age group of 36 to 50 years that is middle age category.

Raghunandan (2004) in his study reported that 45.00 per cent of the respondents (45.33%) belonged to the middle age group, followed by old age (36.25%) and young age group (18.75%), respectively.

Nagoor Meeran and Prince Jayaseelan (1999) in their studies on 'Socio-Personal, Socio-Economic and Socio-Physical Profile of Shrimp farmers in Tamilnadu' observed that majority (52%) of the shrimp farmers were young aged followed by medium (42%) and old (6%) aged involved in Shrimp farming practices.

Ajieh (2010) in his study on 'Adoption of Fishery Technologies by Fish Farmers in Akoko-edo Local Government Area, Edo State, Nigeria' revealed that 15.3 percent of the respondents were within the age of 21 to 30 years, while 61.1 percent were within the age of 31 to 50 years. The remaining 23.6 percent of the respondents fell within the age of 50 and 70 years.

Pandey and Upadhayay (2012) in their studies on Socio-Economic Profile of Fish Farmers of an Adopted Model Aquaculture' Village: Kulubari, West Tripura revealed that majority (57.50%) of fish farmers belonged to meddle age group followed by young age group (32.50%) and only 10 percent fish farmers belonged to old age group in fish culture practices.

Apata (2012) in his studies on 'Awareness and Adoption of Fish Production Technologies' in South-Western, Nigeria found that majority of the respondents (76.4%) were below 50 years of age who were involved in fish culture practices.

2.1.2 Education

Lokhande (1990) found that the substantial per cent of the respondents (27.50 %) were educated up to middle school level, 19.16 per cent respondents were educated up to college level, 16.67 per cent respondents were of the category of high school and primary school and 20.10 per cent of the respondents were illiterate.

Yadkikar (1991) reported that 32.00 per cent of the KVK respondents had education up to graduate level, whereas 42.50 per cent of the respondents had

education up to 12th standard, while, more than one fourth of the respondents (36.50%) had education up to middle school level.

Ingle (1997) found that more than one third of trained farmers (36.66 %) at KVK were educated up to middle school level, whereas in case of untrained farmers 33.33 percent were educated up to primary school level. However, 25.00 per cent of the trained farmers were educated up to high school level. It could further be noticed that the respondents although found to spread over the rest categories of education level but the percentage in the rest categories were negligible.

Desai *et al.,* (1977) found that majority of the KVK trainees had completed up to middle school level of education (59.50 %).

More (1997) indicated that 44.29 per cent of the KVK beneficiaries of cotton production technology were educated up to secondary level, followed by 17.86 per cent of the respondents were educated up to primary level, whereas 15 per cent and 12.14 per cent of the respondents were educated up to higher secondary and college level, respectively.

Kamble (1998) noticed that 47.50 per cent of the KVK respondents belonged to middle school followed by high school (25.00 %) and primary school level (23.33 %). Near about 5.00 per cent respondents were functionally literate and no one respondents was observed in the illiterate category.

Saxena and Gour (1999) noticed that 53.00 per cent KVK respondents had higher education. In case of mushroom cultivars, 45.00 per cent women trainees had primary education followed by 20.00 per cent women who were illiterate.

Patil (2000) observed that 36.67 per cent banana growers were educated up to middle school followed by 25.00 per cent of the banana growers were educated up to high school, while only 05.83 per cent banana growers were illiterate.

Raghunandan (2004) reported that majority (73.75%) of the respondents are literates of which 22.50 per cent studied up to primary school. 20.00 per cent studied middle school, 15.00 per cent respondents up to high school, 11.25 per cent of respondents up to pre university, whereas, 5 per cent respondents had graduation, whereas, 23.28 per cent of the respondents were illiterate.

Jahromi and Zamani (1999) observed that more literate farmers are more capable to get information from various sources; so they can be more efficient farmers. Immanuel (2008) in her studies on 'Adoption of oyster culture by women' in Kerala found that more than 30 percent of respondents were having Primary (I to V standard passed) and middle (VI to VIII standard passed) level of education and 1.4 percent was illiterate (cannot read/write).

Pandey and Upadhayay (2012) in their studies on 'Socio-Economic Profile of Fish Farmers of an Adopted Model Aquaculture' Village: Kulubari, West Tripura observed that majority of respondents (92.50%) involved in fish production were literate and only 7 percent of fish farmers were illiterate.

2.1.3 Caste

Pandey and Upadhayay (2012) in their studies on 'Socio-Economic Profile of Fish Farmers of an Adopted Model Aquaculture' Village: Kulubari, West Tripura revealed that majority of the respondents of the model village (82.5%) belonged to General caste category followed by 20 percent Scheduled tribes (S.T), 17 percent Other Backward Communities (O.B.C) and 15 percent of Scheduled castes (S.C).

Yadav (2012)in his study on 'Utilization of information sources among fish farmers' in Faizabad District of Uttar Pradesh revealed that majority of the respondents (54%) belonged to Scheduled caste (S.C), followed by Backward caste (38%) and Forward caste (8%).

2.1.4 Land holding

Hagre (1991) stated that most of the respondents (58.33 per cent) were medium farmers followed by big farmers (41.67%).

Pataliya (1991) observed that majority of the mango growers had medium land holding. Only 2.50 per cent mango growers had land holding above 6.01 hectares.

Shirsat (1992) found that majority of respondents (38.33 %) had medium size of farm.

Ingle and Kubde (1995) showed that relatively higher proportion of KVK trainees were from 4.01 to 10.00 ha. of land holding group (35.35 %).

Desai *et al.,* (1977) observed that majority of KVK trainees owned 1.01 to 4.00 ha. of land holding (60.1 %).

Ingle (1997) observed that majority of the untrained farmers of KVK had possessed land upto 5 acres. Whereas, 43.33 per cent of the trained farmers possessed 5.01 to 10 acres land followed by 30.00 per cent trained farmers up to 5 acres of land.

Patil (2000) found that majority of the banana growers (64.17 %) were having medium land holding. In general, the above review stated that majority of the respondents has possessed medium size of land holding.

Sadamate (1978) observed positively and highly significant co-relation value between education, size of land holdings, occupation, farm power, extension contact, which indicates greater effect of these variables on the technological gap.

2.1.5 Annual income

Hagre (1991) pointed out that 43.34 per cent of orange growers had medium income followed by high income (38.33 %) and low income group (18.33 %).

Mande (1991) observed that 71.25 per cent respondents had annual income above Rs.10,000 per year.

Nandanwankar (1991) reported that the majority of the beneficiaries (37.50 %) were from higher (above Rs. 9000) income group. Whereas 26.67 per cent non-beneficiaries respondents were from Rs. 5000 to 7000 income group. In case of non-

beneficiaries, 38.75 percent and 33.75 per cent had annual income between Rs. 5000 to 7000 and Rs. 3001 to 5000 respectively.

Desai *et al.*, (1977) reported that majority of KVK trainees (68.70%) had annual income up to Rs. 13000/-.

Ingle (1997) reported that nearly half of the KVK respondents from both categories had income in the range of 12001 to 24,000, followed by 43.33 per cent of trained farmers having the income up to Rs. 12001, i.e. low level of income. It was noticed that 28.33 percent of the trained farmers, had income more than Rs. 24,000 whereas in case of untrained farmers there was negligible proportion of respondents having income more than Rs. 24,000.

Kamble (1998) noted that most of the KVK respondents had medium income (55.00%) followed by high income (35.83 %) while only (9.16 %) had low income.

Kapse (1998) observed that the majority of the farmers (61.67 per cent) belonged to medium income group whereas 20.83 per cent belonged to low income group and 17.50 percent farmers belonged to high income group.

Anchule (2000) reported that majority of the farmers (60.00 per cent) belonged to medium income group, 24.40 per cent belonged to low income group and only 15.60 per cent farmers belonged to high income group.

Karumalaikannan and Santhakumar (2005) in their studies on 'Empowerment status of women self-help group members in fisheries' reported that 64.17 percent of the women SHG members had low level of annual income followed by medium (30%) and high (5.83%) level of annual income.

Singh et al. (2012) in their study on 'Adoption of Hygienic Fish Haandling Practices by Fishermen' at Thoothukodi district of Tamilnadu observed that majority of the fishermen (58.33%) had medium level of annual income followed by high (15.00%) and low (26.67%) levels of annual income.

2.1.6 Extension participation

Sakharkar (1995) found that 36.00 per cent of the respondents had participated in one or more extension activities whereas, two third (63.33%) of the respondents did not participate in any extension activities.

Angadi et al. (1992) reported that majority of the respondents had not participated in various extension activities namely, discussion with extension personnel (98.76%), group meeting (75.23%) and training programmes (72.50%) and 38.13 percent of the respondents participated regularly in extension activities like method demonstrations and Krishi mela respectively.

Gupta (1999) reported that about 74.00% percent of respondents were aware of training programmes of which only 36.00 percent respondents had participated in training programmes, whereas, 56.00 per cent respondents were aware of demonstrations and only 4.66 per cent of farmers had participated, but none of the respondents had participated in field days and field visits.

Kanavi (2000) reported that none of the respondents participated regularly in training and demonstrations. Nearly one third (31.33%) of respondents participated in Krishi mela. Whereas, very less number of respondents participated in extension activities like farm visits(1.33%), group discussion (2.66%) and study tour (4.00%), whereas, 20 per cent participated occasionally in Krishi mela followed by training (4.66%), group discussion (4.00%), demonstration and farm visits (2.00%) each and study tour (0. 66%).

Nagaraja (2002) mentioned that 79.91 percent of the respondents were found not participating in any of the extension activities, whereas, 8.33 per cent of the respondents were found participating in field days followed by training (5.41%), Krishi mela (4.99%) and extension tours (3.35%) as observed.

Ajore and Singh (1995) found that there was a positive correlation between extension contact and skill of the subject matter specialist in alkali soil reclamation.

Kumar (1993) reported that social participation was significantly correlated with change in skill with a substantial direct effect.

2.1.7 Scientific orientation

Sakharkar (1995) observed that majority (65.00%) of the soybean growers of Nagpur district belonged to medium category of scientific orientation, 17.33 per cent each of the farmers belonged to low and high scientific orientation categories.

Saravanakumar (1996) found that majority (70.00%) of the mango growers of Dharmapuri district were in the medium scientific orientation category followed by low (15.83%) and high (14.17%) categories.

Chandran (1997) in her study reported that 31.67 per cent of the respondents belonged to the low scientific orientation category, while 30.00 per cent and 38.33 per cent of them were found to have medium and high scientific orientation, respectively.

Karpagam (2000) reported that majority of the respondents (75.00%) were in medium category followed by low category (13.33%) and high category (11.67%) with respect to scientific orientation.

The above studies reported that majority of farmers belonged to medium scientific orientation category.

Monohari (2001) found that the attitude of the respondents towards improved agricultural technology was favourable. This might be due to the fact they were convinced about the benefit of improved agriculture technology for getting higher yields.

Annamalai and Rao (2003) indicated that the kiosks were started to procure crops, including soy in Madhya Pradesh, wheat in Uttar Pradesh, coffee in Karnataka, and seafood in Andhra Pradesh (Upton and Fuller 2004), thus reducing the procurement costs of ITC.

2.1.8 Mass media participation

Balamatti (1993) observed that out of forty five literate paddy growers of North Canara district (Karnataka), majority (53.33%) of them never read any news paper while40.00 per cent read them occasionally and only 6.67per cent read regularly and all of them were non-subscribers. Majority (54.29%) was found to have listened agricultural programmes on radio occasionally. While, 32.85 per cent had never listened and only 12.86 per cent of them listened regularly.

Hanumanaikar (1995) conducted a study in Ranebennur taluk of Dharwad district (Karnataka) reported that 86.00 per cent of sunflower growers possessed radio and most of them listened it occasionally. Almost all the subscribers of newspaper read the news paper regularly (72.22%).

Patil (1995) noticed that 47.50 per cent, 20.00 per cent and 18.75 per cent of commercial growers of sunflower were daily users of radio, T.V. and newspaper respectively. On the contrary, 43.75 per cent, 25.00 per cent and 23.75 per cent of seed producers were regularly using radio, newspaper and T.V., respectively.

Sakharkar (1995) indicated that 61.00 and 43.00 per cent of the respondents possessed radio and T.V., respectively of which, 13.66 and 12.02 per cent of them were regular listener of the general and agricultural, programme from radio, 39.23 and 30.00 per cent of them were regular viewers of general and agricultural programme on TV. Further, he reported that as high as 63.08 and 58.33 per cent of the respondents regular readers of newspaper and farm magazines, respectively.

Thangavel *et al.,* (1996) reported that 60.00 and 52.00 per cent of the respondents had low level of mass media exposure in wet and dry areas, respectively, 28.00 and 34.00 per cent of both wet and dry areas had high level of mass media exposures.

Krishnamurthy *et al.,* (1998) found that mass media participation was relatively higher (83%) in case of adopters as compared to the non-adopters of weedicides in paddy.

Puthiraprathap *et al.*, (1999) found that a majority of members of credit management group belonged to low category of mass media exposure. It could inferred from above studies that majority of farmers belonged to medium level of mass media participation.

Shah et al. (1973) reported that a greater number of cultivators who were exposed to mass media, had extension contact and urban linkage and had high institutional membership were highly productive as compared to those who did not possess these social traits.

2.1.9 Innovativeness

Hareesha (1994) found that 45.83 per cent of the respondents had high innovative proneness while, 37.5 per cent had low innovative proneness.

Raghupathi (1994) reported that 42.50 per cent of command area farmers were in the medium innovative proneness category, whereas only 15.00 per cent were in low innovative proneness category.

Reddy (1962) found that economic condition or financial position of the farmers always played dominant role in the acceptance of an innovation.

2.1.10 Risk Orientation

Sakharkar (1995) conducted a study on soybean growers in Nagpur district of Maharashtra state and observed that 64.00 per cent of farmers showed medium risk taking ability, whereas, 16.00 per cent and 20.00 per cent of farmers had low and high risk taking ability respectively.

Gupta (1999) observed that majority (64.00%) of respondents were average risk bearers followed by low (24.67%) and high (11.33%) risk bearers.

Nagaraja (2002), reported that a majority (74.85%) of the respondents were found to possess medium risk, whereas, 15.83 per cent and 9.58 per cent of the

respondents were found belonging to high and low level of risk orientation, respectively.

2.1.11 Cosmopoliteness

Ratnakar and Reddy (1991) conducted a study on tribal farmers found that majority of the respondents had high urban contact and visited regularly to the nearby cities, taluka places and district.

Kashem and Hossain (1992) in their study on sugarcane growers in Bangladesh reported that majority of sugarcane growers had medium level of cosmopoliteness.

Kadian and Ramkumar (1999) in a study on factors associated with knowledge level of dairy farmers reported that cosmopoliteness helps to develop interaction, mutual understanding and outside contact which leads to higher knowledge.

Anitha (2004) indicated that more than one-fourth (28.30%) of farm women had high cosmopoliteness followed by medium (44.20%) and low (27.50%) cosmopoliteness.

Shashidhar (2004) conducted a study on influencing factors and constraints in drip irrigation by horticulture farmers of Bijapur district of Karnataka and found that 41.50 per cent of the farmers visited town occasionally followed by once in 15 days (37.50%). Whereas, respondents visiting to town for the personal or domestic purpose were 54.10 per cent followed by 35.00 per cent for new technology or agriculture purpose.

Suresh (2004) reported that 45.00 per cent of respondents had low level of cosmopoliteness followed by medium level (44.17%) of cosmopoliteness and 10.83 per cent had high level of cosmopoliteness.

It could inferred from above studies that majority of farmers belonged medium level of cosmopoliteness category.

Dasgupta (1989) reported that to extent to which the information and recommendation of communication would be accepted by farmers depends on their perception of the credibility of communicator or communicating agents as source of information and influence.

Sagar and Ray (1987) found that the cosmopolite sources of information are the carriers of change. It is therefore, essential for the change agent to have good knowledge about the pattern of use of cosmopolite sources of information of his clients.

2.2 Knowledge of Respondents

Dattari (1980) reported that 69.03 per cent of contact farmers and 30.67 per cent of non contact farmers under T&V system had high level of knowledge regarding improved practices of paddy cultivation. The results indicated a significant difference in extent of knowledge between the two categories of farmers which revealed that the contact farmers under T&V system could gain more knowledge as compared to non contact farmers.

Dangi (1983) in his study on impact of training in adoption of improved practices by the farmers in command area development programme in Rajasthan Canal Project area reported that 69.84 per cent of the contact farmers had high knowledge level, whereas in case of followers only 30.16 per cent had high level of knowledge. The results further showed that there was a significant differences in knowledge between two categories of farmers.

Sharma (1983) concluded that the contact farmers of T and V system possessed higher knowledge as compared to the non-contact farmers in about two thirds of the practices of the improved rice cultivation, while in one-third, they were at equal level of knowledge.

Srivastava and Yadav (1988) inferred from their study that 36.00 per cent of contact farmers of T&V system had good knowledge about farm technologies and

74.00 per cent of non contact farmers of Kanpur district of Uttar Pradesh had poor knowledge about farm technologies.

Reddy (1989) observed that the mean knowledge score of the trained farmers was 28.61 and that of untrained farmers was 20.07. The differences between two mean was found to be significant.

Sharma (1989) observed in his study that 70.00 per cent of respondents gained quite substantial amount of knowledge in respect of the production technology of all the eight important crops of the region under T & V system of agricultural extension. In the same way Choudhary (1991) reported that the farmers had moderate knowledge about the recommended production technology of gram.

Nikam and Rahad (1991) found in their study on lab to land programme that 70.10 per cent beneficiaries and 25.00 per cent non-beneficiaries were having medium knowledge level, while 15.00 per cent beneficiaries and 65.0 per cent non-beneficiaries had low knowledge level. Only 15.00 per cent and 10.00 per cent beneficiaries and non-beneficiaries respectively were having high knowledge level.

Venkaria and Mahajan (1991) reported on the basis of their study on farmers' knowledge about agricultural technology, that nearly half of the respondents (49.00%) had medium level knowledge. Further, they found that comparatively less percent of respondents were observed in low level knowledge group (32.00%) and high level knowledge group (19.00%).

Yadkikar (1991) reported that maximum number of the KVK respondents (55.50 %) gained medium level of knowledge followed by low and high level of knowledge (23.00 % and 21.50 %) respectively.

Angadi *et al.,* (1992) observed that majority of the farmers (58.00%) possessed medium knowledge of cultivation practices of groundnut. This trend was noticed since many farmers lacked proper knowledge of complex practices like application of chemical fertilizers and plant protection measures.

Mundra (1992) reported that there was a significant difference in the knowledge level of member and non-member youths of Neharu Yuva Kendra with regard to rural development programmes and their sponsoring agencies.

Suresh Kumar (1992) found that most of the beneficiaries were having medium level of knowledge about JRY, followed by high level. In case of non-beneficiaries low level was followed by medium level i.e. most of the non-beneficiaries were having low level of knowledge about JRY.

Upadhyay (1993) reported that there was a significant differences in the knowledge of beneficiaries and non-beneficiaries towards Integrated Watershed Development Programme. He further reported that there was no significant differences in the knowledge level of beneficiaries of three tehsils under study regarding major aspects of IWDP.

Venkaria *et al.* (1993) concluded that half of the farmers had medium level of knowledge regarding agricultural technology. Whereas majority of the farmers had favourable attitude towards agricultural technology. Thus, knowledge and attitude towards agricultural technology were positively and significantly related with the inputs use behaviour of all the categories of farmers.

Bheemappa *et al.*, (1994) reported that 60.00 per cent and 71.43 per cent of adopted farmers had knowledge about selection of suitable land and soil type respectively for the groundnut. Proper method of land preparation and by the majority of farmers (91.43 per cent) had knowledge about the selection of varieties was known to 22.86 per cent of farmers. As regards the treatments, 74.28 per cent of farmers had the knowledge of seed treatment and about 60.00 per cent of farmers had knowledge about the right quantity of rhizobium to be used, with regards to fertilizer application 51.43 per cent farmers were knowing the recommended plant nutrients to be used. The method of sowing the seed by hand dibbling was known to 74.28 per cent of farmers. Around 50.00 per cent of farmers expressed the right quantity of gypsum

application. In plant, protection 62.88 per cent of farmers had the knowledge of plant protection chemicals.

Budihal *et al.,* (1994) noted that after the training, increase in knowledge level was seen to the tune of 64.00 per cent in grafting, 53.00 per cent in budding and 38.00 per cent in layering techniques. Further, it was interesting to note that need based skill oriented training had enhanced the knowledge level and resulted in increase in adoption level.

Bhati (1995) reported in his study that the majority of rural people had high knowledge about all the activities conducted by Tilona (N.G.O.). It is due to the fact that the farmers who were benefited by the NGO, have more knowledge about their activities.

Kubde *et al.*, (1997) found that women workers in government nurseries had less than 50.00 per cent knowledge with regards to raising mango grafts (45.00 per cent) and raising seedlings of kagzi lime and orange (42.00 per cent). It was nearly one third in respect of raising custard apple seedlings (35.00 %) whereas, it was observed to be poor about raising guava layers (14.00 %).

Ingle (1997) observed that 90.00 per cent of the trained farmers of KVK were knowing soil type required for summer groundnut. As regards sowing time, about 95.00 per cent of trained farmers were acclimatized. Whereas, 96.66 per cent of the trained farmers were knowing about seed rate. About seed treatment with fungicides, 55.66 per cent, trained farmers were knowing. Fifty per cent of the trained farmers were knowing the rhizobium culture treatment. Regarding the fertilizer dose, 75.00 per cent of trained farmers were knowing the recommended dose.

More (1997) observed that majority of the KVK beneficiaries of cotton production technology (62.14 %) gained medium level of knowledge followed by high (27.86 %) and low (10.00 %) level of knowledge of cotton production practices.

Rajput (1997) reported that the majority of respondents (60%) fell in the medium knowledge group while 22.50 per cent could be observed under high knowledge group and only 17.50 per cent respondents possessed poor knowledge about opium production technology.

Sharma *et al.* (1997) reported that majority of the trained (72.50 per cent) and untrained farmers (64.77 per cent) of KVK were found in medium level of knowledge regarding maize production technology.

Nagabhushanam (1998) observed that women respondents had low level of knowledge (88.63 per cent) of paddy cultivation which was observed before the training whereas, 11.32 per cent had knowledge on paddy cultivation up to medium level. After the training, the respondents gained knowledge which range from medium to high level of their percentage being 49.06 and 47.17 respectively. And only 3.77 per cent of respondents had remained at low level of knowledge after the training.

Veeraiah *et al.*, (1998) reported that majority of the trained farmers of KVK had medium level of knowledge (61.33 %) about recommended critical skills in rain fed groundnut cultivation, followed by low level of knowledge (20.00 %) and high level of knowledge (18.67 %).

Sharma and Sharma (1999) found that majority of adopted farmers had extremely high knowledge regarding extension programmes carried out by KVK. Non-adopted farmers had medium to high knowledge regarding extension programmes carried out by KVK at Churu district of Rajastan.

Ahmed and Philip (1999) inferred from their study that most of the trainees in all the four subject matter *viz.*, kitchen gardening (55.50 %) mushroom cultivation (42.50 *per cent*), layer farming (52.56 %) and fresh water pisciculture (52.50 %) showed medium level of knowledge gain after undergoing the training in the respective field.

Gogoi *et al.,* (2000) reported that the level of knowledge of the trained framers on recommended practices of rice was significantly higher than non-trained farmers.

Raghunandan (2004) reported that about 17.50 per cent of respondents had the complete knowledge of contour cultivation purpose. Majority of respondents possessed the knowledge of reduces soil erosion and conserves soil moisture (62.50%), followed by reduced (cost of cultivation 50.00%) and directly improves soil fertility (26.25%).

Ballav and Prasad (1985) observed that farmer's knowledge about different innovations bears significant negative relationship with gap in technology. In other words, greater the technical knowledge about the information lesser is the gap at field level.

Rolling (1988) stated that knowledge was an attribute of the mind. It could not be transferred. It is the outcome of lifelong information processing, storage, and retrieval going on in the neurophysiological system.

Singh (1967) while analyzing the farmer's training in Bihar concluded that in spite of various limitations, the training imparted to farmers in agricultural schools proved useful in effecting changes in knowledge, attitude and adoption behaviour of farmers with respect to improved method of farming.

Veeranjaneyulu, K., Lakpathi, G. and Rajanikanth, P (*2013*) stated that 58% of farmers are having good knowledge of Fisheries after getting training from KVK, Kampasagar. 34% of farmers are having good knowledge without taking training from KVK, Kampasagar.

2.2.1 Training and knowledge

Khemmani (1983) opined training as planned communication process which results in changes of attitude, skills and/or knowledge in accordance with specific objectives relating to desired patterns of behaviour.

Strayton (1986) described training as the acquisition and development of those knowledge, skills, techniques, attitudes and experiences which enable an individual to make his most contribution to the combined effort of the team of which he is a member.

Gaikward (1988) reported that training is reactive when it merely responds to the demands of immediate nature of a given strategy for development and pro-active when it creates awareness of new opportunities and potentials and consequently helps in formulation of new policies and programmes.

Tyson and York (1989) provided a comprehensive description of training and quoted as work organisation and essentially a learning process in which learning opportunities are purposively structured by the managerial personnel and training staff working in collaboration.

Paul et al. (1989) referred training to be the process of developing or augmenting knowledge, skills and attitudes in person applied to the performance of his/her specific work situation.

Kubr and Prokopenko (1989) stated that training for extension personnel may be defined as a planned and systematic effort to increase knowledge (K), improved skills (S), inculcate appropriate attitudes (A), and develop other attributes (Os) in extension personnel to enable them to better serve their clients-the farmers i.e. T=f (K, S, A, Os).

Hall (1962) described training as a process of aiding employees to gain effectiveness in their present or future work through the development of appropriate habits of thought, action, skill, knowledge and attitude.

Lynton and Pareek (1967) defined training as premises what is essential to modern technologies and economic system with flexibility in action through understanding and confidence.

Rao (1975) described farmer's training as intensive learning activities for a group of selected farmers, assisted by competent trainers to understand and practice the skill required in adoption of new agricultural technology at a place where

appropriate facilities exists and at time and duration considered suitable by the farmers.

Morrison (1976) reported training need as existing any time when an actual condition differs from a desired condition in the human or 'people', aspect of organisation performance or more specifically, when a change in the present human knowledge, skills or attitude can bring about the desired performance.

Chaturbedi (1979) reported that broadly, training aims to maintain and increase the employee's effectiveness in his present job, prepare him for promotion by stimulating his potentials, and develop his skills and knowledge for greater organisational effectiveness.

2.3 Adoption of Recommended Practices by The Respondents

Reddy (1989) found that 45.00 per cent of the trained farmers were in the high adoption group, 41.76 per cent were in medium adoption group and only 13.33 per cent were in low adoption group. Whereas, only 3.33 per cent of untrained farmers were medium adopters. The mean adoption score of trained and untrained farmers was 19.40 and 15.09 respectively. The difference between two means was found to be significant.

Patil Somanagouda (1990) reported that all the respondents adopted recommended seed rate, method of irrigation and intercultivation and earthing-up. Majority of the respondents fully adopted the practices like use of certified seeds, timely sowing, row spacing, application of both basal dose and top dressing of NPK fertilizers and plant protection measures. However, adoption was poor in the case of spacing. Age and farming experience exhibited non-significant relationship with adoption.

Suharban *et al.*, (1991) observed that 45.45 per cent of the mushroom trainees applied the knowledge gained through training in the cultivation of mushroom. Another 45.45 per cent applied the knowledge both in the preparation of spawn and cultivation of mushrooms. Preparation of spawn alone was tried only by 9.10 per cent of the trained persons.

Yadkikar (1991) found that 67.50 per cent of the KVK respondents showed their level of adoption at the medium level while 16.50 per cent and 16.00 per cent of the respondents fall under low and high levels of adoption, respectively.

Uma *et al.,* (1992) stated that the training had significantly affected adoption behaviour in nutrition and home gardening.

Sharma and Riyazuddin (1993) mentioned that in adopted villages, respondents had adopted deworiming and vaccination against enterotoxaemia and sheep pox. Data also showed that majority of the respondents (82.00 %) were feeding concentrates to their breeding rams in adopted villages, while in non-adopted villages only 37.50 per cent respondents were adopted the practices of feeding concentrates to the breeding ram. The pregnant ewes fed with concentrates only by 16.00 per cent respondents, whereas the lambs were given no concentrates in adopted villages.

Ingle *et al.,* (1995) reported that the adoption of preparatory tillage practices, sowing time and method of sowing, spacing, interculture and harvesting were followed by all as per recommendations. It was further observed that SB-11 was the only variety adopted fully by almost all respondents. Adoption of other improved varieties was nil. Use of FYM was more than the recommended dose in case of 48.93 per cent respondents, their seed rates was less than recommended in case of 63.82 per cent respondents, seed treatment was not adopted by 55.31 per cent respondents whereas 34.04 per cent respondents adopted it partially.

Pujar *et al.,* (1996) noted that 87.00, 97.00, 99.50, 25.00, 62.00 and 18,00 per cent of bakery, mat making, doll making, smokless chulla, dairy and poultry trainees of KVK respectively adopted the practices after training.

More (1997) reported that 57.86 per cent of the KVK beneficiaries were having medium level of overall adoption of recommended cultivation practices of cotton followed by 22.86 per cent and 19.28 per cent farmers have high and low level of adoption of cultivation practices of cotton, respectively.

Veeraiah *et al.,* (1998) observed that majority of the trained farmers of KVK (50.67 %) had medium level of adoption of recommended critical skills in rainfed groundnut cultivation. The percentage of farmers having low and high level of adoption being 28.67 per cent and 20.66 per cent, respectively.

Ahmed and Philip (1999) stated that among all the four training programmes half of the trainees of kitchen gardening (45.00 %) and layer farming (52.50 %) expressed medium level of adoption, whereas 45.00 per cent of mushroom cultivation trainees had high level of adoption. But most of the trainees of fresh water pisciculture showed low adoption (65.00 %).

Jondhale *et al.,* (2000) indicated that the adoption of improved practices of summer groundnut was higher among trained farmers than untrained farmers.

Wase (2001) observed that majority of the respondents (56.67 %) were medium level of adoption about jayanti chilli cultivation technology. The percentage of the respondents having high level of adoption was 23.33 per cent and 20.00 per cent of respondents were having low level of adoption.

Meti and Hanchinal(1995) reported that the extension contact was positively and significantly correlated with the adoption score of dry land cotton production technologies.

Dubey.and Srivastava (2005) indicated in their study that trainees have had higher level of adoption of recommended practices than the non-trainees.

Krishna and Jalihal (1976) found that the trained farmers had higher adoption of hybrid maize practices and also higher yields as compared to untrained farmers under similar situations.

Braj Mohan et al. (2003) in their studies on 'Adoption of recommended practices by fish processing plants in Kerala' analysed the adoption of recommended practices by fish processing plants stated that extent of adoption was high among the respondents for three categories namely, use of quick freezers (60%) assessment of water quality (50%) and type of corrugated box for frozen shrimp (55%).

2.4 Relationship Between Selected Characteristics of Respondents With Adoption of Recommended Practices

2.4.1 Age and adoption

More (1987) in rational analysis of contact farmers of Purna command area concluded that age was significantly correlated with the adoption of agricultural technology.

Yadkikar (1991) found that age of the respondents had negative and significant relationship with adoption.

Deshmukh (1995) found that there was no relationship between age of the cotton growers and adoption of the plant protection measures.

Thete (1995) reported that adoption of package of practices of cotton did not depend upon the age of the respondents.

2.4.2 Education and adoption

Raju (1978) reported that there was positive and significant relationship between education of respondents and adoption.

Miskin (1991) observed that education of respondents was positively and significantly related with the extent of adoption of improved technology.

Annamalai and Sekar (1992) reported that there was significant correlation between the education of cotton growers and their participation in professional IPM programmes.

Jaiswal and Dubolia (1990) and Saxena et al. (1990) observed that education was positively and significantly associated with adoption.

2.4.3 Land holding and adoption

Hanchinal *et al.*, (1991) showed that land holding of the respondent's status was found to have significant association with their adoption level of recommended potato cultivation practices.

Deshmukh (1995) found that there was positive and significant relationship between land holding and adoption.

Perez *et al.*, (1997) concluded that farm size possessed by tomato growers had positive and significant relationship with the adoption of IPM practices recommended for tomato crop.

2.4.4 Annual income and adoption

Miskin (1991) reported that there was positively significant effect of annual income on adoption of groundnut technology.

Wasnik (1993) pointed out that land holding had shown non-significant association with adoption of sugarcane practices.

Deshmukh (1995) showed that annual income of respondents was positively and significantly related with their adoption level.

Chikhale *et al.*, (1996) observed that annual income had positive and significant correlation with adoption of orange production technology.

Farkade (1998) found that annual income of respondents had positive and significant relationship with their adoption of biological pest control in cotton by the respondents.

2.4.5 Knowledge and adoption

Makode (1987) observed that there was highly significant relationship between the knowledge level and adoption level of respondents.

Panwar (1990) found that the level of knowledge was highly related with the extent of adoption of recommended varieties, seed treatment, chemical fertilizers and insecticides in contact as well as non-contact farmers.

Mande *et al.,* (1991) found positive and significant relationship between knowledge and adoption of recommended cultivation practices of horticultural crops.

Tawde (1991) found that knowledge had positive and significant relationship with adoption of recommended technology.

Jayale (1992) reported that knowledge of mango and fig growers was positively and significantly related with adoption of horticulture crops.

Khalge (1995) found that knowledge was positively and significantly related with adoption of package of practices of bajra.

2.5 Constraints Faced By Respondents

Patil (1990) showed that lack of knowledge, insufficient supply of water and non-availability and high cost of inputs were the important reasons for non-adoption as expressed by majority of respondents.

Miskin (1991) reported the constraints in using recommended seed rate were non-availability of finance in time, non-availability of quality seed, cost of seed is high and lack of knowledge.

Shehrawat (1992) noted that numbers of constraints were encountered by the farmers for non-adoption or partial adoption of improved agricultural technology for cotton crop. Majority of the respondents reported high cost of pesticides (77.7 %), poor quality of insecticides (89.7 %), lack of knowledge about use of weedicides (97.7 per cent), lack of knowledge of plant protection measures (64.4 per cent), lack of irrigation facilities (28.8 per cent) and scarcity of labours (18.60 per cent).

Sharma and Riyazuddin (1993) observed that the poor infrastructural facilities, non-availability of reliable medicines, poor veterinary aid, difficult procedures and non co-operative attitude of bank authorities, and poor socio-economic status of the sheep farming community in the society were some of the factors which restrain the sheep farmers from the adoption of sheep production technology.

Thakrar and Rawal (1993) reported that irregular supply of electricity was the main constraints faced by the groundnut cultivators which secured highest score 347 and ranked first position. This was followed by non-availability of canal irrigation in time, non-availability of pure seed and high wages of labours secured equal score and ranked fourth.

Ingle (1997) as regards the constraints in adoption of practices of preparatory tillage observed that reason of non-availability of implements at proper time has been expressed by 15.00 per cent of the trained farmers.

Katole *et. al.,* (1998) reported that majority of respondents (80.07 %) expressed that the lack of knowledge about biological control for controlling pests of cotton was a major constraints for them, followed by 78.67 per cent of them stated that cost of insecticide was exorbitant. It was also found that 69.33 per cent of the respondents faced difficulties of lack of knowledge about plant protection measures for cotton hybird AHH- 468. Other minor constraints were financial difficulty and non-availability of insecticides in time stated by 48.00 per cent and 36.67 per cent, respectively.

Sagar (2001) observed problems of large mushroom growers as lack of good quality of spawn, uncertainty in price of mushroom, lack of common facility for storage of fresh mushroom. Problems pertaining to small and marginal mushroom growers are non-availability of requisite inputs, complex process of obtaining loan/finance, lack of low cost mushroom farm design and lack of training facilities.

Anderson et al. (2004) The main cause of the Training and Visit system's disappearance is attributed to the incompatibility of its high recurrent costs with limited budgets available domestically, leading to fiscal unsustainability.

Prasad (1980) emphasized the need for imparting managerial skills to the personnel for effective planning and implementation of the programme.

Ryanand Binswanger (1979) observed that low level of national research expenditure was itself an important socio-economic constraint.

Swanberg (1980) conducted a study to find out the structural limitations confronting farmer in his ability to adopt new technologies and ways in which these constraints can be reduced.

Patil et. al. (2001) noticed that the current extension system needs to be reoriented towards the development of credible and comprehensive database on the whole production system.

Rajput et. al. (2005) identified low market price as the major constraint of small and marginal farmers.

Sharma, (2002) observed that the public extension system needs to be redefined and restructured to upgrade and improve the skills of the farmer.

Chowdhury and Dasgupta (1986) from their study observed that apart from a few agro-biology constraints most of the important constraints centered around socio-economic and infrastructural dimension.

Choudhary (1973) reported that small farmers perceived lack of money as the most important problem. The other problems were high cost of fertilizers, non-availability of fertilizers in village, lack of adequate knowledge about fertilizers.

Maru (2004) The existing agricultural system cannot meet the demand for new information of market-oriented agriculture.

Menon and Bhaskharan (1984) from their study concluded that the task of agricultural development should be made easier if the researchers, extension workers and farmers work together with management zeal, i.e. by rationalizing their behaviour in their sphere of activity.

Taylor (1980) stressed that the institutional weakness was one of the primary factors limiting the improved welfare of people in Asian small farms.

Anderson and Gershon (2004) reported that the efficiency gains in agricultural extension that can come from locally decentralized delivery systems with incentive structures based on largely private provision, but in poorer countries extension services will remain publicly funded.

Sulaiman and Hall (2000) opined that unless extension grows beyond technology transfer, and clearly articulate its role in facilitating broader changes supportive of evolving rural livelihoods, its ability to remain relevant in the future is extremely doubtful.

2.6 Suggestions Given By Respondents

Suharban (1991) suggested that giving publicity to mushroom growing, giving more importance to practical and making available financial assistance for mushroom growing. Organise periodical seminars to trained persons and supply of printed information material on mushroom.

Seema and Hirevenkanagoudar (1992) reported that majority of farm women (62.00 %) suggested to make training programmes more practical oriented, 50.00 per cent of them suggested to organise demonstrations in farmers fields. About 43.00 per cent of them suggested to use more AV aids.

Gaikwad and Gunjal (2000) noted some suggestions to overcome the problems faced by farmers. About half of beneficiaries (50.66%) from all KVKs stated that loan should be made available with lower interest rate, low cost agricultural technologies should recommended by extension agencies and formation of farmer group to make transfer of technology easy. Similarly, 25.33 to 48.00 per cent beneficiaries suggested involvement of women in dissemination of agriculture information. More than 65.33 per cent beneficiaries from KVK demanded to have market facility nearby villages. Whereas more than 70.66 per cent suggested for availability of market information to the farmer.

Chapter - 3

Research Setting

3.1. State at a glance:

The study area is situated in the state of West Bengal located in the eastern part of India lies between 21°31′ and 27°14′ N latitude and 85°51′ and 89°53′ E longitudes.

To the south is the Bay of Bengal, to the North is Sikkim and to its East are Assam and Bangladesh and to the west it has Bihar and Jharkhand respectively. It has common borders with the neighbouring countries of Nepal and Bihar and in the North and Bangladesh in the East. The state is quite unique to have the tropic of Cancer running across the state.

Table 3.1: State profile

Total geographic area	88,752 sq. Km
Total population	8,02,21,171
Rural population	5,77,34,690
Urban population	2,24,86,481
Number of districts	19

Source: (Census of India, 2001)

3.2. Selection of the district:

The Bankura district was selected purposively. This is obviously due to the familiarity of researcher's with the local dialect and accents are a great help in building up a rapport, quick and easy approach and access to the source of information.

The District: Bankura

Bankura district is one of the seven districts of Burdwan Division in the Indianstate of West Bengal. The district has been described as the "connecting link

between the plains of Bengal on the east and Chota Nagpur plateau on the west." The areas to the east and north-east are low lying alluvial plains. To the west the surface gradually rises, giving way to undulating country, interspersed with rocky hillocks. Centre of the famous Malla kingdom of western Bengal, Bankura and its surrounding regions are identified with its historical and cultural significance for the later period of Middle Ages. Vaishnavism, which gained the status of state religion of the Malla kingdom in seventeenth century AD, shaped the culture of the region. The Malla Kingdom was annexed by British East India Company in 1765 and the modern Bankura district took its form in 1881 and was named after its headquarters.

Etymology:

There are different opinions about the etymology of the word *Bankura*. In the language of the Kol-Mundas, *orah* or *rah* means habitation. *Banku* means extremely beautiful. It may also have come from the word *banka* which means zig-zag. One of the most influential deities in the district is Dharmathakur and he is locally called Bankura Roy. According to local tradition, the town, which is presently the headquarters of the district, was named after its founder, a chieftain named Banku Rai. Another legend has it the town was named after Bir Bankura, one of the twenty-two sons of Bir Hambir, the Raja of Bishnupur. He divided his kingdom into twenty-two tarafs or circles and gave one to each son. Taraf Jaybelia fell to the lot of Bir Bankura. He developed the town that now bears the name Bankura. It has also been suggested that the name is a corruption of the word Bankunda, meaning five tanks. The name *Bacoonda* is found in old official records.

Geography:

Bankura district is a part of Burdwan Division. It is situated between 22° 38' and 23° 38' north latitude and between 86° 36' and 87° 46' east longitude. It has an area of 6,882 square kilometres (2,657 sq mi). On the north and north-east the district is bounded by Bardhaman district, from which it is separated mostly by the Damodar River. On the south-east it is bounded by Hooghly district, on the south by Paschim Medinipur district and on the west by Purulia district. Bankura district has been described as the "connecting link between the plains of Bengal on the east and Chota

Nagpur plateau on the west." The areas to the east and north-east are low lying alluvial plains, similar to predominating rice lands of Bengal. To the west the surface gradually rises, giving way to undulating country, interspersed with rocky hillocks. Much of the country is covered with jungles.

The western part of the district has poor, ferruginous soil and hard beds of laterite with scrub jungles and *sal* woods. Long broken ridges with irregular patches of more recent alluvium have marks of seasonal cultivation. During the long dry season large extents of red soil with hardly any trees lend the country a scorched and dreary appearance. In the eastern part the eye constantly rests on wide expanses of rice fields, green in the rains but parched and dry in summer.

The Gondwana system is represented in the northern portion of the district, south of the Damodar, between Mejia and Biharinath Hill. The beds covered with alluvium contain seams of coal belonging to the Raniganj system.

Hills and rivers:

The hills of the district consist of outliers of the Chota Nagpur plateau and only two are of any great height – Biharinath and Susunia. While the former rises to a height of 448 metres (1,470 ft), the latter attains a height of 440 metres (1,440 ft).

The rivers of the area flow from the north-east to the south-west in courses roughly parallel to one another. They are mostly hill streams, originating in the hills in the west. The rivers come down in floods after heavy rains and subside as rapidly as they rise. In summer, their sand beds are almost always dry. The principal rivers are: Damodar, Dwarakeswar, Shilabati, Kangsabati, Sali, Gandheswari, Kukhra, Birai, Jaypanda and Bhairabbanki. There are some small but picturesque waterfalls along the course of the Shilabati near Harmasra, and along the course of the Kangsabati in the Raipur area.

Kangsabati Project was started during the second five year plan period (1956–1961). The dam across the Kangsabati has a length of 10,098 metres (33,130 ft) and a height of 38 metres (125 ft).

Climate:

The climate, especially in the upland tracts to the west, is much drier than in eastern or southern Bengal. From the beginning of March to early June, hot westerly winds prevail, the thermometer in the shade rising to around 45 °C (113 °F). The monsoon months, June to September, are comparatively pleasant. The total average rainfall is 1,400 millimetres (55 in), the bulk of the rain coming in the months of June to September. Winters are pleasant with temperatures dropping down to below 27 °C (81 °F) in December.

Economy:

In 2006 the Ministry of Panchayati Raj named Bankura one of the country's 250 most backward districts (out of a total of 640). It is one of the nineteen districts in West Bengal currently receiving funds from the Backward Regions Grant Fund Programme (BRGF).

Divisions:

Admninistrative divisions:

The district comprises three subdivisions: Bankura Sadar, Khatra and Bishnupur. Bankura Sadar subdivision consists of Bankura municipality and eight community development blocs: Bankura — I, Bankura — II, Barjora, Chhatna, Gangajalghati, Mejia, Onda and Shaltora. Khatra subdivision consists of eight community development blocs: Indpur, Khatra, Hirbandh, Raipur, Sarenga, Ranibandh, Simlapal and Taldangra. Bishnupur subdivision consists of Bishnupur and Sonamukhi municipalities and six community development blocks: Indas, Joypur, Patrasayar, Kotulpur, Sonamukhi and Bishnupur.

Bankura is the district headquarters. There are 21 police stations, 22 development blocks, 3 municipalities, 190 gram panchayats and 5187 villages in this district.

Other than municipality area, each subdivision contains community development blocs which in turn are divided into rural areas and census towns. In total there are 5 urban units: 3 municipalities and 2 census towns.

Assembly constituencies:

The district is divided into 13 assembly constituencies (assembly constituency numbers in brackets): Taldangra (244), Raipur (ST) (245), Ranibandh (ST) (246), Indpur (SC) (247), Chhatna (248), Gangajalghati (SC) (249), Barjora (250), Bankura (251), Onda (252), Vishnupur (253), Kotulpur (254), Indas (SC) (255) and Sonamukhi (SC) (256).

Raipur and Ranibandh constituencies are reserved for Scheduled Tribes (ST) candidates. Indpur, Gangajalghati, Indas and Sonamukhi constituencies are reserved for Scheduled Castes (SC) candidates. Taldangra, Raipur, Ranibandh, Indpur, Vishnupur, Kotulpur and Indas constituencies are part of Vishnupur (Lok Sabha constituency), which is reserved for Scheduled Castes (SC). Chhatna, Bankura and Onda are assembly segments of Bankura (Lok Sabha constituency), which also contains four assembly segments from Purulia district. Gangajalghati, Barjora and Sonamukhi constituencies are part of Durgapur (Lok Sabha constituency), which also contains four assembly segments from Bardhaman district.

As per order of the Delimitation Commission in respect of the delimitation of constituencies in the West Bengal, the district will be divided into 12 assembly constituencies (assembly constituency numbers in brackets):[20]Saltora (SC) (247), Chhatna (248), Ranibandh (ST) (249), Raipur (ST) (250), Taldangra (251), Bankura (252), Barjora (253), Onda (254), Bishnupur (255), Katulpur (SC) (256), Indas (SC) (257) and Sonamukhi (SC) (258).

Raipur and Ranibandh constituencies will be reserved for Scheduled Tribes (ST) candidates. Saltora, Katulpur, Indas and Sonamukhi constituencies will be reserved for Scheduled Castes (SC) candidates. Saltora, Chhatna, Ranibandh, Raipur, Taldangra, and Bankura constituencies will be part of Bankura (Lok Sabha constituency), which will also contain one assembly segment from Purulia district. Barjora, Onda, Bishnupur, Katulpur, Indas and Sonamukhi will be assembly segments

of Bishnupur (Lok Sabha constituency), which also contains one assembly segments from Bardhaman district.

Demographics

According to the 2011 census Bankura district has a population of 3,596,292, roughly equal to the nation of Lithuaniaor the US state of Connecticut. This gives it a ranking of 80th in India (out of a total of 640). The district has a population density of 523 inhabitants per square kilometre (1,350 /sq mi). Its population growth rate over the decade 2001-2011 was 12.64%.Bankura has a sex ratio of 954 females for every 1000 males,[21] and a literacy rate of 70.95%.

In the 2001 census, Bankura district had a total population of 3,191,822 of which 1,634,561 were males and 1,557,261 were females. Decadal growth for the period 1991-2001 was 13.79% in Bankura district against 17.84% in West Bengal. The urban population was 235,264 against a rural population of 2,956,558. The district had a density of population of 464 persons per km^2. The district had a scheduled caste population of 1,040,297 and a scheduled tribe population of 335,047.

The first census was taken in 1872. The district as now constituted had a population of 968,597. In the 1901 census, 90.7 per cent of the population spoke a dialect of Bengali known as *Rarhi Boli*, which was also spoken in the adjoining districts. Santali was spoken by about 9 per cent of the population. 87.4 per cent of the population were Hindus, 8 per cent were Animists and 5.6 per cent were Muslims. Bankura has a literacy rate of 63.84 per cent.

Road Transport

District Headquarters Bankura is well connected by road .Durgapur, Bankura, Sonamukhi are the Cities in this district having road connectivity to major towns and remote villages. Bankura is about 178 KM by road to Kolkata(Capital of West Bengal).

Rail Transport

Some of the rail way stations in district are Durgapur ,Bankura , Bishnupur , Jhantipahari , Chhatna , Ondagram , Sirjam , Ramsagar which connects most of the towns and villages in the District.

Bus Transport

West Bengal Surface Transport Corporation (WBSTC) runs Busses from Major cities to Towns and Villages in this District.

Table 3. 2: Demographic and other important features of the Bankura district

Particulars	Number/percentage
Block	22
Panchayat Samity	22
Gram Panchayat	190
Gram Sangsad	2464
Mouza	3830
Total area (sq. km.)	6,882
Density (per sq. km.)	464
Total Population	31,92,695
Rural Population	29,57,447
Male	15,15,450
Female	14,41,997
Urban Population	2,35,248
Male	1,20,552
Female	1,14,696

Total irrigation (ha)	48,068
Major irrigation canal (ha)	1,83,609
Minor ground irrigation (ha)	81,968
Surface water irrigation (ha)	1,42,491
Total Rural Literacy (%)	62
Male (%)	75.80
Female (%)	47.60
Total Urban Literacy (%)	80.20
Male (%)	88.10
Female (%)	71.90

Source: (Census of India, 2001)

Table 3. 3: Demographic and Other important features of the Bankura district

Particulars	Number/percentage
Population growth (percentage)	12.64
Area (sq. km.)	6882
Density (per sq. km)	523
Proportion to West Bengal population (percentage)	3.94
Sex ratio	954 female/1000 male
Child sex ratio (Upto 6 years)	943 female/1000 male
Average literacy (%)	70.95
Average male literacy (%)	81.00
Average female literacy (%)	60.44
Total child population(Upto 6 years)	405401

Male child population	208632
Female child population	196769
Total literacy	2264013
Total male literacy	1321794
Total female literacy	942219

Source: (Census of India, 2011)

Table 3. 4: Total population by religion, caste and by sex in the district of Bankura in 2001.

Particulars	**Number**		
	Male	**Female**	**Total**
Hindu	13,80,500	13,12,522	26,93,022
Muslim	1,24,566	1,15,156	2,39,722
Christian	1,475	1,543	3,018
Sikh	67	47	114
Buddhist	67	71	138
Jain	1779	1708	3487
Others	1,26,937	1,24,764	2,51,701
Religious not stated	911	882	1,793

Particulars	**Number**				
	Rural		**Urban**		**Total**
	Male	**Female**	**Male**	**Female**	
S.C	4,79,898	4,63,847	26,970	26,993	9,97,708
S.T	1,65,843	1,63,237	889	814	3,30,783

Source: (Census of India, 2001)

Table 3. 5: Production and Other important features of the Bankura district.

Particulars	Number/percentage
Primary Institution	3,472
Middle school	71
High school	247
Higher Secondary school	145
Collage	18
Open University	3
University	1
Technical school	3
ITI	1
ITC	1
Total Co-operative Society	1,739
Member	4,37,826
Annual rainfall (mm.)	1,803
Production of principle crops	
Cereals (thousand ton)	1153.4
Pulses (thousand ton)	0.2
Oil seed (thousand ton)	26.5
Fibres (thousand ton)	1.6
Miscellaneous (thousand ton)	459.3

Source: (Census of India, 2006-2007) and Assistant Registrar of Co-operative Society of Bankura.

Fisheries of Bankura district

Pisciculture is an important factor of economical development of Bankura. Bankura ranked first in Pisciculture within West Bengal. The district provides a majority amount of Fish production during the last five years, but still due to some unavoidable reasons we regularly find fishes purchased from Andhra Pradesh in most of the district's fish markets. Ramsagar of Bankura district is widely known destination with about 200 hacharies. Recently a modern fish production unit has been started at Mukutmonipur.

Under Rashtriya Sam VikasYojana (RSVY), nearly 81 Hec.of pond area has been excavated. The scheme has been implemented through fishermen's groups in a participatory mode. The fishermen's groups have been encouraged to share a small part of the produce with the Primary Schools to make it a part of the mid-day meal. This has created a stake of community at large in the project.

Theacitivities of fishery sector in Bankura is concenred, fish-breeding industries in Ramsagar and surrounding zone requires special mention. Transaction of about Rs. 6-7 crores through spawn production of about 50,000 million numbers in 225 to 250 numbers of hatcheries per annum occurs in that zone. About 1500 to 2000 numbers of workers are directly involved in production system and many other enterprises have grown by correlated activities. Spawn purchasers from different parts of India come here every year to purchase various types of spawn.

Table 3.6 Fisheries of Bankura district

1.	Total water area	52341 Hec.
2.	Water area under Pisciculture	14400 ha.
3.	People engaged in fishery	1, 85,000 (Approx).
4.	Fishermen Population	37,500
5.	Annual Production of Table Fish	21,750 M.T.
6.	Central Fishermen's Coop. Societies	2
7.	Primary Fishermen's Co-operative Societies	40
8.	Fish Production Groups	15 (working)
9.	Fish Farmers Trained :	
	a) ¾ days Non- FFDA Fishery Training	463

	b) 15- days Fishery Training	12082
	c) 30- days Fishery Training	2026
10.	Fisher-Women Trained in net Making	760
11.	Fishermen Community Hall	9
12.	No. of Eco-Hatchery	200
13.	Water area requisitioned under Inland Fisheries Act	88.30 ha.
14.	No. of Houses Constructed under Indira AvasYojana	185
15.	No. of houses constructed under Basic Minimum Services Scheme	13
16.	Model Fishermen Village :-	3 Purandarpur with 100 houses. Nirisha with 78 houses 3. Chhatarkanali with 60 houses
17.	Fishermen received Old Age Pension	67
18.	S.F.D.C. Project	1 (Krishnabundh)
19.	Water area covered under F.F.D.A.	5726.47 ha. (Beneficiary-9197)/ 5803.38 ha
20.	Water area covered under N.C.D.C Project	313 ha. (in 8 nos. big bundhs/ reservoir) 3600 ha. (Kangsabati Reservoir)
21	No. of Fish Farmers Benefited	9481 nos

Source: - Office of the Additional Director of Fisheries, Bankura

Table 3.7 Fish seed, fingerlings production in Bankura								
Year	Number of rearing ponds	Water area covered (in Hec.)	Fingerling production		Sale value (Rs. in lakh)	Production cost (Rs.in lakh)	Net profit (Rs. in lakh)	Average sale value (Rs. per Kg.)
			Number (in million)	Weight (in MT)				
2000-'01	1018	544.0	456	5472	1915.00	638.00	1277.00	35
2001-'02	1086	575.5	486	5832	2041.20	680.00	1360.00	35
2002-'03	1121	599.5	502	6024	2168.64	722.88	1445.76	35-37
2003-'04	1228	612.0	554	6648	2393.28	797.76	1595.52	35-37
2004-'05	1445	664.5	585	7020	2597.40	865.80	1731.60	35-38
Source:- Office of the Additional Director of Fisheries, Bankura								

Table - 3.8 Fish production in Bankura district								
Year	No. of stocking ponds	Water area covered (in ha)	Table fish production (MT)	Sale value (Rs./MT)	Total sale value (Rs. in lakh)	Total production cost (Rs.in lakh)	Net profit (Rs. in lakh)	Average sale value (Rs. per Kg.)
2000-'01	22213	19620.40	49051.61	36000	17658.57	3433.61	14224.96	36
2001-'02	22342	19700.65	49744.16	38000	18902.78	3730.81	15171.97	38
2002-'03	22411	19715.25	50273.88	40000	20109.55	3803.21	1630.34	40
2003-'04	22437	19722.50	50785.43	40000	20314.17	3948.56	16365.61	40
Source:- Office of the Additional Director of Fisheries, Bankura								

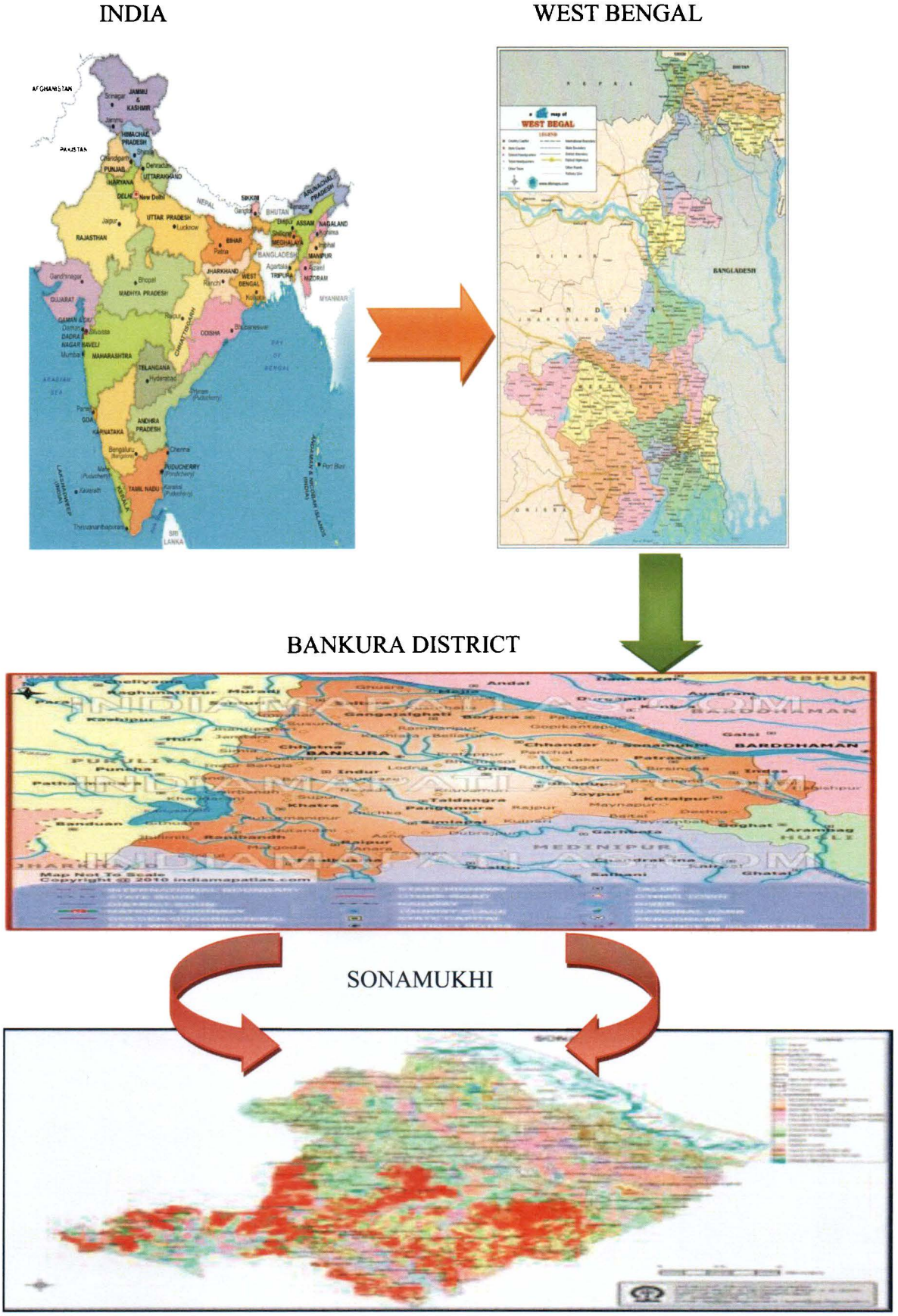
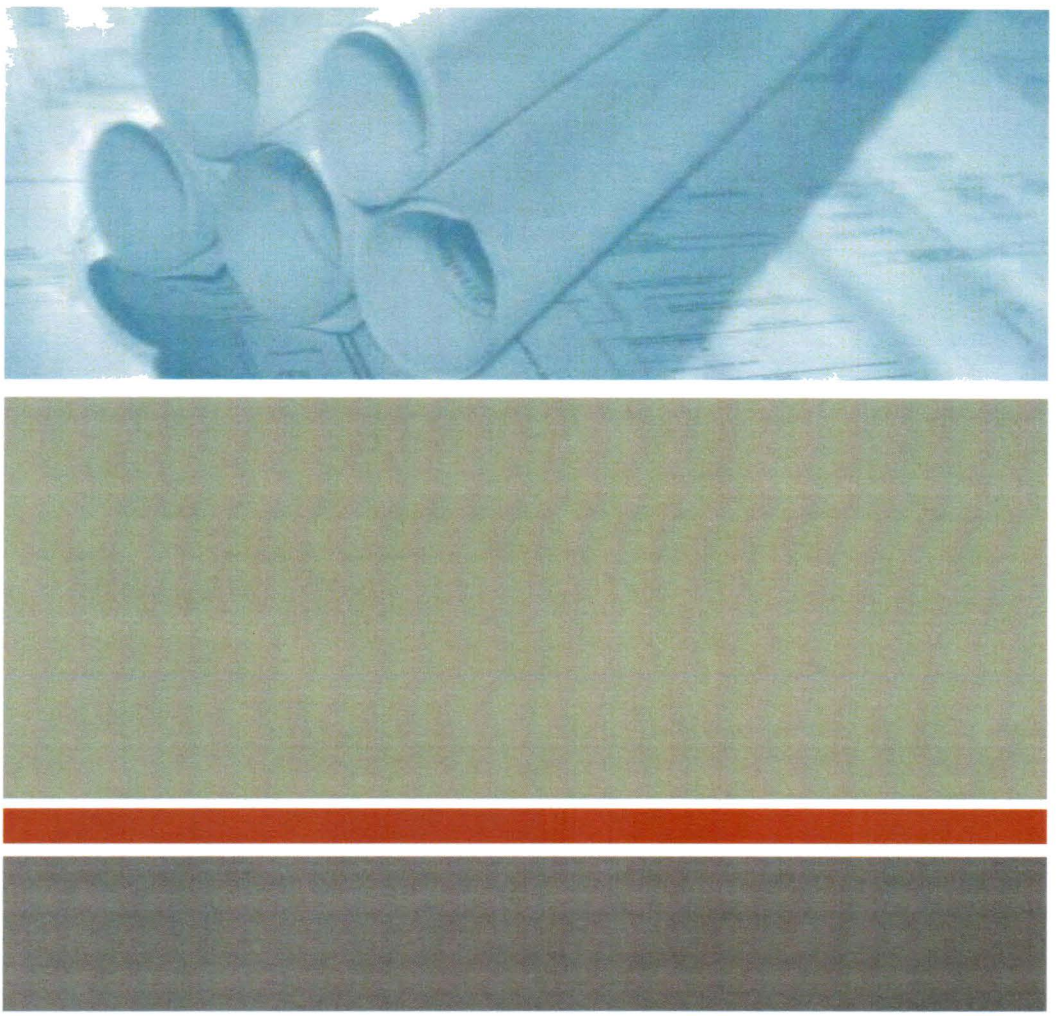


Plate-1: Map of the study area.

Chapter - 4



Materials and Methods

4. Materials and Methods

The systematic planning and conduct of a piece of research programme demands an appropriate research methodology, which is a vital prerequisite of any successful research study. In the domain of social science, again it is essential to use a standard method of research design and appropriate techniques of measurement of selected variables and rules or procedure for the testing of observations.

This chapter deals with the various methods and techniques employed in conducting the present research work. The text has been presented under the following heads:-

4.1. Locale of the study
4.2. Sampling design
4.3. Variables and their empirical measurement
4.4. Tools and techniques of data collection
4.5. Statistical tools

4.1. Locale of the study :

The present study was carried out in Bankura district of West Bengal, India. The area was purposively selected for the study. The area was more or less homogeneous in respect to socio-cultural conditions, facilities for service and critical inputs. Moreover, the district has relatively high potential for conducting the present research. Apart from this intrinsic merit of the locale of the study what influenced the researcher in her choice was the additional fact of her familiarity, with the local dialect and accents and intimate knowledge of the social milieu which served as a great help in building up a rapport with the fish farmers, facilitating a quick and easy approach and access to the sources of information.

4.2. Sampling design:

Out of 22 blocks of Bankura district, one block namely, Sonamukhi was purposively selected for the present study. In the present investigation on the impact assessment of training programmes imparted by K.V.K. Sonamukhi –K.V.K was

considered as it has a good track record in terms of different training programmes offered related to fisheries and also large-scale participation of farmers in these training programmes.

For selection of the respondents, a list of fish farmers who had undergone any training programme on improved fish farming practices was collected from KVK – Sonamukhi. Out of a total of 180 fish farmers, 50 % were selected by simple random sampling without replacement technique, thus a total of 90 farmers were constituted as a sample of the present study.

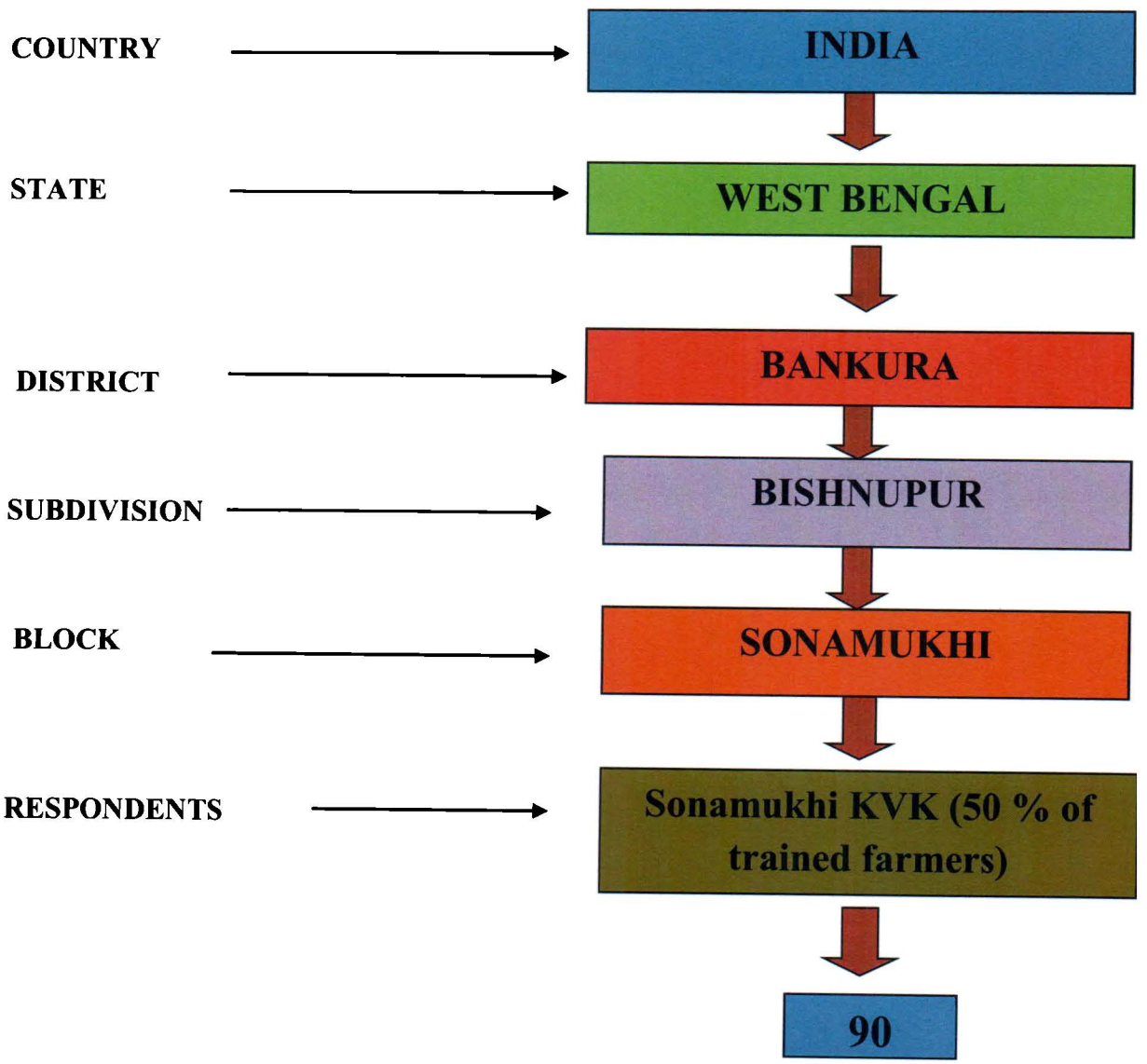


Plate-2: Survey Protocol of the Study Area

4.3. Variables and their Empirical Measurements:

Keeping in view the objectives of the study, the adoption behaviour of the fish farmers and knowledge of the fish farmers about scientific fish culture practices were considered as dependent variables. Based on review of literature and discussion with scientists and experts, 17 independent variables were considered for the present study. Among the independent variables, 10 were socio-economic, 3 were communication, 3 were situational and there was 1 descriptive variable. The list of variables and their empirical measurements used in the study are presented below. The scales developed by earlier researchers for measurement of variables have suitably been modified and used in the present study wherever required. The list of the finally selected variables along with their measurements procedure is presented in the Table 4.3.1 below:

Table 4.3: Independent and Dependent Variables and their Measurements:

Sl. No.	Variables	Measurement
INDEPENDENT VARIABLES:		
Socio-Economic:		
X_1	Age	Chronological age in years.
X_2	Gender	Structured schedule developed for the study
X_3	Caste	Structured schedule developed for the study
X_4	Education of respondents	Structured schedule developed for the study
X_5	Family type	Structured schedule developed for the study
X_6	Family size	Structured schedule developed for the study
X_7	Land holding	Structured schedule developed for the study
X_8	Gross income	Schedule developed for this study
X_9	Source of income	Schedule developed for this study
X_{10}	Annual fish production	Schedule developed for this study

Communication:		
X_{11}	Cosmopoliteness	Scale developed by Moulik (1965) with necessary modification.
X_{12}	Extension contact	Schedule developed
X_{13}	Exposure to mass media	Procedure followed by Patil (1990)
Situational Variables:		
$\mathbf{X_{14}}$	Pond size (area)	Schedule developed
$\mathbf{X_{15}}$	Duration of water availability	Schedule developed
$\mathbf{X_{16}}$	Source of water	Schedule developed
Constraints:		
$\mathbf{X_{17}}$	Problem in fish culture	Structured schedule developed for the study.
DEPENDENT VARIABLES:		
$\mathbf{Y_1}$	***Knowledge*** *about Scientific Fish Culture Practices.*	The test developed by Goswami (2010).
$\mathbf{Y_2}$	***Adoption*** *index in Scientific Fish Culture Practices.*	Scoring procedure developed by Sinha and Kolte (1974)

The independent and dependent variables and their measurement techniques have been operationalised in the following manner.

4.3.1. Operationalization And Measurement Of Variables:

4.3.1: Independent Variables:

From the large number of variables which may have theoretical relationship with the dependent variables (02), a manageable system of important variables that could be adopted for empirical measurement was selected for the present study.

4.3.1. A: Socio-Economic Variables:

4.3.1. A.1(X_1) Age:

Age refers to number of years the respondent lived since birth at the time of interview and was rounded off to the nearest whole number.

In the present study, the number of years rounded to the nearest whole number the respondent lived since birth at the time of interview was taken as measures of age of the respondent. The respondents were categorized in to three age groups based on the procedure followed by Kundu (2010).

Table 4.3.1.A.1. Scoring procedure for age

Category	Score
Young (15-30 years)	1
Middle (31-46 years)	2
Old age (47-62 years)	3

4.3.1. A.2 (X_2) Gender:

In the present study, it refers to whether there is male or female respondent. Following scoring procedure were considered in this study which is in consonance with the categorization followed by Kundu (2010).

Table 4.3.1.A.2. Scoring procedure for gender

Category	Score
Male	1
Female	2

4.3.1. A.3 (X_3) Caste:

It refers to social category whose members are assigned a permanent status within a given social hierarchy. Following four categories of the caste were considered in this study which is in consonance with the categorization followed by Kundu (2010).

Table 4.3.1.A.3. Scoring procedure for caste

Category	Score
Scheduled Caste	1
Scheduled Tribe	2
Other Backward Caste	3
General	4

4.3.1. A.4 (X_4) Education of respondents:

The educational status of the individual was scored in accordance with education sub scale of socio-economic status scale of Pareek and Trivedi (1964). The scale composed of illiterate, primary, middle school, matriculate and graduation with corresponding scores of 0, 1, 2, 3 and 4.

Table 4.3.1.A.4. Scoring procedure for educational status

Category	Score
Illiterate	0
Primary	1
Middle school	2
Matriculate	3
Graduation and above	4

4.3.1. A.5 (X_5) Family Type:

In the present study, it refers to whether there is single or joint family system in the respondent's family. A family was considered as single when it consists of husband, wife and unmarried children. A joint family consisted of other blood relations also.

The scoring system was developed by Pareek and Trivedi (1964) in their Socio-Economic Status Scale- Rural which was followed to quantify the family type of the respondents.

Table 4.3.1.A.5. Scoring procedure for family type

Category	Score
Single	1
Joint	2

4.3.1. A.6 (X_6) Family Size:

It refers to the total number of members present in respondent's family. Generally, families consisting of one to five members are being considered as small family, while, families having more than 5 members are considered as large family. Here, the scoring system followed by Pareek and Trivedi (1964) in their Socio-Economic Status Scale- Rural was followed.

Table 4.3.1.A.6. Scoring procedure for family size

Category	Score
Up to 5 members	1
>5 members	2

4.3.1. A.7 (X_7) Land Holding:

The area of land is an important economic parameter to assess the economic position of a person in the society. The procedure for scoring of land holding of the respondents is as follows:

Different research workers tried to categorize the size of holding in different ways. Pareek and Trivedi (1964) while constructing the socio- economic status scale

rural, used item analysis and determined weight and age for different size of landholding groups. In their scale, farmers with 'no land' scored - 0, up to one acre -1, up to five acres- 2, up to ten acres- 3, up to fifteen acres- 4, up to twenty acres- 5 and above 20 acres- 6 scored.

In the present study, the actual size of land holding in Bigha was taken into consideration. This measure was adopted because of the obvious reason of accuracy and comprehension.

Table 4.3.1.A.7. Scoring procedure for land holding

Category	Score
No Land	0
Upto 7 Bigha	1
Upto 14 Bigha	2
Upto 21 Bigha	3
Above 21 Bigha	4

4.3.1. A.8 (X_8) Gross Income:

Gross income of the respondents is directly related to the standard of living. Income may be drawn from agriculture or from sources other than agriculture (Kundu, 2010).

Table 4.3.1.A.8. Scoring procedure for Gross income

Category	Score
< Rs. 70,000/-per year	1
Rs. 70,000-1,20,000/-per year	2
>Rs. 1,20,000/-per year	3

4.3.1. A.9 (X_9) Source of income:

The respondents were asked about their annual income. Their annual income depends on their several alternative categories of income sources. These are primary, secondary, tertiary, quarterly (Kundu, 2010). Their respective scores were presented below:

Table 4.3.1.A.9. Scoring procedure for source of income

Category	Score
Agriculture	0
Agriculture + Fishery	1
Agriculture + Fishery + Business	2
Agriculture + Fishery + Business + Job	3

4.3.1. A.10 (X_{10}) Annual Fish Production:

Annual fish production is one of the most important indicators as it indicates how the growers are improving their cultivation keeping in pace with the demand and availability of modern technologies and their adoption (Kundu, 2010). They have been categorized as mentioned below:

Table 4.3.1.A.10. Scoring procedure for annual fish production

Category	Score
Below 100 kg/bigha/year	1
100-200 kg/bigha/year	2
Above 200 kg/bigha/year	3

4.3.1.B. Communication Variables :-

4.3.1.B.1(X_{11}) Cosmopoliteness :-

It refers to frequency of outside contact for obtaining information by respondents. The sources of information considered for gaining the cosmopoliteness were State capital, Block town, Sub-division town and local town. To measure the degree of cosmopoliteness each respondent was asked to indicate their exposure to different information sources on a four- point continuum rating scale. The scoring procedures for the responses were most often (4), sometimes (3), rarely (2) and never (1) based on the procedure as followed by Kundu (2010).

Table 4.3.1.B.1. Scoring procedure for cosmopoliteness

How often do you visit the following places (give tick mark)

Place	Frequency			
	Most often (4)	**Sometimes (3)**	**Rarely (2)**	**Never (1)**
State Capital Block town Sub-division town Local town				

4.3.1.B.2 (X_{12}) Contact with extension personnel or agencies:-

The different contacts with extension personnel for the present study were Gram Sevak, ADO, Block Development Officer (BDO), FEO, University teacher, K.V.K scientist and progressive farmers.

To measure the degree of utilization of these sources, each respondent was asked to indicate their contacts on a four point continuum rating scale as followed by Kundu, (2010).

Table 4.3.1.B.2. Scoring procedure for extension contact

How often do you contact the following extension personnel/ agencies (give tick mark):

Extension agent	Frequency			
	Most often (4)	**Sometimes (3)**	**Rarely (2)**	**Never (1)**
Gram Sevak ADO BDO FEO University teacher KVK Scientist Progressive Farmer				

4.3.1.B.3 (X_{13}) Exposure to mass media:-

Radio, television, newspaper, magazine and cinema were considered as sources of information from mass media.

To measure the degree of utilization of these sources, each respondent was asked to indicate their mass-media exposure on a four point continuum rating scale with the points of most often (4), sometimes (3), rarely (2) and never (1), which is in consonance with the scaling technique followed by Kundu, (2010).

Table 4.3.1.B.3. Scoring procedure for exposure to mass media

How often do you use the following mass media sources (give tick mark):

Place	Frequency			
	Most often (4)	Sometimes (3)	Rarely (2)	Never (1)
Radio				
Television				
Newspaper				
Magazine				
Cinema				

4.3.1. C. Situational Variables:

4.3.1.C.1(X_{14}) Pond size (area):

In the present study, the area of ponds in Bigha as available in land records was taken as a measure of the pond size.

The area of ponds including the embankments is generally shown in the land records which may not reflect the actual water area available for fish culture. The respondents were categorized into four categories based on the available pond areas. The same categorization was followed by Kundu, (2010) in his study.

Table 4.3.1.C.1. Scoring procedure for pond size (area)

Category	Score
No Pond	0
Less than 1 Bigha	1
1 Bigha	2
Above 1 Bigha	3

4.3.1.C.2 (X_{15}) Duration of water availability in the pond:

It refers to the average water retention period in the village ponds in which the respondents are practising composite fish culture. Data pertaining to water retention were collected and categorized into two groups viz. short duration i.e. seasonal and long duration i.e. perennial. The scoring pattern followed for the duration of water availability is shown below (Goswami, 2010).

Table 4.3.1.C.2. Scoring procedure for duration of water availability

Category	Score
Seasonal (6-9 months)	1
Perennial (9-12 months)	2

4.3.1.C.3 (X_{16}) Source of water in the pond:

It refers to the main source of water for village ponds possessed by respondents for practising fish culture. Scores were given for different water sources as followed by (Goswami, 2010).

Table 4.3.1.C.3. Scoring procedure for source of water

Category	Score
Canal	0
Rain water	1
Both rain and canal	2

4.3.1. D. Constraints:

4.3.1.D.1(X_{17}) Constraints to adoption of scientific fish culture :

A set of constraints or problems were prepared on the basis of an adequate review of literature, discussions and preliminary survey in the study area. The constraints or problems are as given below:

A. Problems related to infrastructure

B. Problems related to fishing equipments

C. Problems related to water

D. Problems related to transportation

E. Problems related to credit

F. Problems related to transportation

G. Problems related to fish seed

H. Problems related to fish diseases

I. Problems related to artificial fish feeds

J. Problems related to loan facilities

K. Problems related to fish marketing,

L. Problems related to social situation,

M. Problems related to poaching and

N. Problems related to use of fish poisons.

Although the problems were selected from the areas mentioned above, respondents were requested to check any one of the response categories (level of seriousness) against each problem. The respondents were also asked to describe any other problems faced by them in addition to the above mentioned problems. The responses thus received were rated on a three point continuum rating scale as given below:

The intensity of each problem was worked out by summing up all the individual scores obtained by the respondents on each of the problems. The problems were then categorized on their total seriousness scores as the respondents perceived. These were categorized into three categories viz, most serious (3), serious (2) and not so serious (1) by the procedure followed by Sigman and Swanson (1984).

It refers to the existing problems of fish culture and their respective score.

Table 4.3.1.D.1. Scoring procedure for constraints

Problems	Frequency		
	Most serious (3)	Serious (2)	Not serious (1)
Lack of Infrastructure			
Lack of fishing equipment			
Lack of water			
Good transport			
Lack of good quality of fish seed			
Disease problem			
Lack of good quality of feed			
Loan facility			
Marketing problem			
Political disturbance			
Poaching			
Poisoning			

4.3.2. Dependent Variables:

4.3.2.1: (Y_1) Extent of knowledge about Scientific Fish Culture Practices:

In this study, Knowledge refers to the body of information understood and retained by the respondents about fish culture which comprises various improved fish culture and management practices for increased fish production from a unit area of water body.

The knowledge test developed by Goswami (2010) with necessary modifications was utilized for the present study which consisted of 29 items, covering different aspects of fish culture practices, i.e., pre-stocking, stocking and post-stocking practices with required managerial skills. All the items were objective type and the 'one score' was given for the 'yes' response and 'zero' for the 'no' response. The summation of scores for the 'yes' responses over all the items for a particular respondent indicated his extent of knowledge. The maximum and the minimum score would be twenty nine and zero respectively. Further, the rawknowledge score of each individual respondent was converted into a knowledge index, using the below mentioned formula.

Number of correct responses

Knowledge index (KI) = ---------- × 100

Total number of knowledge items

Table 4.3.2.1: Knowledge test schedule on scientific fish culture

Sl. No.	Practices	Score
1.	What in kind of soil is good for fish culture?	Clay loamy/ loamy-(1) Any other-(0)
2.	What in the minimum depth of water required for fish culture?	1m –(1) Any other (0)
3.	What are the nutrients required for production of natural fish food organisms in fish pond?	N/ P –(1) Any other -(0)
4.	Is it necessary to use lime in fish culture?	Yes –(1) No –(0)
5.	How do you correct acidic condition of fish culture pond/tank?	Using lime –(1) Any other –(0)
6.	Do you know the recommended dosage of lime used in general?	250-300 kg/ha/yr –(1) Any other –(0)
7.	Should you have to manure the fish culture ponds?	Yes –(1) No –(0)
8.	Name some common organic manures used in fish culture.	RCD/ Poultry manure/ Pig dung –(1) Any other –(0)
9.	Do you know the rate of application of cow dung (including initial dose and subsequent monthly doses)?	RCD 5000 kg/ ha/ yr –(1) Any other -?(0)

10.	How many days before of stocking of fish seed manure should be applied?	7-10 or 15 days –(1) Any other –(0)
11.	Is it necessary to use inorganic fertilizers in addition to organic manures in fish culture?	Yes –(1) No –(0)
12.	Is it necessary to eradicate excess aquatic weeds?	Yes –(1) No –(0)
13.	What in the manual method of eradication/ control of predatory and weed fishes?	Repeated netting using small meshed drag net –(1) Any other –(0)
14.	Name any piscide used in fish culture.	Mohua oil cake/ bleaching powder / neem cake –(1) Any other –(0)
15.	Do you know the recommended dosage of mohua oil cake or bleaching powder?	600-800 kg/ha of MOC –(1) Any other –(0)
16.	Name three Indian major carps	Catla, Rohu, Mrigal –(1) Any other –(0)
17.	Name three exotic carps	Common carp, Grass carp, Silver carp –(1) Any other –(0)
18.	Which is the fastest growing major carp and exotic carp?	Catla & Silver carp – (1) Any other –(0)
19.	Catla and silver carp are surface feeders Rohu is a column feeder Mrigal feeds on bottom vegetation Common carp in omnivorous	Yes –(1) No –(0)
20.	Which fish grows well in weed infested tanks?	Grass carp –(1) Any other –(0)
21.	What is the ideal size of fish seed for stocking?	30-40 mm (1)

		Any other –(0)
22.	Whether supplementary feeding is necessary in CFC?	Yes –(1) No –(0)
23.	Name the common supplementary feeds .	GOC, rice bran, silk worm, pupae-(1) Any other –(0)
24.	After stocking, once in how many days manuring should be done?	Every month –(1) Any other –(0)
25.	Do you know the recommended manuring schedule to be practiced after stocking?	200-250 kg/ha (RCD) –(1) Any other –(0)
26.	Do you know the indicators of oxygen depletion in fish pond?	Gasping at surface / mass mortality –(1) Any other –(0)
27.	Name any fish disease that occur in fish culture ponds	UDS, Fin & tail rot, learnea –(1) Any other –(0)
28.	In general, after how many months of stocking the fish crop should be harvested?	8-10 month –(1) Any other –(0)
29.	What should be the optimum size of harvesting?	0.75-1.0 kg –(1) Any other –(0)

4.3.2.2: (Y_2) Adoption Behaviour of fish farmers towards scientific fish culture practices:

According to Rogers (1962) adoption is a decision to continue full use of an innovation. In the present study, the extent of adoption was conceptualized as the extent to which the fish farmers (respondents) have adopted the recommended composite fish culture practices as retained from the training programmes organized by KVK, Sonamukhi for increasing fish production.

The methodology followed in developing scoring procedure for measuring adoption of composite fish culture practices:

In the present study, the extent of adoption of recommended composite fish culture practices was measured by using the adoption quotient developed by Sen Gupta (1967). Accordingly, the following formula was used to calculate the general adoption level.

$$\textit{Adoption quotient} = \frac{\text{Adoption score of the respondent}}{\text{Maximum adoption score one could get}} \times 100$$

The following scores were assigned respectively for full and non-adoption of the recommended practices.

Table 4.3.2.2. Scoring procedure for adoption level

Adoption level	Score
Non-adoption	0
Full adoption	1

The raw adoption scores were converted into adoption quotient for measuring the general adoption level.

Selection of recommended composite fish culture practices:

Taking into consideration the fundamental principles of composite fish culture practices, improved fish culture practices recommended for adoption in irrigated tanks by operating FFDAs and department of fisheries in West Bengal were identified. These identified practices were considered after an in-depth detailed review of literature published by FFDAs. Directorate of Fisheries, Central Inland Fisheries Research Institutes, University of Animal and Fishery Sciences and also discussion with the officials and scientists in the concerned field who are working with the fish farmers. By this process 11 improved fish culture practices were selected as relevant to the study area. The practicability of the recommended fish culture practices was got further confirmed by discussions with the concerned scientists, the extension personnel of the FFDAs and officials of Department of Fisheries. The criteria like 'recommendation of practices for longer period (many years)', 'fair degree

of communication and extension efforts by the implementing agency' and 'general acceptance of the practice among fish farmers' were also kept in view while finalizing the identification of the practices. The 11 practices which were finally selected for the study are mentioned below along with the respective scores assigned for each practice.

Table 4.3.2.3: Adoption test schedule on scientific fish culture

	Recommended practices	Scores assigned for	
		Full adoption (2)	Non- adoption (1)
A.	**Pre-stocking practices**		
1.	Testing of soil and water Recommendation: Testing for water and soil for acidity/ alkalinity	2	1
2.	Control of aquatic weeds Recommendation: Removal/ eradication of aquatic weeds by chemical/ manual method	2	1
3.	Application of lime for improving soil and water quality F. A : Recommended dosage (250-300 kg/ ha) N. A : No application of lime	2	1
4.	Initial manuring with organic manures (RCD or poultry) F. A : Recommended dosage (2500 kg/ ha) N. A : No application of manure	2	1
5.	Application of inorganic fertilizers (urea and super phosphate) F. A : Recommended dosage (25 kg urea + 50 kg SPO_4 kg/ ha) N. A No application of inorganic fertilizers	2	1

B. Stocking practices			
6.	Ratio of stocking of selected species F. A : As recommended ratio N. A : Single species of stocking	2	1
7.	Size of the fish seed stocked F. A : More than 30 mm N. A : Less than 20 mm	2	1
C. Post-stocking practices			
8.	Use of supplementary feeds in prescribed proportion F. A : Recommended proportion of GOC and RB N. A : no feeding	2	1
9.	Post-stocking manuring with organic manures F. A : Recommended dosage (250 kg/ ha/ month) N. A : No application	2	1
10.	Post-stocking fertilization with inorganic fertilizers F. A : Recommended (30-40 kg/ ha/ month) N. A : No application	2	1
11.	Periodic netting to check the growth and health of fishes F. A : Recommended (monthly netting) N. A : No netting	2	1

The overall adoption score of a respondent is the sum total of scores obtained for each practice mentioned above. The maximum and minimum overall adoption score that a respondent might secure was 22 and 11 respectively.

4.4. Tools and Techniques of data collection:

Through a realistic pre-testing a researcher can learn more about all aspects of the planned procedure (Fowler, 1987). In the present study, the entire set of draft interview schedule containing all the above mentioned aspects were subjected to pre-testing with 10% non sample respondents before administering into the actual respondent. In the light of the experience of the pre-testing, the final schedule was revised and modified with appropriate wordings and contents. For easy understanding, the schedule was prepared as simple and to the point as far as possible. In preparation of the schedule, opinion of the experts was also considered. The final interview schedule was annexed as **(Annexure I, II and III)**.

Field data were collected with the help of structured and pre-tested interview schedule developed for this purpose. All the data were collected from the respondents through personal interview.

Before interviewing the respondents, they were explained the purpose of conducting the research study and data collection from them. Moreover, they were also assured that the information provided by them will be kept confidential and will only be utilized for writing the research report as a whole. This facilitated to establish the rapport with them to get the free frank responses and thereby reliable data. Besides necessary information from secondary sources, like census, Government publications, research journal, books, reports and other published documents was also made use of. The data collection was done from April, 2014 to July, 2014.

4.4.1. Construction of the Schedule:

The draft schedule for collection of data, incorporation the tools and techniques of measurement of different variables, was pretested twice, each time with 10 fish farmers. In pretesting, care was taken not to include farmers who were selected as sample for final interview.

On the basis of experiences in pretesting, appropriate change in the construction of questions and their sequences were made. The schedule was then finalized and duplicated. The final form of the interview schedule is given in **Annexure I, II and III.**

4.4.2. Field Data Collection:

The data were collected during April, 2014 to July, 2014 with the help of schedule constructed for the study. In each village, before starting the interview, a few days were devoted to the establishment of rapport with the respondents.

The schedule was administered in local language and the replies were recorded in English on the schedule. The interview was done by the researcher himself.

4.4.3. Data Collection and Analysis:

The process of data collection exclusively includes the ways and means of approaching and gaining access to various information sources in order to fulfil the objectives of the study.

4.4.4. Tools and Techniques:

A structured schedule was developed for the purpose of data collection. While constructing the schedule, the objectives were taken into consideration and statements were included based on the experience. The schedule was pre-tested in the actual field situation at a place other than the locale of the present study. Necessary modifications were incorporated accordingly and a final schedule was developed **(Annexure- I, II and III).**

4.4.5. Collection of Secondary Data:

The background information about the area of the study was obtained through secondary sources. A local village level worker of K.V.K adopted group accompanied the researcher in gaining easy entrance to the study area. Before the actual data collection several visits were made to build rapport. The data collection was taken up during April, 2014 to July, 2014. All respondents were personally interviewed.

4.5. Statistical Analysis:

The data were collected, complied, tabulated and also categorized for further clarity, realization and interpretation. In the present study, the following methods

were used in analysis of data using the standard formula and by the help of SPSS 10.0 for windows software.

1. Percentage Analysis
2. Mean
3. Standard Deviation
4. 't'- test

1. Percentage Analysis:

Percentage was used for making simple comparisons. For calculation percentages, the frequency of a particular cell was divided by the total number of respondents in that particular category and multiplied by 100. Percentage were calculated up to two places after the decimal point.

The formula for the percentage of a series of numbers is as follow:

$$\text{Percentage} = F/N \times 100$$

Where, F = frequency

N = Total number of respondent

2. Mean:

Mean or average, taken as representative of group of items implies a measured degree of validity. The arithmetic mean is the simple average which is calculated as the sum of the items divided by the number of the items.

The formula for the mean of a series of numbers is as follow:-

$$\text{Mean} = \frac{X}{N}$$

Where, X = Sum of the individual items

N = Number of items

3. Standard Deviation (σ):

Standard deviation is the most widely used measure of dispersion of a series and is commonly denoted by the symbol '**σ**' (pronounced as 'Sigma'). It is

defined as the square root of the average of the squares of deviations. When such deviations for the values of individual items in a series are obtained from the arithmetic average.

4. 'T'- test:

The t- test (or student's t- test) gives an indication of the separateness of two sets of measurements, and is thus used to check whether two sets of measures are essentially different (and usually that an experimental effect has been demonstrated). The typical way of doing this is with the null hypothesis that means of the two sets of measures are equal.

5. Correlation Co-efficient (r):-

In order to study the relationship between independent variables like age, education, income, marital status etc. the correlation co-efficient were used for the study.

The significance of the estimated correlation co-efficient were tested at 5% and 1% level of significance by using the statistical table for biological, agricultural and medical research of Fisher and Yates, 1975. The formula used for estimating the co-efficient correlation was as follows-

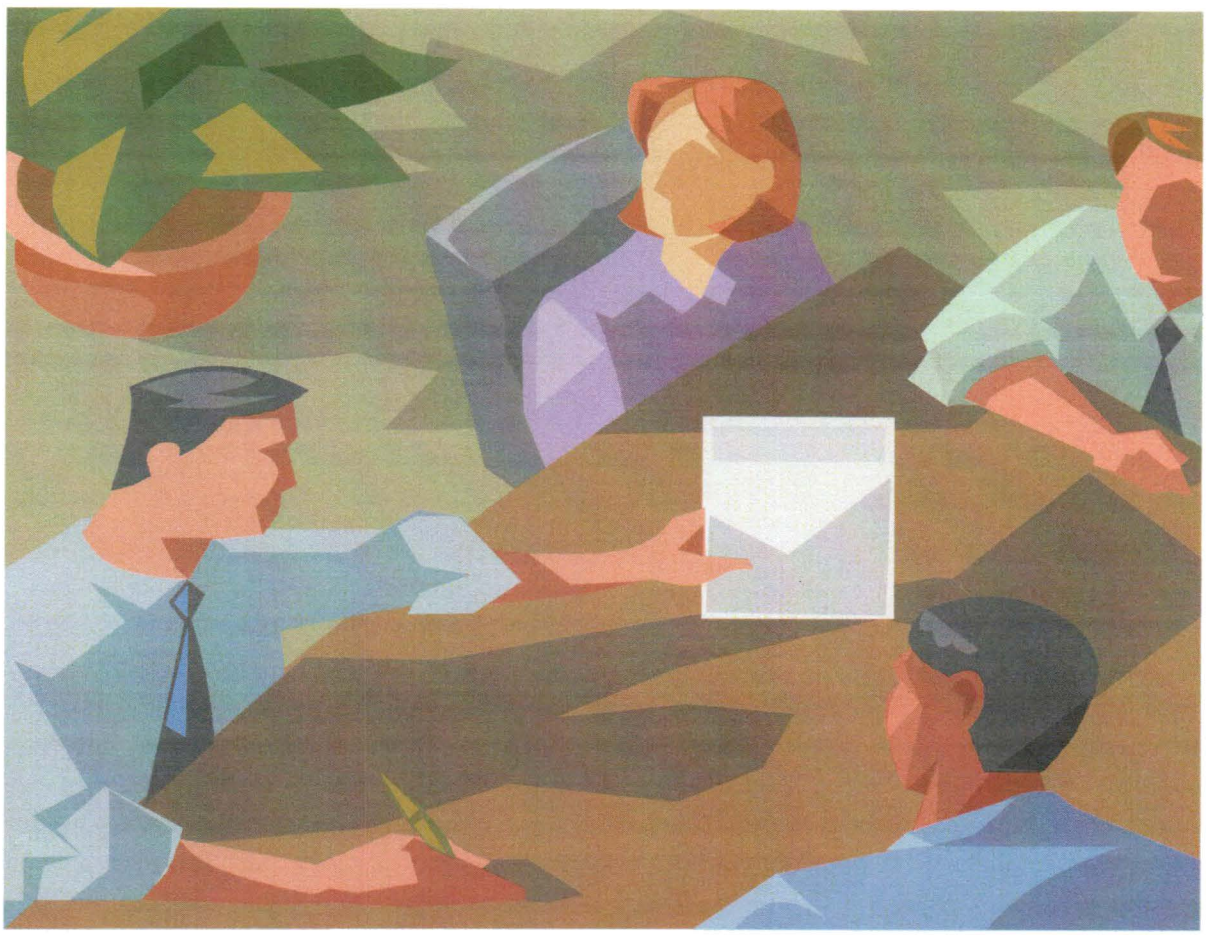
$$r = \frac{\sum XY - \frac{\sum X \sum Y}{N}}{\sqrt{\left(\sum X^2 - \frac{(\sum X)^2}{N}\right)\left(\sum Y^2 - \frac{(\sum Y)^2}{N}\right)}}$$

Where, r = Correlation co-efficient

X = Independent variable

Y = Dependent variable

Chapter - 5



Results and Discussion

5. Results and Discussion

The results of the present study have been presented systematically in the form of tables and graphs. The major findings of the study are presented below in the following parts.

PART – I

5. 1: Distribution of Respondents according to their Socio Personal Profile

5. 1. 1: Age:

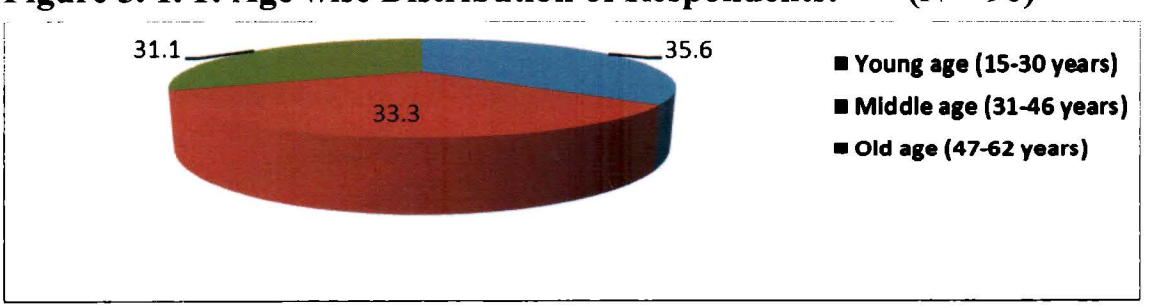
The age of the respondents under this study was found to vary between 15 years to 62 years. The data regarding the age of the respondents are presented in Table 5.1.1 below:

Table 5. 1. 1: Age wise Distribution of Respondents: - (N = 90)

SL. NO.	AGE	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Young age (15-30 years)	32	35.6
2.	Middle age (31-46 years)	30	33.3
3.	Old age (47-62 years)	28	31.1

The findings of the study indicated that 35.6% respondents belonged to the young age group followed by middle age group (33.3%) and old age group (31.1%). Similar findings were reported by Ajieh (2010), Apata (2012) and Pandey and Upadhyay (2012).

Figure 5. 1. 1: Age wise Distribution of Respondents: - (N = 90)



5. 1. 2: Gender:

The findings of the study indicated that all respondents (100%) were male. There was no female respondent in the study area.

5. 1.3: Caste:

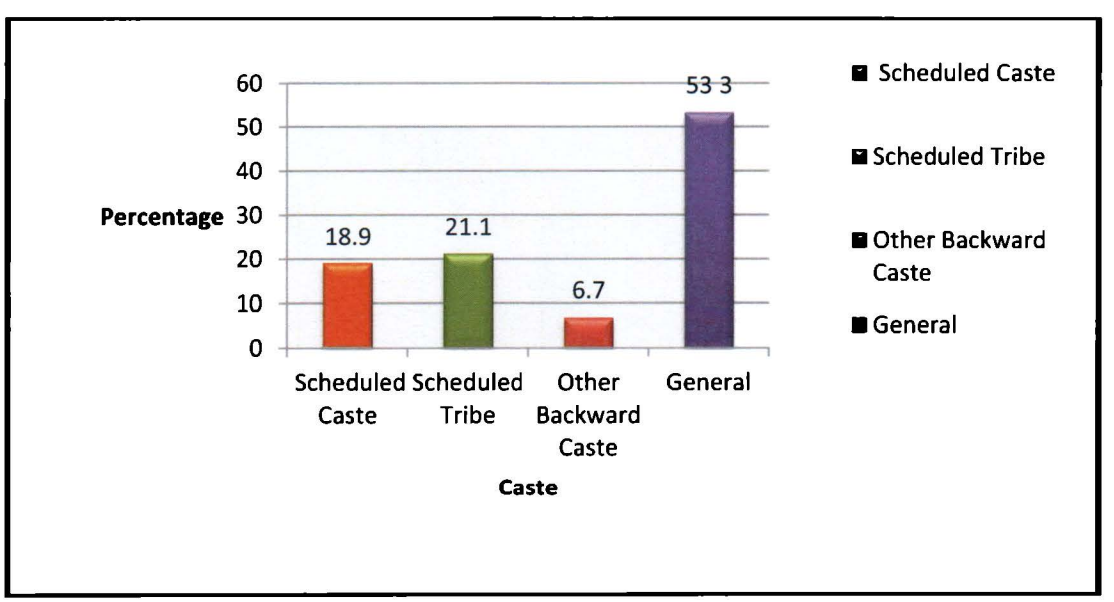
The caste of the respondents was also ascertained during the interview, which was compiled and tabulated as reported in the table 5.1.3:

Table 5. 1. 3: Caste wise Distribution of Respondents: - (N = 90)

SL. NO.	CASTE	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Scheduled Caste	17	18.9
2.	Scheduled Tribe	19	21.1
3.	Other Backward Caste	6	6.7
4.	General	48	53.3

From the table 5.1.3, it can be noticed that majority of the K.V.K trained respondents belonged to General Caste (53.3%), followed by Scheduled Tribe (21.1%), Scheduled Caste (18.9%) and only 6 out of 90 respondents (6.7%) were O.B.C.

Figure 5. 1. 3: Caste wise Distribution of Respondents: - (N = 90)



5.1.4: Education:

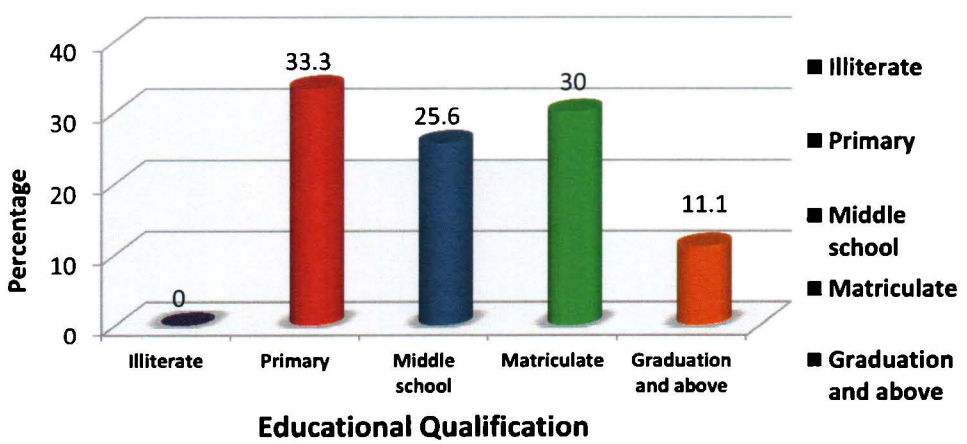
The level of education or formal schooling of the respondents has been an important characteristic for them. Hence, data regarding formal education of the respondents were collected which have been reported in Table 5.1.4.

Table 5.1.4: Distribution of Respondents according to their Educational Qualification:- (N = 90)

SL. NO.	QUALIFICATION	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Illiterate	0	0
2.	Primary	30	33.3
3.	Middle school	23	25.6
4.	Matriculate	27	30
5.	Graduation and above	10	11.1

The data in the Table 5.1.4 indicates that majority (33.3%) of the respondents were having educational qualification up to primary level. 30% had academic qualification up to matriculation followed by 25.6% were up to middle school and only11.1% were graduates. There was no illiterate respondent. These findings are in consonance with the findings of Jahrami and Zamani (1999) and Raghunandan (2004).

Figure 5.1.4: Distribution of Respondents according to their Educational Qualification:- (N = 90)



5.1.5: Family type:

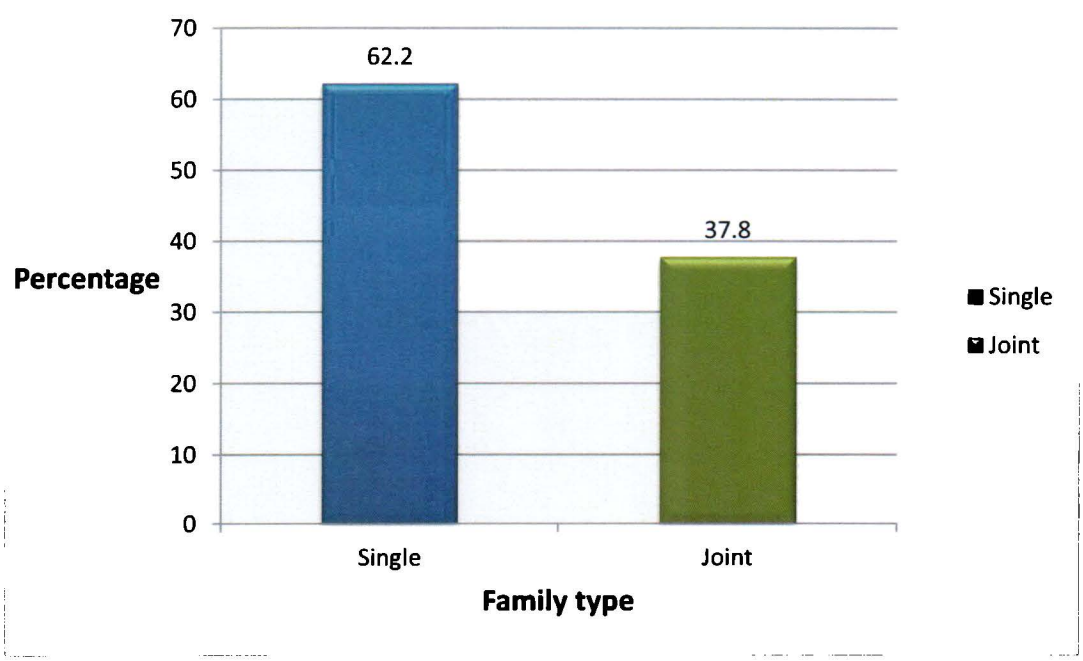
The data regarding the family type of the respondents are presented in Table 5.1.5 below.

Table 5.1.5: Distribution of Respondents according to their Family type:-(N = 90)

SL. NO.	FAMILY TYPE	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Single	56	62.2
2.	Joint	34	37.8

Table 5.1.5 indicates that, more than half of the respondents (62.2%) were having nuclear family and rest of them (37.8%) were living in joint family.

Figure 5.1.5: Distribution of Respondents according to their Family type: - (N = 90)



5.1.6: Family size:

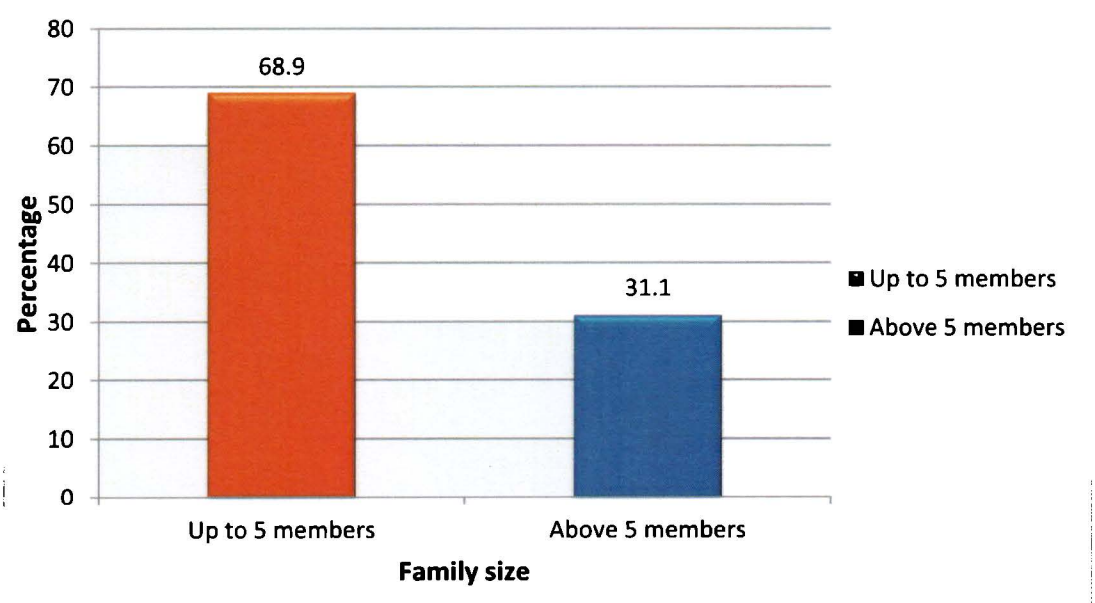
The data regarding the family size of the respondents are presented in Table 5.1.6 below:

Table 5.1.6: Distribution of Respondents according to their Family size:-(N = 90)

SL.NO.	FAMILY SIZE	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Up to 5 members	62	68.9
2.	Above 5 members	28	31.1

It can be observed from the Table 5.1.6 that majority of respondents (i.e. 68.9%) were having small (Up to 5 members) family size, whereas, 31.1% were having large (above 5 members) family size.

Figure 5.1.6: Distribution of Respondents according to their Family size:-(N = 90)



5. 2: Distribution of Respondents according to Socio-Economic Profile

5.2.1: Sources of Income:

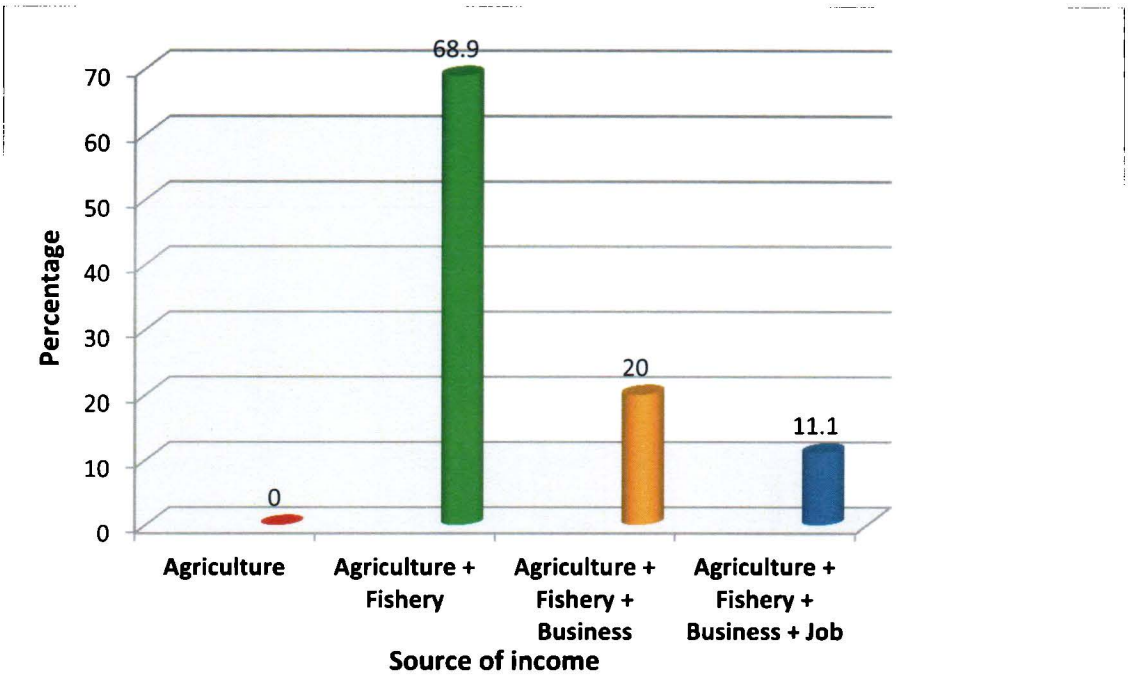
Rural people were engaged in various occupations for earning their income. Information about the sources of income of the respondents under study is presented in Table 5.2.1.

Table 5.2.1: Distribution of Respondents according to their Sources of Income: - (N = 90)

SL. NO.	SOURCE OF INCOME	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Agriculture	0	0
2.	Agriculture + Fishery	62	**68.9**
3.	Agriculture + Fishery + Business	18	20.0
4.	Agriculture + Fishery + Business + Job	10	**11.1**

Table 5.2.1 indicates that majority (68.9%) of the respondents were involved in agriculture and fishery whereas, 20 percent of the respondents were involved in agriculture, fishery and business activities and 11.1 percent of the respondents were involved in agriculture, fishery, business and other job. There was no respondent solely involved in agriculture.

Figure 5.2.1: Distribution of Respondents according to their Sources of Income: - (N = 90)



5.2.2: Land holding:

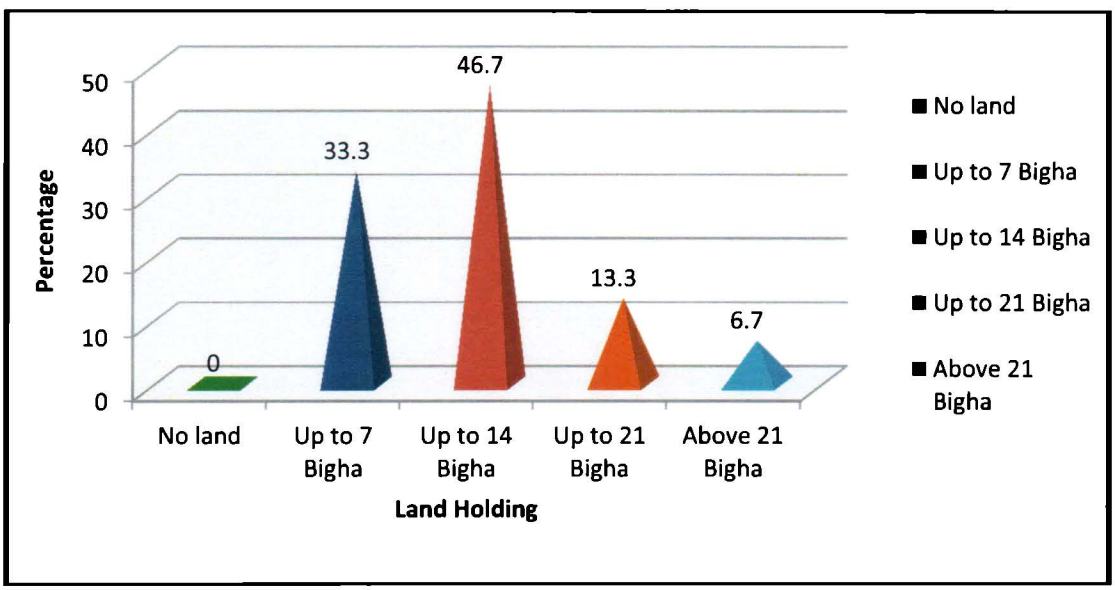
The data regarding the land holding of the respondents are presented in Table 5.2.2 below:

Table 5.2.2: Distribution of Respondents according to their Land Holding:-(N = 90)

SL.NO.	LAND HOLDING	FREQUENCY (N =90)	PERCENTAGE (%)
1.	No land	0	0
2.	Up to 7 Bigha	30	33.3
3.	Up to 14 Bigha	42	46.7
4.	Up to 21 Bigha	12	13.3
5.	Above 21 Bigha	6	6.7

Table 5.2.2 depicts that 46.7% respondents were having up to 14 bigha land followed by 33.3% were having up to 7 bigha land and 13.3% were having up to 21 bigha land. Only 6 out of 90 respondents (6.7%) were having above 21 bigha land. There was no landless farmer found in the present study.

Figure 5.2.2: Distribution of Respondents according to their Land Holding:-(N = 90)



5.2.3: Annual income before training:

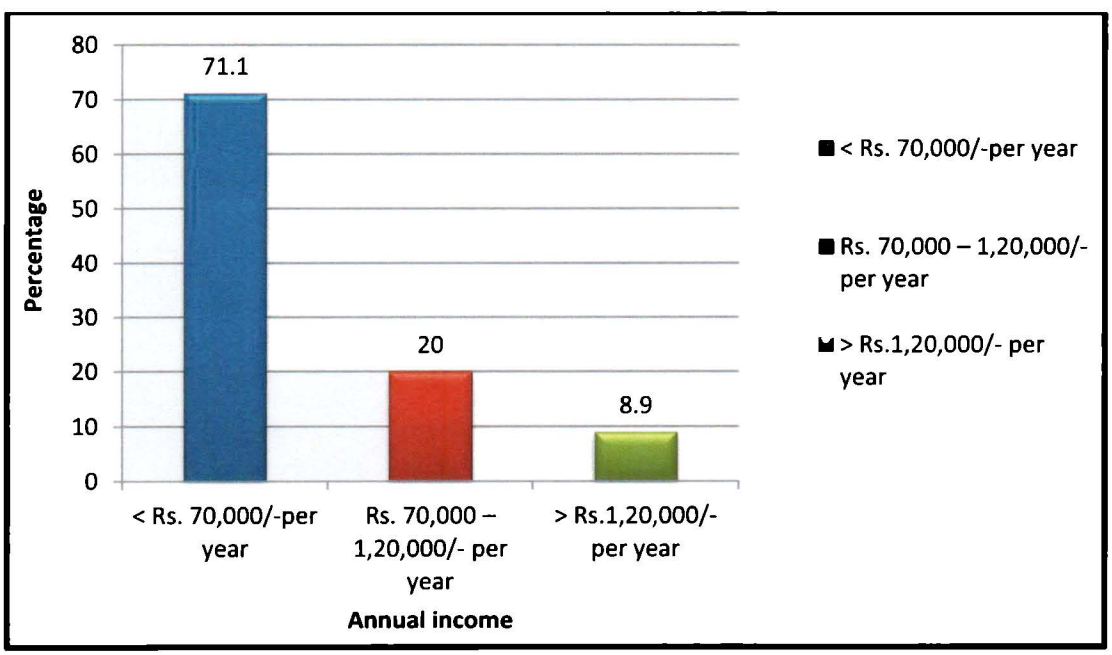
The annual income of the respondents under this study was found to vary between Rs. 60,000/- and Rs. 1, 30,000/-. The data regarding the annual income of the respondents have been presented in Table 5.2.3 below.

Table 5.2.3: Distribution of Respondents according to their Annual Income Before Training:- (N = 90)

SL. NO.	ANNUAL INCOME	GROUP	FREQUENCY (N =90)	PERCENTAGE (%)
1.	< Rs. 70,000/-per year	Low	64	**71.1**
2.	Rs. 70,000 – 1,20,000/- per year	Medium	18	20.0
3.	> Rs.1,20,000/- per year	High	8	**8.9**

The Table 5.2.3, shows that, majority of the respondents (71.1%) belonged to the low income group (< Rs. 70,000/-per year) followed by medium income (Rs. 70,000 – 1, 20,000/- per year) group (20%) and 8.9% belonged to the high income group (> Rs.1, 20,000/- per year).

Figure 5.2.3: Distribution of Respondents according to their Annual Income Before Training:-(N = 90)



5.2.4: Annual income after training:

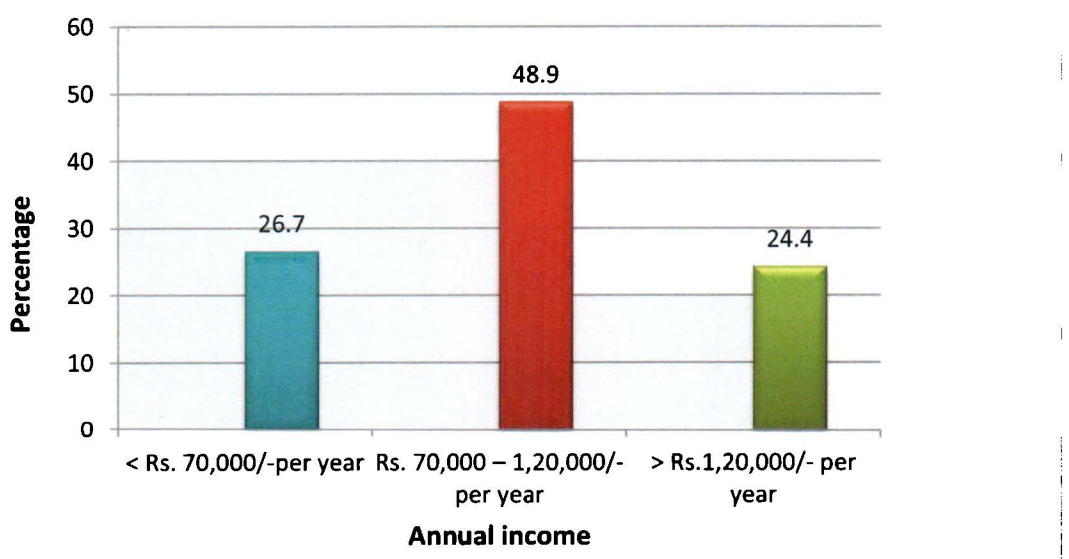
The data regarding the annual income of the respondents have been presented in Table 5.2.4 below.

Table 5.2.4: Distribution of Respondents according to their Annual Income After Training:-(N = 90)

SL. NO.	ANNUAL INCOME	GROUP	FREQUENCY (N =90)	PERCEN TAGE (%)
1.	< Rs. 70,000/-per year	Low	24	26.7
2.	Rs. 70,000 – 1,20,000/- per year	Medium	44	**48.9**
3.	> Rs.1,20,000/- per year	High	22	24.4

The Table 5.2.4, reveals that, most of the respondents (48.9%) belonged to the medium income group (Rs. 70,000 – 1, 20,000/- per year), followed by 26.7% respondents belonged to the low income group (< Rs. 70,000/-per year) and 24.4% of the respondents belonged to the high income group (> Rs.1, 20,000/- per year).

Figure 5.2.4: Distribution of Respondents according to their Annual Income After Training:- (N = 90)



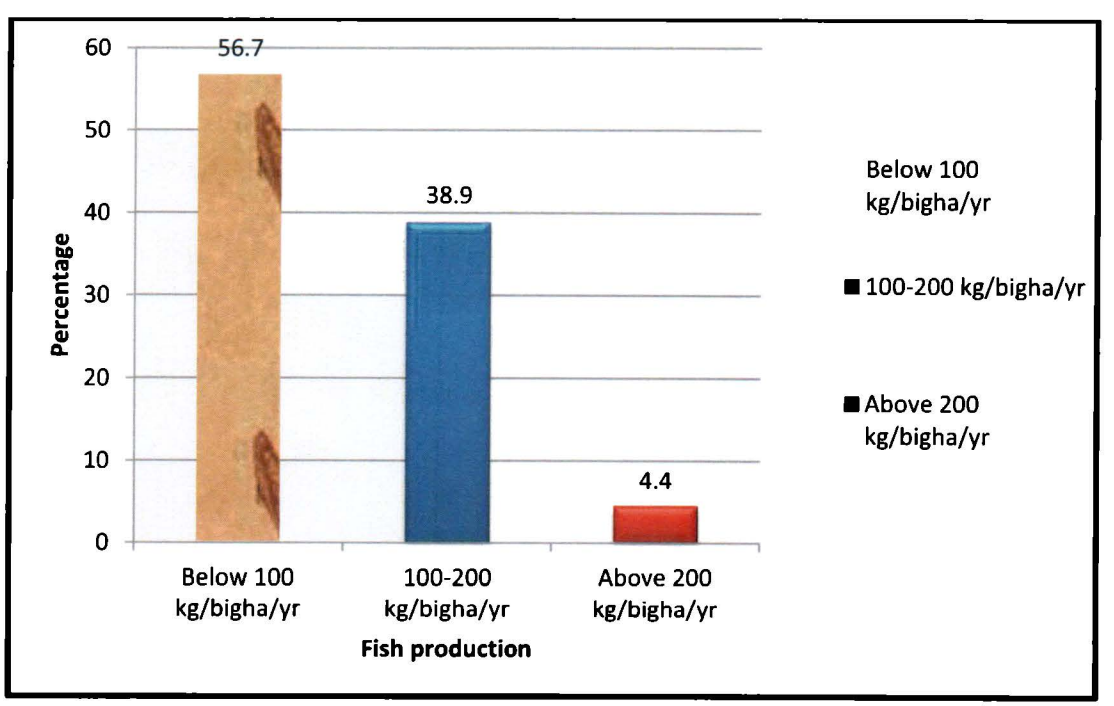
5.2.5: Annual fish production before training:

Table 5.2.5: Distribution of Respondents according to their Annual Fish Production Before Training :- (N = 90)

SL. NO.	ANNUAL FISH PRODUCTION	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Below 100 kg/bigha/yr	51	56.7
2.	100-200 kg/bigha/yr	35	38.9
3.	Above 200 kg/bigha/yr	4	4.4

It is clear from the above table that, majority of the respondents (56.7%) achieved the annual fish production of 'below 100kg/bigha/yr', followed by 38.9% were having the annual fish production between 100 and 200kg/bigha/yr and only 4.4% were having the annual fish production of 'above 200kg/bigha/yr'.

Figure 5.2.5: Distribution of Respondents according to their Annual Fish Production Before Training :- (N = 90)



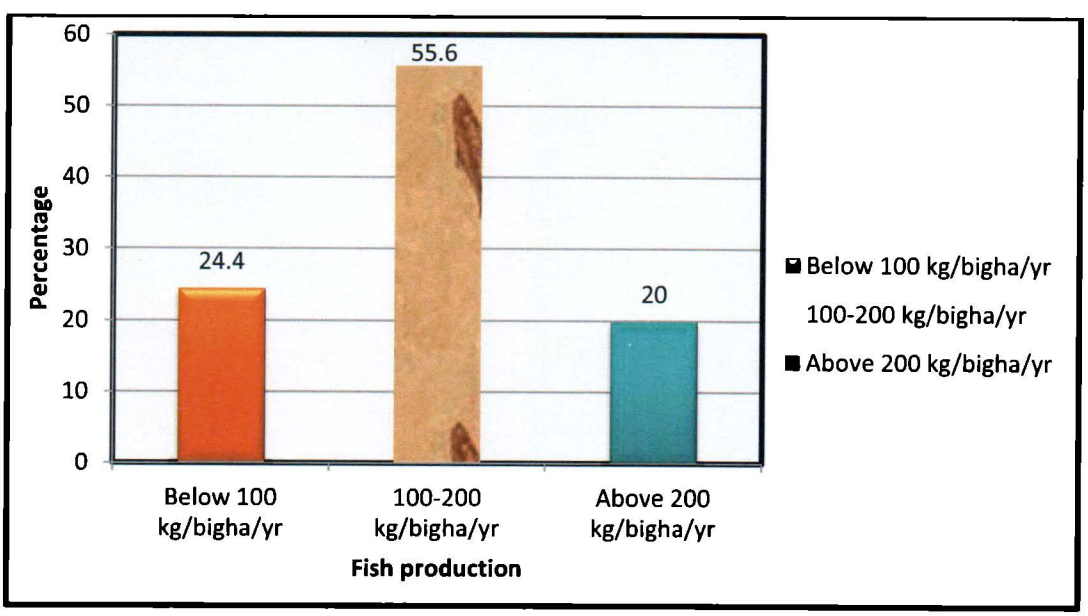
5.2.6: Annual fish production after training:-

Table 5.2.6: Distribution of Respondents according to their Annual Fish Production After Training:- (N = 90)

SL. NO.	ANNUAL FISH PRODUCTION	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Below 100 kg/bigha/yr	22	24.4
2.	100-200 kg/bigha/yr	50	**55.6**
3.	Above 200 kg/bigha/yr	18	20

As presented in the table 5.2.6, majority of the respondents (55.6%) were having the annual fish production between 100 and 200kg/bigha/yr, followed by 24.4% of the respondents were having annual fish production of below 100kg/bigha/yr and 20% of the respondents were having annual fish production above 200kg/bigha/yr.

Figure 5.2.6: Distribution of Respondents according to their Annual Fish Production After Training:- (N = 90)



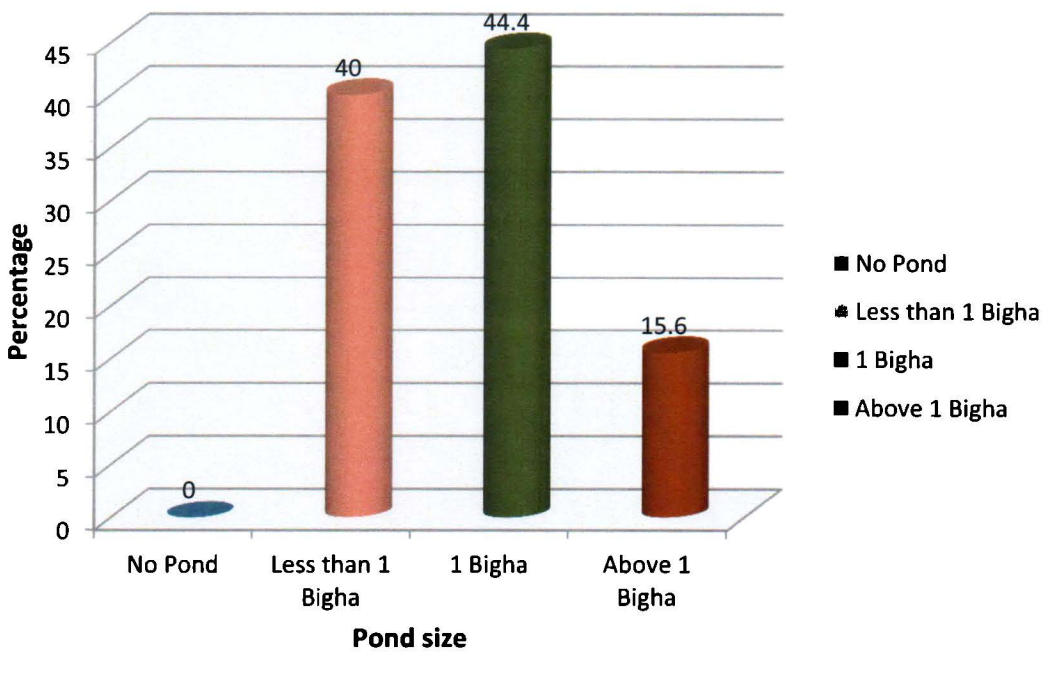
5.2.7: Pond size:

Table 5.2.7: Distribution of Respondents according to their Pond size: (N = 90)

SL.NO.	POND SIZE	FREQUENCY (N =90)	PERCENTAGE (%)
1.	No Pond	0	0
2.	Less than 1 Bigha	36	40
3.	1 Bigha	40	**44.4**
4.	Above 1 Bigha	14	15.6

The Table 5.2.7, reveals that all the respondents were having ponds, out of them 44.4% were having ponds with an area of 1 bigha, 40% of the respondents were having ponds with an area of less than 1 bigha and 15.6% of the respondents were having above 1 bigha pond area.

Figure 5.2.7: Distribution of Respondents according to their Pond size: (N = 90)



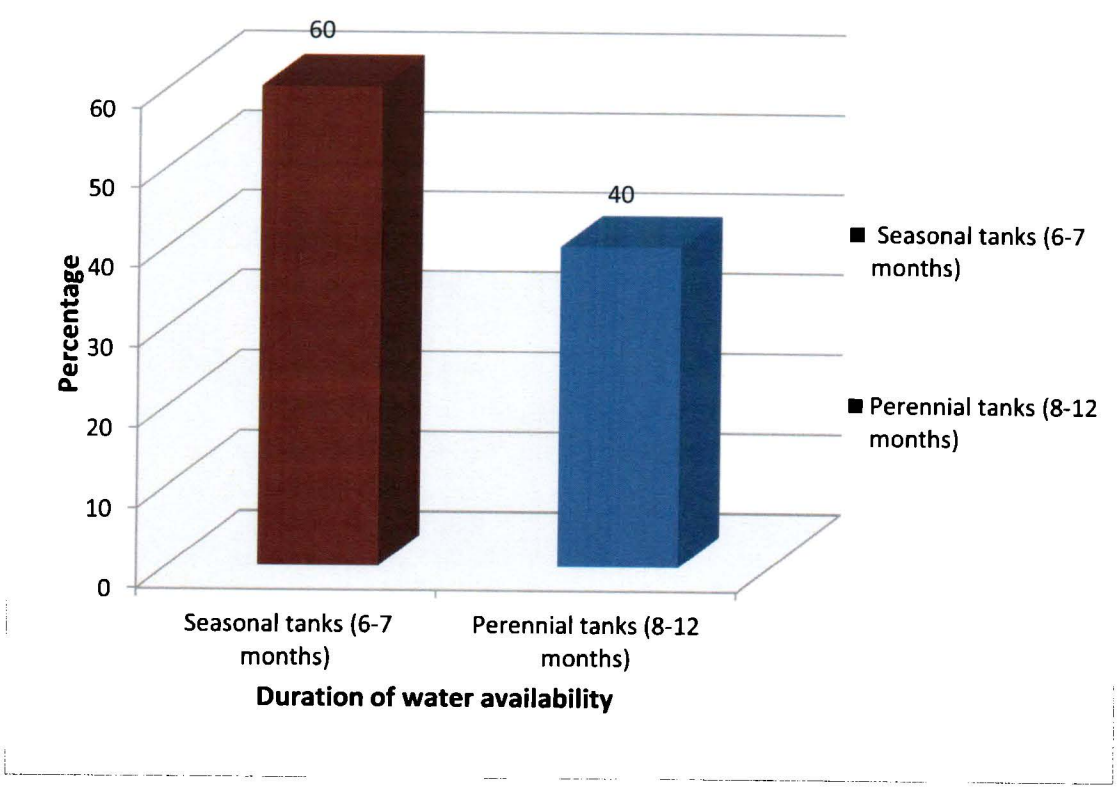
5.2.8: Duration of water availability:

Table 5.2.8: Distribution of Respondents according to the Duration of Water Availability in their Ponds: (N = 90)

SL. NO.	DURATION OF WATER AVAILABILITY	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Seasonal tanks (6-7 months)	54	60
2.	Perennial tanks (8-12 months)	36	40

The findings of the study indicated that, maximum numbers of fish farmers (60%) were found to have seasonal tanks whereas, 40% were found to have perennial tanks.

Figure 5.2.8: Distribution of Respondents according to the Duration of Water Availability in their Ponds: (N = 90)



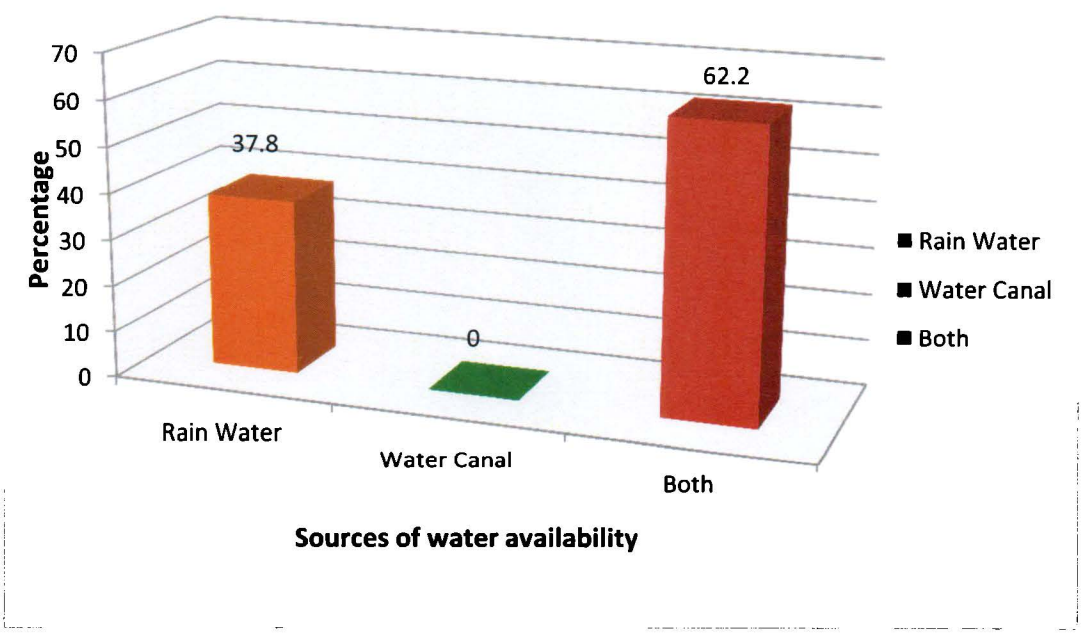
5.2.9: Sources of water availability:

Table 5.2.9: Distribution of Respondents according to the Sources of Water availability in their ponds:- (N = 90)

SL. NO.	SOURCE OF WATER	FREQUENCY (N =90)	PERCENTAGE (%)
1.	Rain Water	34	37.8
2.	Water Canal	0	0
3.	Both	56	**62.2**

Table 5.2.9, indicates that 62.2% of respondents used both rain water and canal water for fish culture and only 37.8% of respondents utilized rain water for fish culture.

Figure 5.2.9: Distribution of Respondents according to the Sources of Water availability in their ponds:- (N = 90)



5. 3: Distribution of Respondents according to their Communication Characteristics.

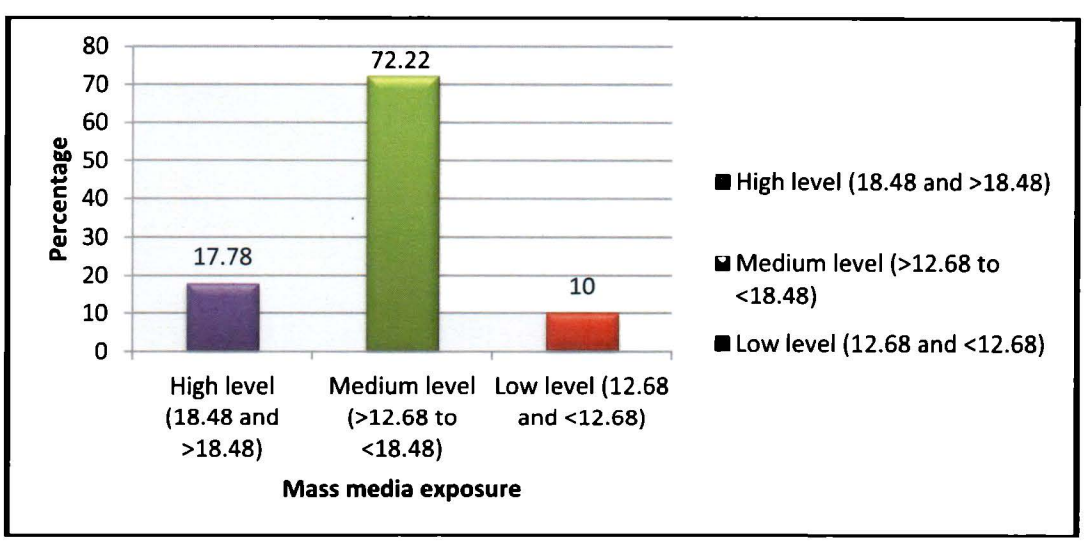
5.3.1: Exposure to mass media:

Table 5.3.1: Distribution of Respondents according to their Exposure to mass media: (N = 90)

SL. NO.	EXPOSURE TO MASS MEDIA	FREQUENCY (N =90)	PERCENTAGE (%)
1.	High level (18.48 and >18.48)	16	17.78
2.	Medium level (>12.68 to <18.48)	65	**72.22**
3.	Low level (12.68 and <12.68)	9	10
Mean = 15.58		**S.D.** = 2.90	

The findings of the study revealed that majority (72.22%) of the respondents were having medium level of mass media exposure whereas, 17.78 percent and 10 percent of respondents had high and low level of mass media exposure respectively.

Figure 5.3.1: Distribution of Respondents according to their Exposure to mass media: (N = 90)



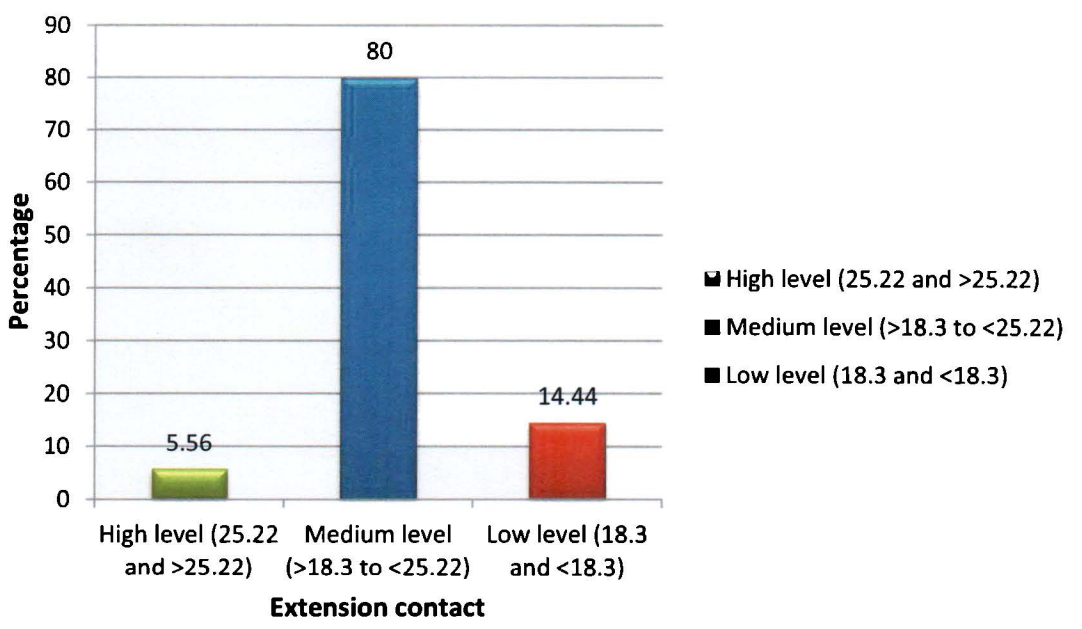
5.3.2: Extension contacts:

Table 5.3.2: Distribution of Respondents according to their Extension contacts:- (N = 90)

SL. NO.	EXTENSION CONTACT	FREQUENCY (N =90)	PERCENTAGE (%)
1.	High level (25.22 and >25.22)	5	5.56
2.	Medium level (>18.3 to <25.22)	72	80
3.	Low level (18.3 and <18.3)	13	14.44
Mean = 21.76		**S.D.** = 3.46	

Table 5.3.2 depicts that majority (80%) of the respondents had medium level of extension contacts, whereas, 5.56 percent and 14.44 percent of them had high and low level of extension contacts respectively.

Figure 5.3.2: Distribution of Respondents according to their Extension contacts:- (N = 90)



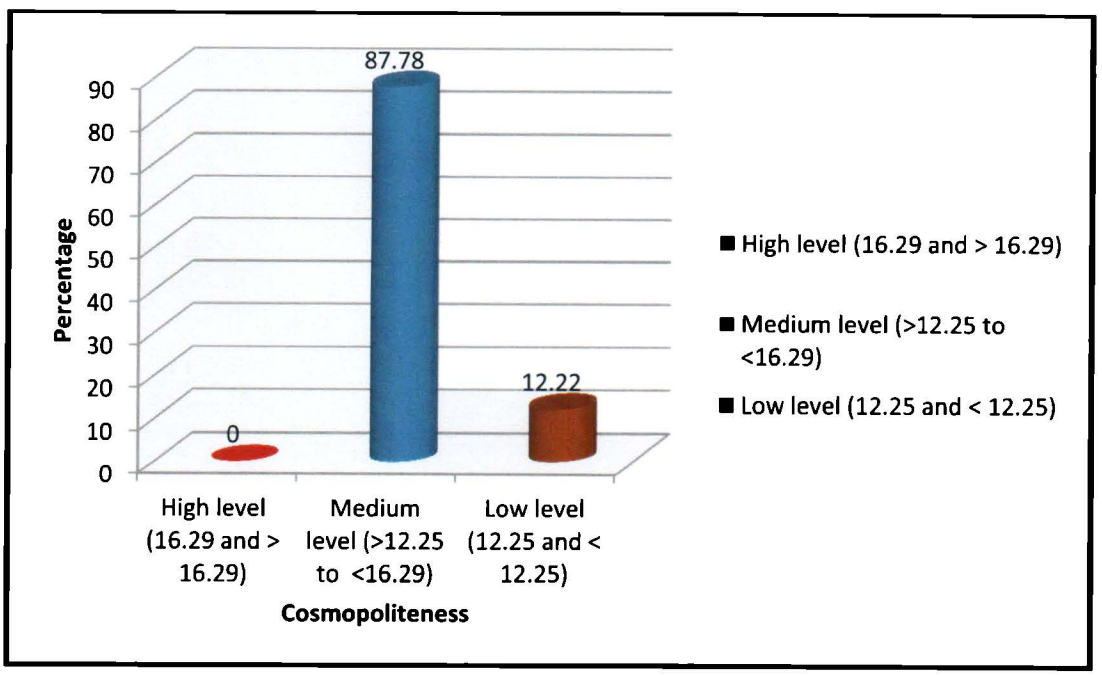
5.3.3: Cosmopoliteness:

Table 5.3.3: Distribution of Respondents according to their Cosmopoliteness:-(N = 90)

SL. NO.	COSMOPOLITENESS	FREQUENCY (N =90)	PERCENTAGE (%)
1.	High level (16.29 and > 16.29)	0	0
2.	Medium level (>12.25 to <16.29)	79	**87.78**
3.	Low level (12.25 and < 12.25)	11	12.22
Mean = 14.27		**S.D.** = 2.02	

Table 5.3.1 depicts that majority of the respondents (87.78%) were categorized under medium level of cosmopoliteness followed by 12.22 percent in the category of low level of cosmopoliteness.

Figure 5.3.3: Distribution of Respondents according to their Cosmopoliteness:- (N = 90)



5.4. Evaluation of fishery training programmes:-

5.4.1 Relevance of course contents covered:

Data with regards to the relevance of course contents covered in training as perceived by trainees have been depicted in Table 5.4.1.

Table 5.4.1: Distribution of respondents on relevance of course contents (N =90)

Sr. No.	Particulars	Highly relevant		Relevant		Not relevant	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1.	Pond preparation and management (Nursery, rearing and stocking ponds)	70	**77.78**	20	22.22	0	0
2.	Composite fish culture	72	**80**	18	20	0	0
3.	Egg fertilizing of fish	35	38.89	40	44.44	15	16.67
4.	Disease control procedure and prevention of diseases of fish	62	**68.89**	18	20	10	11.11
5.	Ornamental fish culture	25	27.78	44	48.89	21	23.33
6.	Induced breeding procedure	20	22.22	38	42.22	32	35.56
7.	Hatchery	28	31.11	42	46.67	20	22.22

	preparation and maintenance						
8.	Prawn culture	18	20	30	33.33	42	46.67
			Total = 45.83		Total = 34.72		Total = 19.45

The findings of the study indicated that the topics such as pond preparation and management (nursery, rearing and stocking pond), composite fish culture and disease control procedure and prevention of diseases of fish were perceived by the trainees as highly relevant. The topic nursery, rearing and stocking pond preparation and management was highly relevant as indicated by 77.78 percent of the respondents. The topic composite fish culture was highly relevant to 80 percent of the respondents and topic disease control procedure and prevention of diseases of fish is highly relevant as reported by 68.89 percent of the respondents.

The topics such as egg fertilizing of fish, ornamental fish culture, induced breeding procedure, hatchery preparation and maintenance were perceived as relevant by 44.44, 48.89, 42.22 and 46.67 percent of trainees respectively.

Among the topics covered, prawn culture was perceived not relevant by 46.67 percent of the respondents.

It could therefore be inferred that the topics were highly relevant by the trainees (45.83%).

5.4.2 Utility of topics covered:

The total items of usefulness of the topics of training on fish farming numbering to 8 were administered to the trainees and their responses were elicited on the three point continuum such as most useful, useful and least useful with the score of 3, 2 and 1 respectively.

Data with regards to the utility of topics covered in the training programme on fish farming as perceived by the trainees have been depicted in Table 5.4.2.

Table 5.4.2: Distribution of respondents according to the utility of topics covered in the training programme as perceived by them.

(N = 90)

Sr. No.	Particulars	Most useful		Useful		Least useful	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1.	Pond preparation and management (Nursery, rearing and stocking ponds)	72	**80**	12	13.33	6	6.67
2.	Composite fish culture	74	**82.22**	16	17.78	0	0
3.	Egg fertilizing of fish	28	31.11	42	46.67	20	22.22
4.	Disease control procedure and prevention of diseases of fish	70	**77.78**	20	22.22	0	0
5.	Ornamental fish culture	25	27.78	40	44.44	25	27.78
6.	Induced breeding procedure	18	20	50	55.56	22	24.44
7.	Hatchery preparation and maintenance	24	26.67	56	62.22	10	11.11
8.	Prawn culture	18	20	10	11.11	62	68.89

The findings of the study revealed that out of 8 topics covered in the training programme including the practicals, the topics namely pond preparation and management (nursery, rearing and stocking ponds), composite fish culture, disease control procedure and prevention of diseases of fish were perceived as most useful by 80, 82.22 and 77.78 percent of the trainees respectively. The topics which were

perceived only useful by the respondents were egg fertilizing of fish (46.67%), ornamental fish culture (44.44%), induced breeding procedure (55.56%), hatchery preparation and maintenance (62.22%). The topic which was perceived least useful was prawn culture by 68.89 percent of the respondents.

5.4.3 Fulfilment of expectations:

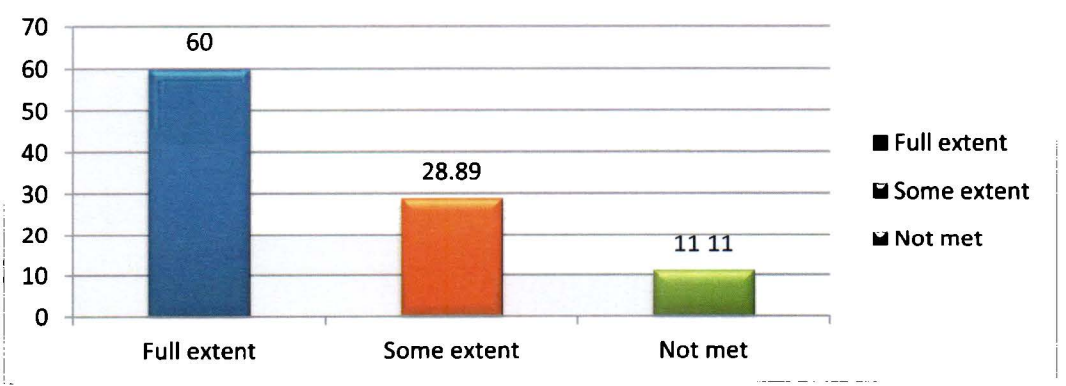
Expectation refers to the aspect that trainees desire to acquire information during training as per their job requirements.

Table 5.4.3.Distribution of respondents on the extent of fulfilment of expectations. (N =90)

S. No.	Extent of fulfilment of expectations	Respondents	
		Frequency	Percentage
1.	Full extent	54	60
2.	Some extent	26	28.89
3.	Not met	10	11.11

The data incorporated in Table 5.4.3 revealed that more than half of the respondents (60%) perceived that their expectations in attaining the training to full extent. 28.89 percent of the respondents felt their expectations are met to some extent. It is interested to note that 11.11 per cent of the respondents perceived their expectations are not met in joining the training.

Figure 5.4.3.Distribution of respondents on the extent of fulfilment of expectations. (N =90)



5.4.4. Training effectiveness:

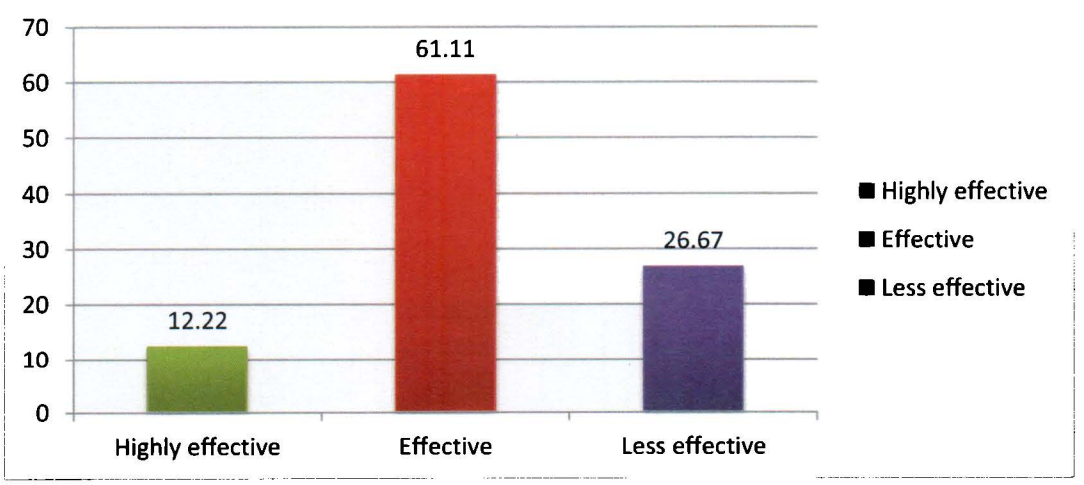
By taking into account, the above indicators of training effectiveness, total score on this aspect was worked by adding scores of all aspects considered responsible for organizational effectiveness and then the training effectiveness was worked out.

Table 5.4.4.Distribution of respondents according to their level of training effectiveness. (N = 90)

S. No.	Training effectiveness level	Respondents	
		Frequency	Percentage
1.	Highly effective	11	12.22
2.	Effective	55	61.11
3.	Less effective	24	26.67

The data depicted in Table 5.4.4 shows that 61.11 percent of the respondents perceived that training programme was effective however 26.67 percent of the respondents perceived training was less effective. Only 12.22 percent of the respondents felt training programme on fish farming was highly effective; this might be due to the fact that certain constraints were felt by both trainer and trainees.

Figure 5.4.4.Distribution of respondents according to their level of training effectiveness. (N = 90)



5. 5: Distribution of Respondents according to their Knowledge:-

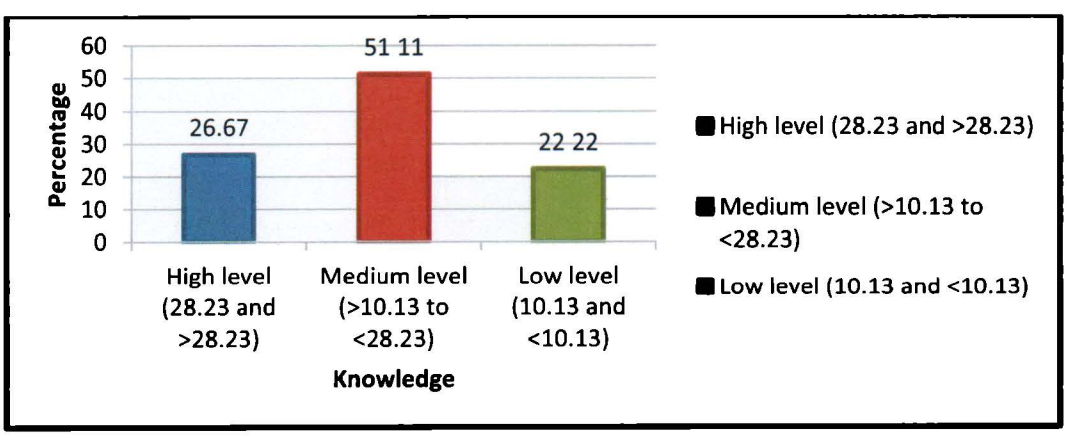
Scientific knowledge of any technology is an essential prerequisite for increased productivity. The content of the knowledge test was composed of questions called items. The knowledge test consisted of 29 items covering different aspects of scientific fish culture practices. The Table 5.5 indicated the knowledge level of the respondents.

Table 5.5: Distribution of Respondents according to their Knowledge: (N = 90)

SL. NO.	KNOWLEDGE	FREQUENCY (N =90)	PERCENTAGE (%)
1.	High level (28.23 and >28.23)	24	26.67
2.	Medium level (>10.13 to <28.23)	46	**51.11**
3.	Low level (10.13 and <10.13)	20	22.22
Mean = 19.18		**S.D.** = 9.05	

As regards the knowledge level of the respondents about scientific fish culture practices, it was found that out of 90 respondents most of the respondents had medium level of knowledge (51.11%) followed by 26.67 percent and 22.22 percent of the respondents had high and low level of knowledge respectively.

Figure 5.5: Distribution of Respondents according to their Knowledge: (N = 90)



5. 6: Distribution of Respondents according to their Adoption:-

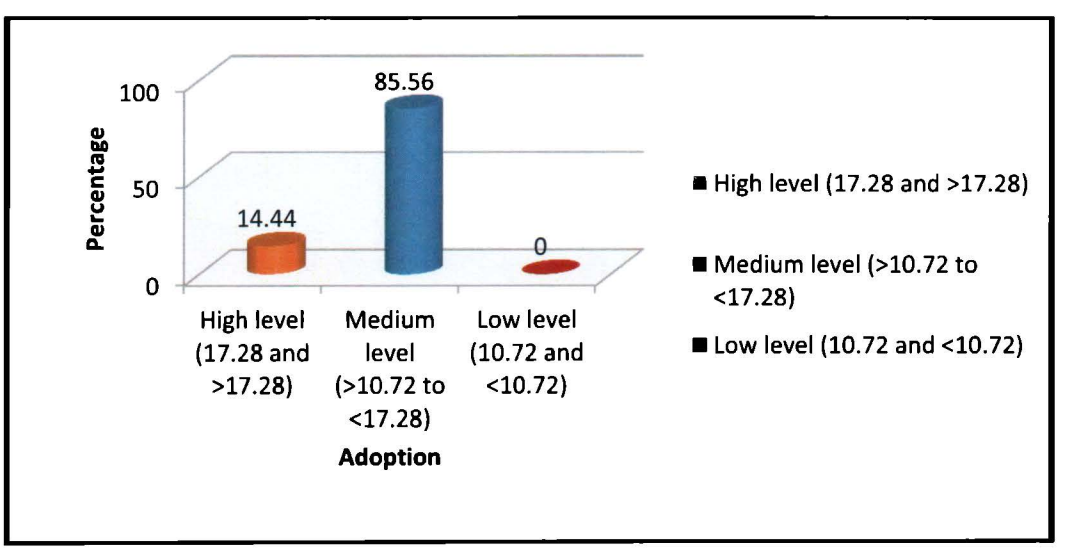
The content of the adoption test was composed of questions called items. The adoption test consisted of 11 items covering different aspects of scientific fish culture practices. The Table 5.6 indicated the adoption level of the respondents.

Table 5.6: Distribution of Respondents according to their Adoption: (N = 90)

SL. NO.	ADOPTION	FREQUENCY (N =90)	PERCENTAGE (%)
1.	High level (17.28 and >17.28)	13	14.44
2.	Medium level (>10.72 to <17.28)	77	**85.56**
3.	Low level (10.72 and <10.72)	0	0
Mean = 14		**S.D.** = 3.28	

As regards the adoption level of the respondents about scientific fish culture practices, it was found that majority of the respondents had medium level of adoption (85.56%) followed by 14.44 percent of the respondents had high level of adoption respectively.

Figure 5.6: Distribution of Respondents according to their Adoption: (N = 90)



5. 7: Problems faced by the respondents:

This was necessary to know the constraints that the respondents were facing during the operation of fish culture practices. The constraints have been given in the following table-

Table 5.7: Constraints faced by the respondents:-

Sl. No.	Statements	Most serious		Serious		Not serious	
		F	%	F	%	F	%
1.	Lack of Infrastructure	45	50	28	31.1	17	18.9
2.	Lack of fishing equipment	57	**63.3**	16	17.8	17	18.9
3.	Lack of pond water during culture season	75	**83.3**	10	11.1	5	5.6
4.	Good transport	68	**75.6**	18	20	4	4.4
5.	Lack of good quality of fish seed	18	20	13	14.4	59	**65.6**
6.	Disease problem	62	**68.9**	19	21.1	9	10
7.	Lack of good quality of feed	22	24.4	45	**50**	23	25.6
8.	Loan facility	55	**61.1**	17	18.9	18	20
9.	Marketing problem	74	**82.2**	16	17.8	0	0
10.	Political disturbance	58	**64.4**	18	20	14	15.6
11.	Poaching	14	15.6	22	24.4	54	**60**
12.	Poisoning	63	**70**	16	17.8	11	12.2

The table 5.7.highlights that the respondents were not free from problems. However, in personal the major problems reported by the respondents were lack of fishing equipments (63.3%), lack of pond water during culture season (83.3%), lack of transportation facilities (75.6%), disease problem (68.9%), lack of loan facilities (61.1%), poor marketing facilities (82.2%), political disturbance (64.4%), pond poisoning (70%) and it was also found that lack of availability of good quality feed created disappointment among 50 percent respondents.

PART - 2

5. 8: Results of Relational Analyses

Table 5.8.1: Two sample Paired T test between the quantity of Fish production of respondents at 'Before' and 'After' the Training Programmes on Improved Fish Culture Practices

S. No.	Category	t-calculated	t-critical	Decision (α=0.05)
1.	Fish production at 'Before' and 'After' the Training Programmes	-13.03	1.99	H_0Accepted

It is clear from the table 5.8.1 that the value of t_{cal} (-13.03) is less than the t_{crit} value i.e. 1.99 at 5% level of significance. Thus, the H_0 was accepted and it could be concluded that there was no significant differences between the Fish production figures of the respondents at 'Before' and 'After' attending Training Programmes Imparted by KVK Sonamukhi. This might be due to the fact that although they were convinced about the benefits of improved aquaculture technology but they could not able to adopt package of practices for increasing production.

Table 5.8.2: Two sample Paired T test between the Income levels of respondents at 'Before' and 'After' the Training Programmes on Improved Fish Culture Practices

S. No.	Category	t-calculated	t-critical	Decision (α=0.05)
1.	Income at 'Before' and 'After' the Training Programmes	-6.19	1.99	H_0Accepted

The result of two sample paired t test shows that the value of t_{cal} (-6.19) is less than the value of t_{crit} i.e. 1.99at 5% level of significance, leading to the acceptance of H_0 and equally, it is conspicuous from the table 5.8.2 that there was no significant differences existed between the Annual Incomes of the respondents at 'Before' and 'After' attending Training Programmes Imparted by KVK Sonamukhi on Improved Fish Culture Practices.

Table 5.8.3: Correlation coefficient of selected socio-economic variables of the respondents

S. No.	Variable- I	Variable- II	r Value
1	Knowledge score	Adoption score	0.7**
2	Cosmopoliteness	Knowledge score	0.9**
3	Mass media exposure	Knowledge score	0.9**
4	Extension contact	Knowledge score	0.9**
5	Cosmopoliteness	Adoption score	0.6**
6	Mass media exposure	Adoption score	0.8**
7	Extension contacts	Adoption score	0.7**
8	Land Holding	Pond Size	0.6**
9	Extension contacts	Pond Size	-0.6**

** *At 5% level of significance*

Correlation Coefficient Analysis:

Results of Correlation analysis revealed that the adoption score of the respondents was found to be positively and significantly correlated with the knowledge score at the 0.05 level of probability. Similarly, cosmopoliteness, mass media exposure and extension contacts were positively and significantly correlated with both adoption score and knowledge score at 5% level of probability whereas age and family size were non-significantly correlated with knowledge score of the respondents. It is evident from the table 5.8.3 that two variables namely land holding and pond size were positively correlated among themselves.

More contacts by the farmers with the extension personnel provide them an opportunity to know and discuss regarding modern cultivation practices, which in turn enriches their knowledge. Greater contacts with extension personnel might have motivated the farmers in various ways and they might have gained more knowledge due to the wider exposure, contact and interaction with source of technical information that is extension personnel. Another possible reason could be, due to availability of different activities in K.V.K area compared to other areas, the government officials, private agencies and also together extension agencies might have concentrated more extension activities in that area and hence due to the direct or

indirect participation of farmers, their knowledge level might have increased to a greater extent.

The above findings were in conformity with the findings of Gangadharappa (1979), and Somasundaram and Singh (1979) who indicated the presence of a positive and significant association between extension participation and gain in knowledge.

Exposure to different mass media sources like news papers, farm magazines, radio and television might have helped the respondents to gain recent information. The advent of mass media provided enormous opportunities for repeated exposure of farmer to new technology motivating them to take further interest to learn about them. Hence, those farmers who had higher exposure to mass media had exhibited higher knowledge. Similar findings were reported by Bhatkar *et al.,* (1995) and Kanavi (2000) who found the significant relationship between knowledge and mass media exposure.

Farmers with low cosmopoliteness had low level of knowledge. The correlation revealed that there was significant association between cosmopoliteness and knowledge of trained respondents. The findings are in conformity with findings of Manju, (1997), Preetha, (1997) and Manju, (1996). The possible reason for this trend may be that cosmopolite oriented individuals will have greater contact with the larger society and this might have broadened the mental horizon of farmers to acquire more reinforcement in gaining knowledge about fish farming practices prevailing in other region or locality.

The relationship between extension participation and adoption of improved fish farming practices among trained farmers was significant as revealed by 'r' value.

The possible reason for this trend may be that, the farmers who had participated in training course, attended meeting, field days, tours, farmer's fair might have come in closer contact with extension personnel and other farmers leading to increased knowledge about cultivation practices, which might have motivated them for positive action, that is adoption. The other reason that could attribute is that extension participation provides opportunity for contrived experience and interaction with other farmers thus leading to higher adoption.

The findings of the present study was in conformity with the findings reported by Reddy and Jalihal (1974), Sundarswamy and Doriaswamy (1975), Ravikumar (1979), Pamadi (1980) and Rotti (1983) who also reported significant relationship between extension participation and adoption.

Mass media significantly related with adoption level of the respondents. Exposure to different mass media sources like news papers, farm magazines, radio and television might have helped the respondents to gain recent information. The advent of mass media provided enormous opportunities for repeated exposure of farmer to new technology motivating them to take further interest to learn about them. Hence, those farmers who had higher exposure to mass media had exhibited higher adoption.

Similar findings were reported by Bhatkar *et al.,* (1995) and Kanavi (2000) who found the significant relationship between knowledge and mass media exposure.

A significant association between cosmopoliteness and adoption level of farmers was observed. Farmers with high level of cosmopoliteness were high adopters and vice-versa. Present findings were in conformity with the findings of Manju, V. (1997), Manju, S.P. (1996) and Preetha, L. (1997).

The reason that could be attributed to such a situation is that the cosmopoliteness plays an important role in adoption behaviour. The rationale is that greater contact with the larger society might have broadened the mental horizons of farmers, thus helping in adoption of new technologies.

From the Table 5.8.3 it is clear that there was positive and significant relationship between knowledge level and adoption level of the respondents. This implies that as knowledge of individual increases regarding any technology or innovations they tend to adopt the practices to the full extent regarded that it is suitable to his field conditions.

The positive relationship could be attributed to the factors like innovativeness, scientific orientation, extension participation, mass media utilization, which directly or indirectly influence the thinking behaviour of an individual to acquire recent

information regarding practice or innovation and in turn influence his adoption decision process.

Age was found to be non-significantly related with the level of knowledge of trained farmers. This inferred that farmers of different age group had similar knowledge level regarding recommended fish farming practices. The knowledge level of younger farmers was slightly higher than old farmer but this was not significant.

The relationship might be because farmers of different age have understood the important practices required. This might have helped majority of farmers to know about the practices at similar level. This finding was in conformity with Bhatkar (1995) and Kanavi (2000).

Chapter - 6

Summary and Implications

6. *Summary and Implications*

Krishi Vigyan Kendra is the vehicle to the information and technologies to the farmers and beneficiaries through the scientists and resource personnel as instrumental from the laboratories and research units. The process includes training, meeting, field demonstration, front line demonstration organized by the scientist and resource personnel as instrumental. The success and efficiency of the program largely depend on the pursuance and follow up activities under taken by the KVKs are spread all over our esteemed motherland India to develop agriculture and to improve the livelihood of the countrymen particularly the farm families and farming communities.

Training is an important input which will help farmers to practice techniques scientifically. Krishi Vigyan Kendras conduct trainings on different aspects to transfer technology. To bring sustainability in farm production through fish culture practices Krishi Vigyan Kendra, Sonamukhi, Bankura is imparting trainings to the farmers in its jurisdiction. Keeping this in view the present study was designed with the following specific objectives.

i. To study socio-economic profile of the trainees.
ii. To investigate the extent of effectiveness of training programme on fish production in terms of utility of topics taught.
iii. To study the impact of training programmes imparted by K.V.K on knowledge level of respondents.
iv. To study the impact of training programmes imparted by K.V.K on adoption level of respondents.
v. To study the constraints which are encountered by fish farmers in adoption of improved fish farming practices.

With an objective to study the impact of K.V.K on the fish growers and fish culture and in an academic interest to a survey has been carried out in Sonamukhi block under K.V.K domain of Sonamukhi in Bankura district under C.A.D.C. The K.V.K has been in operation since long in the area which has been brought under the

study. This area being dominated by the farming communities with farming system having fish culture as one of the important components for their livelihood. The farmers are basically resource poor having small holding size of land and at least a water reservoir (pond) for fish culture, mostly for their own consumption. A chunk of youths and farmers from the farming community has been trained up by the K.V.K scientists and resource personnel of Sonamukhi K.V.K, C.A.D.C. The trained farmers have dual role towards the development of the farm and farming systems as well as or the betterment of their livelihood. The trained farmers themselves would adopt the knowledge and technologies in their own farm in one hand and would demonstrate the acquired knowledge and technologies to the devouring farmers, friend and relatives on the other hand.

The salient findings of the study are as follows

- Majority of the respondents (35.6%) belonged to the young age group.
- All respondents (100%) were male. There was no female respondent in the study area.
- Majority of the K.V.K trained respondents belonged to General Caste (53.3%).
- Majority of the respondents (33.3%) were having educational qualification up to primary level.
- More than half of the respondents (62.2%) were having nuclear family.
- Majority of respondents (i.e. 68.9%) were having small (Up to 5 members) family size.
- Majority (68.9%) of the respondents were involved in agriculture and fishery.
- Majority of the respondents (46.7%) were having up to 14 bigha land.
- Before imparting the K.V.K training majority of the respondents (71.1%) belonged to the low income group (< Rs. 70,000/-per year).
- After imparting the K.V.K training most of the respondents (48.9%) belonged to the medium income group (Rs. 70,000 – 1, 20,000/- per year).
- Before imparting the K.V.K training majority of the respondents (56.7%) achieved the annual fish production of 'below 100kg/bigha/yr.
- After imparting the K.V.K training majority of the respondents (55.6%) were having the annual fish production between 100 and 200kg/bigha/yr.

- All the respondents were having ponds and majority of them (44.4%) were having ponds with an area of 1 bigha.
- Maximum numbers of fish farmers (60%) were found to have seasonal ponds.
- Majority of the respondents (62.2%) used both rain water and canal water for fish culture.
- Majority (72.22%) of the respondents were having medium level of mass media exposure.
- Majority (80%) of the respondents had medium level of extension contacts.
- Majority of the respondents (87.78%) were categorized under medium level of cosmopoliteness.
- The topics such as pond preparation and management (nursery, rearing and stocking pond), composite fish culture and disease control procedure and prevention of diseases of fish were perceived by the trainees to be highly relevant.
- The topics namely pond preparation and management (nursery, rearing and stocking), composite fish culture, disease control procedure and prevention of diseases of fish were perceived as most useful by 80, 82.22 and 77.78 percent of the trainees respectively.
- More than half of the respondents (60%) perceived that their expectations in attaining the training to full extent.
- Majority of the trainees (61.11%) percent of the respondents perceived that training programme was effective.
- Most of the respondents (51.11%) had medium level of knowledge.
- Majority of the respondents (85.56%) had medium level of adoption.
- The major problems reported by the respondents were lack of fishing equipments (63.3%), lack of pond water during culture season (83.3%), lack of transportation facilities (75.6%), disease problem (68.9%), lack of loan facilities (61.1%), poor marketing facilities (82.2%), political disturbance (64.4%), pond poisoning (70%) and it was also found that lack of availability of good quality feed created disappointment among 50 percent respondents.
- The statistical analysis indicated that there was no significant difference between the fish production figures of the respondents at 'Before' and 'After' Conduct of Training Programme Imparted by KVK Sonamukhi.

- There was no significant difference between the annual income figures of the respondents at 'Before' and 'After' Conduct of Training Programme Imparted by KVK Sonamukhi.
- Results of Correlation analysis revealed that the adoption score of the respondents was found to be positively and significantly correlated with the knowledge score at the 0.05 level of probability. Similarly, cosmopoliteness, mass media exposure and extension contacts were positively and significantly correlated with both adoption score and knowledge score at 5% level of probability whereas age and family size were not correlated with knowledge score of the respondents. It is evident from the table 5.10 that two variables namely land holding and pond size were positively correlated among themselves.

Through the study a positive change in some character, behaviour, belief and activities of the farmers and farming system due to K.V.K activities was noticed to the possible extent. Before training, the farmers did not apply feed to the fishes in pond, though they did apply fertilizers and manures to their crop whatever small the quantity may be. No control measure for diseases used to be taken, rarely they thought of growing fishes in their ponds in commercial basis; they would grow fishes for their home consumption with minimum care. They used to release fingerlings only but after training most of them are convinced about the modern technologies. Many of them started adopting the improved techniques and there has been change, to some extent, in the socio-economy of the farmers and farming community. Production of fishes has been increased from less than 100kg/bigha/yr to more than 200kg/bigha/yr. The farmers started sending the excess fish to the market for sell, resulting increase in annual income from below Rs. 70,000/- (by 71.1%) to above Rs. 70,000/- (by 73.3% farmers). There has been improvement in the livelihood of few farmers and the village as a whole to little extent.

More improvement could have been there had it not been devoid of irrigation facilities, had there been facilities for good transport, marketing, good financial facilities and also health care unit and education institution.

Hindrances are mostly of non-technical nature. The K.V.K personnel have little to do, but they can improve the research work in the tune to the need of the day to address to the problems ahead and deal with them to their fullest extent.

KVK is working as a knowledge hub for latest agricultural technology in Bankura district. The frontline demonstration conducted on integrated farming at farmer's fields in Bankura district of West Bengal revealed that the farmers can get increased fish yield by following the recommended package of practices. The productivity gain under FLD over farmer's practice created awareness and aggravated the other farmers to adopt improved fish farming practices in the district. This study suggests for conducting intensive trainings, FLDs and effective use of all means of extension education to educate the fish growers for higher production of fish and to get higher net return on sustainable basis.

Implications of the study:-

- Concerted extension educational efforts are needed to educate the farmers about improve fish farming practices to increase production at farm level.

- Motivational training should be given to the farmers to improve their knowledge for adoption of improved technology.

- More training programmes should be organised on disease control procedure and prevention of diseases of fish as farmers indicated they are most useful for them.

- Farmers should be encouraged to adopt package of practices to improve productivity at farm level.

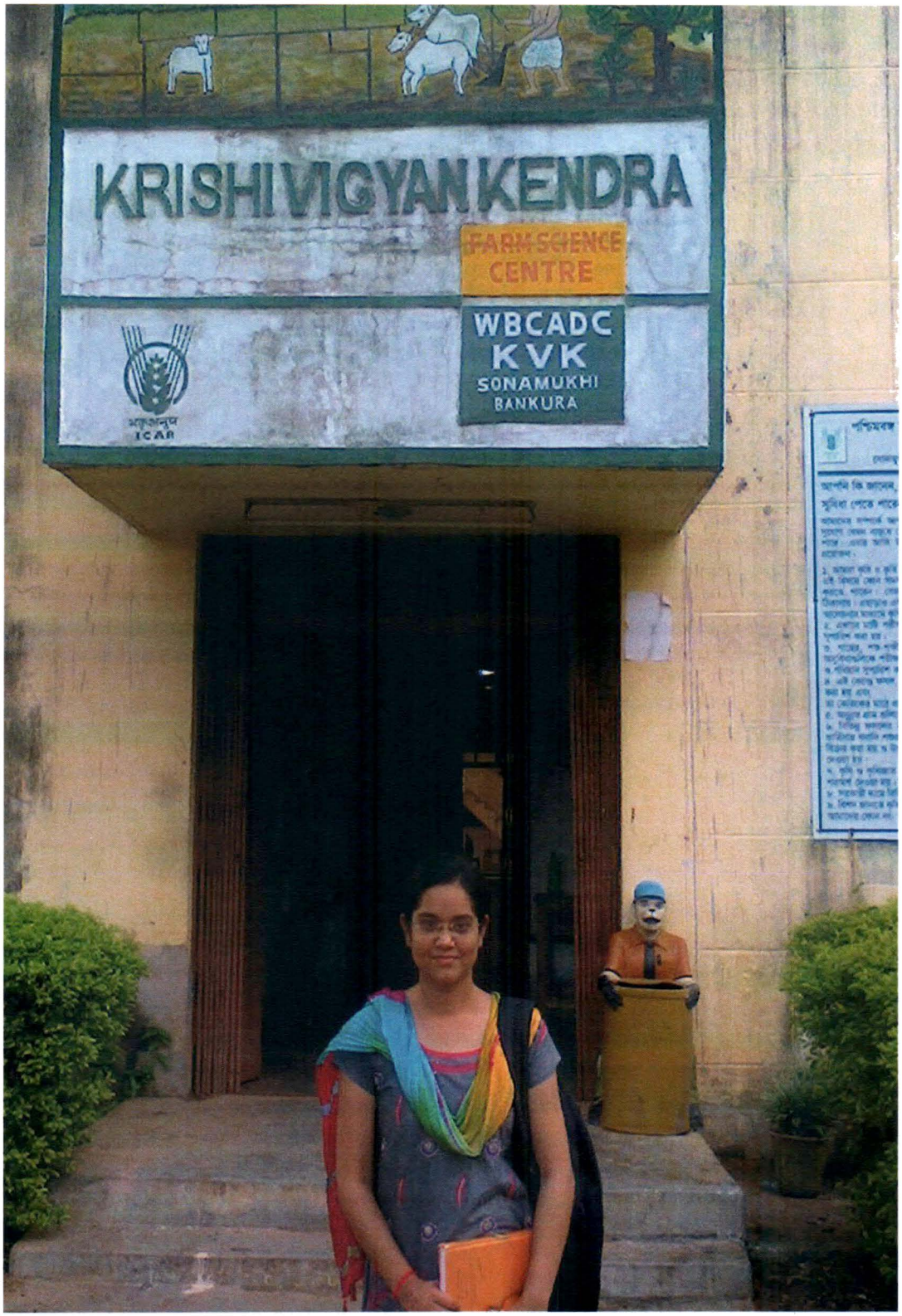


Plate-3: Sonamukhi K.V.K

Plate-4: Mother culture test tube of mushroom

Plate-5: Researcher interacting with Programme co-ordinator

Plate-6: Researcher discussing with K.V.K personnel

Plate-7: Researcher receiving information on freezing of Mashroom seeds

Plate-8: Researcher interacting with villagers

Plate-9: Researcher discussing with a fish farmer

Plate-10: Researcher interacting with K.V.K personnel

Future Scope

Green Revolution laid emphasis on high yielding varieties of crops fertilizes irrigation and crop protection. The farmers adopted the prescribed package of the green revolution. Partly or fully resulting in there has been substation increase in crop production and food sufficiency. The effect reached the farms at remote village also. The effect of the Blue Revolution did not reach fish-growers to the extent of any satisfaction in the area under study. Despite the K.V.K scientists doing their best the farmer could not adopt the improved package of practices prescribed by K.V.K people. They apply fertilizers to the crops but not interested in applying fish-feed to the ponds. Many of the farmers understand and are convinced of the technologies to be adopted, but most of the farmers are resource poor finance being the main constraint the farmer cannot adopt the technologies. Though most of the farmers are having ponds, they cannot keep the ponds alive throughout the year they dry up during summer season. To address to these constraints the plan of work in future might be drawn up taking the following points in view.

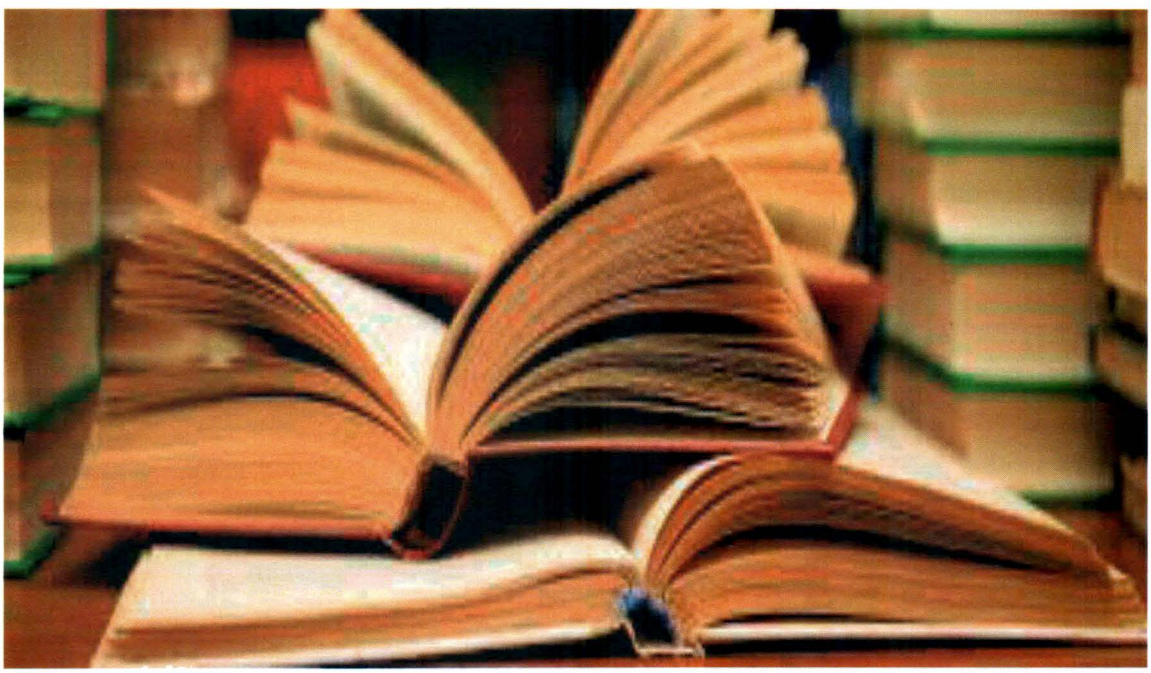
Detail study may in future be undertaken as to the sources of financial support from different agencies to the beneficiaries. The Govts, both State and Central, different NGOs, Banks, NABARD have been extending their financial subsidies, soft loans and financial assistance in different farms. The study in future might include if the farmers are familiar with the names of the organization, their nature, addresses. If the farmers know who the beneficiaries the benefits are extended, how to approach, whom to contact all these sorts of information would help establish the present status as to the percentage of farmers fall in different profile of knowledge. This would help the K.V.K scientists and resource personnel accordingly.

The detail study on the knowledge of rain-water harvest, its efficiency feasibility would be prudential to be undertaken which would lead to formulate technological program to address the felt need problems or the farmers.

Suggestions for future research

1. The present study was conducted with a limited sample size. In order to derive wider generalization, a study with large sample size could be conducted.
2. Comparative studies on trainings conducted by various KVKs on improved fish farming practices can be taken up to derive wider generalisations.
3. Case studies of successful practicing fish farmers may be taken up.
4. Impact assessment of various training programmes conducted by KVKs can be studied.

Chapter - 7



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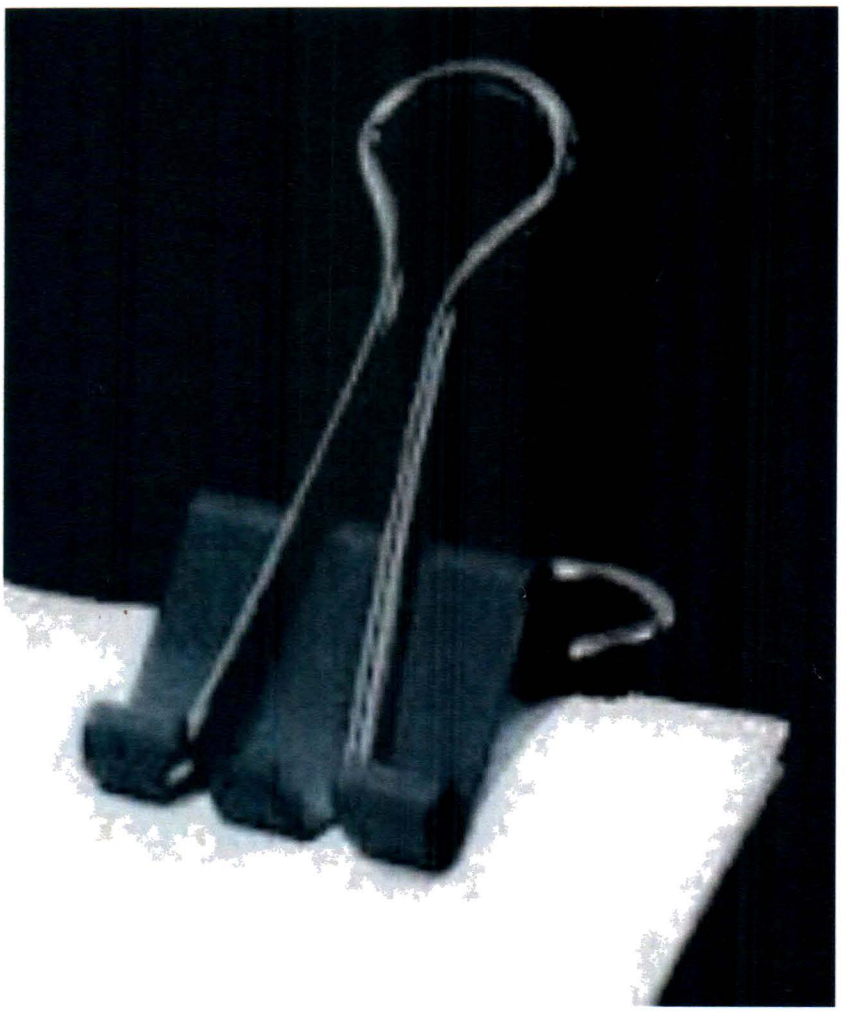
Chapter - 8



Annexure

Annexure-I

INTERVIEW SCHEDULE FOR TRAINEES OF SONAMUKHI KVK-ADOPTED VILLAGES

A. IDENTIFICATION:

Sl. No. **Date:**

Village

Name of Block

District

B. GENERAL INFORMATION

1. **Respondent's Name**
2. **Age:**
3. **Gender:** i) Male ii) Female

4. **Gross family Income/ Year: (give tick mark)**

Income	Before	After
a) Below Rs. 60,000/-		
b) Rs. 60,000-1,20,000/-		
c) Above Rs. 1,20,000/-		

5. **Source of Family Income: (give tick mark)**

Sl. No.	Name of Job
1.	Agriculture
2.	Agriculture + Fishery
3.	Agriculture + Fishery + Business
4.	Agriculture + Fishery + Business + Job

C. SOCIO-ECONOMIC INFORMATION:

1. **Caste:** i) S.C ii) S.T iii) O.B.C iv) Gen

2. **Family type:-**
   i) Joint ii) Nuclear

3. **Size of family:-**
   i) Upto 5 members ii) Above 5 members

4. Education of respondents

i. Illiterate
ii. Primary
iii. Middle school
iv. Matriculate
v. Graduate and above

5.Land holding (In Bigha): i) No Land ii) Up to 7 Bigha iii) Up to 14 Bigha
iv) Up to 21 Bigha v) Above 21 Bigha

COMMUNICATION SOURCES

1. Cosmopoliteness:-

How often do you visit the following places (give tick mark)

Place	**Most often 4**	**Sometimes 3**	**Rarely 2**	**Never 1**
State Capital **Block town** **S.D town** **Local Town** **Any other**				

2. Exposure to mass media:-

How often you use the followings (give tick mark):

Media	**Most often 4**	**Sometimes 3**	**Rarely 2**	**Never 1**
Radio Television Newspaper Magazine Cinema Any other				

3. How often you contact the following extension personnel/ agencies (give tick mark):

Extension agent	**Most often 4**	**Sometimes 3**	**Rarely 2**	**Never 1**
Gram sevak ADO BDO				

FEO Univ. teacher KVK Scientist Progressive Farmer Any other				

D. INFORMATION ABOUT IMPACT IN FISHERY:

1. **Pond size:**

2. **Duration of water availability:**
   i. Seasonal tanks (6-7 months)
   ii. Perennial tanks (8-12 months)

3. **Source of water:**
   i. Rainfed
   ii. Canalled
   iii. Both rainfed and canalled

4. **Annual Fish Production:**

Fish Production	Before	After
a) Below 80 kg/bigha/yr b) 80-150 kg/bigha/yr c) Above 150 kg/bigha/yr		

CONSTRAINTS:

1. **Problem in fish culture:**

Problems	Most serious (3)	Serious (2)	Not serious (1)
Lack of Infrastructure			
Lack of fishing equipment			
Lack of water			
Good transport			
Lack of good quality of fish seed			
Disease problem			
Lack of good quality of feed			
Loan facility			
Marketing problem			
Political disturbance			
Poaching			
Poisoning			

Annexure-II

EVALUATION OF FISHERY TRAINING PROGRAMMES

1. **Relevance of Course Contents**

In your opinion how the courses are relevant with fish production.

Sl. No.	Particulars (Lectures)	Highly relevant (3)	Relevant (2)	Not relevant (1)
1.				
2.				
3.				
4.				

2. **Extent of usefulness of topics/ utility of topics covered in the training programme as perceived by them.**

Sl. No.	Topics	Most useful (3)	Useful (2)	Least useful (1)
1.				
2.				
3.				
4.				

3. **Extent of fulfilment of expectations:**
   - i. Full extent
   - ii. Some extent
   - iii. Not met

4. **Level of training effectiveness as perceived by respondents:**

Sl. No.	Particulars	Highly effective	Effective	Less effective
1.				
2.				
3.				
4.				

Annexure-III

General Interview Schedule For Knowledge and Adoption

1. INFORMATION OF THE KNOWLEDGE ABOUT SCIENTIFIC FISH CULTURE PRACTICES

Knowledge test on scientific fish culture

Sl. No.	Practices	Score
1.	What in kind of soil is good for fish culture?	Clay loamy/ loamy-(1) Any other-(0)
2.	What in the minimum depth of water required for fish culture?	1m –(1) Any other (0)
3.	What are the nutrients required for production of natural fish food organisms in fish pond?	N/ P –(1) Any other -(0)
4.	Is it necessary to use lime in fish culture?	Yes –(1) No –(0)
5.	How do you correct acidic condition of fish culture pond/tank?	Using lime –(1) Any other –(0)
6.	Do you know the recommended dosage of lime used in general?	250-300 kg/ha/yr –(1) Any other –(0)
7.	Should you have to manure the fish culture ponds?	Yes –(1) No –(0)
8.	Name some common organic manures used in fish culture.	RCD/ Poultry manure/ Pig dung –(1) Any other –(0)
9.	Do you know the rate of application of cow dung (including initial dose and subsequent monthly doses)?	RCD 5000 kg/ ha/ yr – (1) Any other -?(0)
10.	How many days before of stocking of fish seed manure should be applied?	7-10 or 15 days –(1) Any other –(0)
11.	Is it necessary to use inorganic fertilizers in addition to organic manures in fish culture?	Yes –(1) No –(0)
12.	Is it necessary to eradicate excess aquatic weeds?	Yes –(1) No –(0)
13.	What in the manual method of eradication/ control of predatory and weed fishes?	Repeated netting using small meshed drag net – (1) Any other –(0)

14.	Name any piscide used in fish culture.	Mohua oil cake/ bleaching powder / neem cake –(1) Any other –(0)
15.	Do you know the recommended dosage of mohua oil cake or bleaching powder?	600-800 kg/ha of MOC –(1) Any other –(0)
16.	Name three Indian major carps	Catla, Rohu, Mrigal – (1) Any other –(0)
17.	Name three exotic carps	Common carp, Grass carp, Silver carp –(1) Any other –(0)
18.	Which is the fastest growing major carp and exotic carp?	Catla & Silver carp –(1) Any other –(0)
19.	Catla and silver carp are surface feeders Rohu is a column feeder Mrigal feeds on bottom vegetation Common carp in omnivorous	Yes –(1) No –(0)
20.	Which fish grows well in weed infested tanks?	Grass carp –(1) Any other –(0)
21.	What is the ideal size of fish seed for stocking?	30-40 mm (1) Any other –(0)
22.	Whether supplementary feeding is necessary in CFC?	Yes –(1) No –(0)
23.	Name the common supplementary feeds .	GOC, rice bran, silk worm, pupae-(1) Any other –(0)
24.	After stocking, once in how many days manuring should be done?	Every month –(1) Any other –(0)
25.	Do you know the recommended manuring schedule to be practiced after stocking?	200-250 kg/ha (RCD) – (1) Any other –(0)
26.	Do you know the indicators of oxygen depletion in fish pond?	Gasping at surface / mass mortality –(1) Any other –(0)
27.	Name any fish disease that occur in fish culture ponds	UDS, Fin & tail rot, learnea –(1) Any other –(0)
28.	In general, after how many months of stocking the fish crop should be harvested?	8-10 month –(1) Any other –(0)
29.	What should be the optimum size of harvesting?	0.75-1.0 kg –(1) Any other –(0)

2. INFORMATION OF THE ADOPTION ABOUT SCIENTIFIC FISH CULTURE PRACTICES

Recommended practices	Scores assigned for	
	Full adoption (2)	Non- adoption (1)
A. Pre-stocking practices		
Testing of soil and water Recommendation: Testing for water and soil for acidity/ alkalinity	2	1
Control of aquatic weeds Recommendation: Removal/ eradication of aquatic weeds by chemical/ manual method	2	1
Application of lime for improving soil and water quality F. A : Recommended dosage (250-300 kg/ ha) N. A : No application of lime	2	1
Initial manuring with organic manures (RCD or poultry) F. A : Recommended dosage (2500 kg/ ha) N. A : No application of manure	2	1
Application of inorganic fertilizers (urea and super phosphate) F. A : Recommended dosage (25 kg urea + 50 kg SPO_4 kg/ ha) N. A : No application of inorganic fertilizers	2	1
B. Stocking practices		
Ratio of stocking of selected species F. A : As recommended ratio N. A : Single species of stocking	2	1
Size of the fish seed stocked F. A : More than 30 mm N. A : Less than 20 mm	2	1
C. Post-stocking practices		
Use of supplementary feeds in prescribed proportion F. A : Recommended proportion of GOC and RB N. A : no feeding	2	1
Post-stocking manuring with organic manures F. A : Recommended dosage (250 kg/ ha/ month) N. A : No application	2	1
Post-stocking fertilization with inorganic fertilizers F. A : Recommended (30-40 kg/ ha/ month) N. A : No application	2	1
Periodic netting to check the growth and health of fishes F. A : Recommended (monthly netting) N. A : No netting	2	1