STUDY ON ENTREPRENEURSHIP QUALITIES OF FISH FARMERS IN ANAND DISTRICT OF GUJARAT STATE

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ANAND CAMPUS, ANAND - 388 110.

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Regn. No. : 04-04462-2000
DEDICATED
TO MY
BELOVED PARENTS

WITHOUT THEIR
LOVE AND SUPPORT
NOTHING COULD HAVE BEEN POSSIBLE
STUDY ON ENTREPRENEURSHIP QUALITIES
OF FISH FARMERS IN ANAND DISTRICT
OF GUJARAT STATE

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ABSTRACT

Fish farming plays an important role in the economy of India. It helps in generating employment, earning foreign exchange, raising nutritional level and augmenting food supply.

Fish is a major source of food for people throughout the world and the main source of protein for 1 billion people. For more than 150 million people, fish furnishes not only vital nutrition but also is a source of employment and income. Almost 95 percent of those who rely on fish for their livelihood live in developing countries. Aquaculture, the farming of fish, shellfish and seaweeds represents the fastest growing sector in world food production.

India has also vast water resource capable of producing both type of fish i.e. inland fish and marine fish. For maximizing the production
of fish, the adoption of scientific inland fish farming technology is very important. To bring success in fish farming, a person involved in fish farming should have basic qualities of entrepreneurs instead of having common characteristics like a simple person.

Looking to the above facts, "Study on entrepreneurship qualities of fish farmers in Anand district of Gujarat state" was undertaken with following objectives:

1. To study entrepreneurship qualities of fish farmers.
2. To study the level of adoption of fish farmers regarding improved practices of fish farming.
3. To ascertain the relationship between entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming.
4. To study the constraints faced by fish farmers in adoption of improved practices of fish farming.
5. To obtain suggestions of fish farmers for successful inland fish farming.

The present study was conducted in two talukas of Anand district namely Anand and Petlad. From each taluka, out of total available fish farmers 60 per cent were selected. Thus, a random sample of 82 fish farmers was selected.
farmers was selected. The data were collected with the help of personal interview.

For the measurement of independent and dependent variables, appropriate scales developed and adopted by other research workers were used with due modifications. The statistical tools used for the analysis of the data were percentage, mean, standard deviation and correlation coefficient. The important findings of the study are summarized as under:

1. Majority of the fish farmers had middle age (92.69 per cent), either secondary level or less than that level of education (84.14 per cent) and from 2.1 to 5 years of experience of fish farming (63.42 per cent).

2. Majority of the fish farmers had up to 1.0 ha. of pond size (63.42 per cent) and from 6.1 to 12 feet of minimum depth of water in ponds (80.48 per cent).

3. Majority (75.60 per cent) of the fish farmers had medium level of mass media exposure and small size of family (57.32 per cent).

4. Majority (69.52 per cent) of the fish farmers had medium socio-economic status.
5 Majority of the fish farmers had medium level of annual income (79.26 per cent) and medium level of achievement (68.29 per cent).

6 Majority of the fish farmers had medium level of economic motivation (86.59 per cent), risk orientation (75.60 per cent), scientific orientation (74.39 per cent) and innovation proneness (73.18 per cent).

7 Majority (59.76 per cent) of the fish farmers were neutral in their attitude towards F.F.D.A.

8 Majority (79.27 per cent) of the fish farmers had medium level of adoption of scientific inland fish farming.

9 Three entrepreneurship qualities of fish farmers namely socio-economic status, level of income and family size had positive and significant relationship with their level of adoption of improved fish farming technology.

10 Poaching of the fish from the pond (rank I), inadequacy of water (rank II), harassment from the other villagers (rank III), improper credit facility (rank IV), non-availability of desired variety of fish seed (rank V), untimely supply of fish seeds (rank VI), unenumerative price of fish (rank VII), costliness of fish seeds (rank VIII), lack of preservation and curing facility (rank IX), high cost and poor quality of inputs.
(rank X), difficulties in approaching the authority (rank XI) and disease in fish (rank XII) were the major constraints faced by fish farmers in adoption of improved fish farming technology.

Legal provision to restrict poaching of fish (rank I), timely supply of fish seeds (rank II), timely credit supply (rank III), provision of insurance (rank IV), supply adequate quantity of fish seeds (rank V), arrangement for providing water for the pond in summer (rank VI), panchayat should solve the problem of harassment from the other villagers (rank VII) and remunerative price for the fish (rank VIII) were the important suggestions given by the fish farmers for successful inland fish farming.
Dr. M.N. Popat  
Major Advisor  
Associate Extension Educationist  
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Anand Campus, Anand.

CERTIFICATE

This is to certify that the thesis entitled "STUDY ON ENTREPRENEURSHIP QUALITIES OF FISH FARMERS IN ANAND DISTRICT OF GUJARAT STATE" submitted in partial fulfillment of the requirement for the degree of MASTER OF SCIENCE in AGRICULTURE in the subject of EXTENSION EDUCATION of the Gujarat Agricultural University, Anand campus, Anand is a bonafide research work carried out by SHRI VAGHELA MANISHKUMAR SOMCHANDBHAI under my guidance and supervision and that no part of the thesis has submitted for any other degree. The assistance and help received during the course of investigation has been fully acknowledged.

Place: Anand  
Date: 3 January, 2003

(M.N. POPOPAT)  
MAJOR ADVISOR
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Date: January 1, 2003

(Vaghela Manishkumar Somchandbhai)
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INTRODUCTION
CHAPTER I
INTRODUCTION

We have been talking about green revolution for many years, but the famines of last three years have shown how deceptive those talking are! There is no surety of satisfying the hunger of crores of people of India, unless we cast our eyes on water resource, which is three-fourth part of the whole earth. Industrialization and civilization processes are so quick and large that the most of the fertile land is used for that purpose. The shortage of food is likely to be one of the greatest problems in the years to come, because the new ways of food production like fish farming, piggery, poultry etc. have so far been not adopted by the people as much as they would be.

India has vast water resource, which is capable of producing fish. This resource is of two types: Inland and Marine. Fish farming through inland water resource has achieved a great significance in India because of full flowing rivers, ponds, lacks, which bring the source of production very close to where it is needed. Due to the lack of gap between production and consumption center, the problem of preservation and transportation is less or negligible. Inland fish has high market value also particularly in the region having a preferential demand for such fish.
India’s coastline stretches more than eight thousand kilometers over its peninsula as well as the islands scattered in the Bay of Bengal and Arabian Sea. The inland fish potential is higher with a well spread location of rivers, canals and reservoirs. The country has an estimated fish production potential of about 8.5 million tonnes comprising 3.9 million tonnes in marine sector and 4.6 million tonnes in the inland sector. The total production was 5.4 million tonnes in 1997-98 comprising 3.0 million tonnes of marine fish and 2.4 million tonnes of inland fish. It is seen that the level of exploitation is as high as 77 per cent in marine sector while it is lower at about 52 per cent in the inland sector. Fish production has been showing a steady growth over the years and has reached the level of 5.4 million tonnes in 1997-98 from a figure of about 0.7 million tonnes in 1950-51. Besides being a source of cheap and nutritious food to a large section of poor population, fisheries sector has been a major contributor of foreign exchange earnings through export. During 1997-98 the earnings from export of fishery products amounted to about Rs. 47 billion, i.e. about US$ 1.12 billion. Earlier the foreign exchange earnings were largely from shrimp exports but gradually diversification of the products has been exported is gradually taking place. (Annon.2002)

One third of sea cost of India is under Gujarat state. Also, we have plenty of rivers full of water all the year, we also have lacks/ponds,
and so in such forms we have good quality of water in comparison to other states.

According to WHO (World Health Organization) at least 12-15 grams of animal protein per person is necessary for the proper formation of body structure. It can be made available from milk, meat, eggs, fish, etc. But the common people do not use all the mentioned sources of animal protein because they are costlier except fish. In this context, if we have to get the required amount of protein from fish production, we will need at least 10 lac acres more land. Now even common people have realized the importance of water resources for health and economics of the state. The major advantage of fish farming is that it needs less land resource, which is vital now a day. In order to achieve best results from fish farming, person involved in it should have basic qualities of entrepreneurs instead of having common qualities like a simple farmer.

An entrepreneur is an economic man who tries to maximize his profits by innovations. He is not only an innovator but also a person with a will to act on something new and who has ability to take risk and to bring about something new by organizing human efforts systematically. The activities done by such entrepreneurs are of great importance in developing country like India, where there are great opportunities for using innovations to exploit the available resources. Thus, in all the activities of
economic development, more focus is being centered on entrepreneurship of people.

Entrepreneur plays a key role in the economic development of the country and the development of the entrepreneurship is an ingredient of economic development. To be a successful fish entrepreneur one needs proper adoption of fish farming technology along with other capabilities in terms of personality traits. Instead of having common qualities like other simple farmers, a person involved in fish farming should possess basic qualities of entrepreneur in order to get best result from fishery. There are large numbers of people involved in fish farming in middle Gujarat. Also, FFDA (Fish Farmers’ Development Agency), Anand, has played a significant role by providing technical guidance and training to those persons, who want to do fish farming.

By considering all the above facts, the present investigation on “Study on entrepreneurship qualities of fish farmers in Anand district of Gujarat state” was decided to be undertaken.

1.1 STATEMENT OF THE PROBLEM

Fish farming is being done in India for many years or from ancient time; it has got economic, nutritional, industrial and recreational importance in the life of fish farmers, but scientific up keep is very low. Besides, entrepreneur qualities, economic factors and socio-cultural variables such as education, caste and religion also influence the acceptance
of fishery enterprise. Acceptance of new technology has not been easy on the part of people particularly in the rural areas. In the same proportion it has been difficult for the extension worker to accelerate the process of fish farming.

To meet this situation a fuller and deeper understanding of the people in relation to fish farming seems imperative. The investigator thus felt to examine existing status of fishery enterprise. With a view to analyzing these; study on entrepreneurship qualities of fish farmers was undertaken in Anand district of Gujarat state.

1.2  **OBJECTIVES OF THE STUDY**

The overall objective of the study was to examine entrepreneurship qualities of fish farmers in Anand district of Gujarat state.

The specific objectives of the study were as under:

1. To study entrepreneurship qualities of fish farmers.
2. To study level of adoption of fish farmers regarding improved practices of fish farming.
3. To ascertain the relationship between entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming.
4. To study the constraints faced by fish farmers in adoption of improved practices of fish farming.
To obtain suggestions of fish farmers for successful inland fish farming.

### 1.3 Scope of the Study

There are large numbers of projects for agricultural development but there is no surety of filling the number of empty stomachs of people of our country in the years to come. Using other areas of food production can solve this problem. Fish farming is one of those areas to ease out enormous pressure on agriculture.

The present study will be of great use to extension workers, planners, administrators and research workers, as it would throw some light on entrepreneurship qualities of fish farmers. The knowledge regarding entrepreneurship qualities of fish farmers, involved in fish farming influencing the success or failure of fish farming, will be the most useful to extension workers to restructure and reframe extension approach in right direction. The findings of the study will be certainly helpful to the administrators and field workers, while developing and implementing the new programmes for the benefit and modernization of fish farming to the expectations.

### 1.4 Derivation of Hypothesis

On the basis of objectives of the study, the following null hypothesis was formulated.
H1: There is no significant relationship between the selected entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming.

1.5 LIMITATIONS OF THE STUDY

1 The area of the study was limited to few villages of Anand district only.

2 The study was confined to only 82 respondents.

3 The study was limited to only important entrepreneurship qualities of fish farmers.

4 The study was based on the verbal expression and responses of the respondents.
CHAPTER II
REVIEW OF LITERATURE

The main purpose of review of literature is to put forth findings of the research study, which are related to the present investigation. The literature reviewed so far clearly indicated that very few research studies have been conducted on the key entrepreneurship qualities included in this investigation. A brief account of such literature related to the problem under study has been presented under the following heads.

2.1 Entrepreneurship qualities of fish farmers.

2.2 Level of adoption of fish farmers regarding improved practices of fish farming.

2.3 The relationship between entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming.

2.4 Constraints faced by fish farmers in adoption of improved practices of fish farming.

2.5 Suggestions of fish farmers for successful inland fish farming.

2.6 Theoretical orientation.
2.1 **ENTREPRENEURSHIP QUALITIES OF FISH FARMERS**

2.1.1 **Age**

*Pitchaiah et al.* (1987) found that 54 per cent of the fishermen were below 40 years of age.

*Solanki* (1990) reported that 60.53 per cent of the fish farmers belonged to young age group i.e. up to thirty years.

*Nath* (1993) pointed out that three-fourth (75.00 per cent) of the respondents were from middle age group.

*Patel* (1996) revealed that slightly more than three-fifth of the respondents (60 per cent) were from middle age group.

*Mankar et al.* (2000) found that majority (56.67 per cent) of the respondents belonged to middle age group.

2.1.2 **Education**

*Pitchaiah et al.* (1987) revealed that the majority of the fishermen (78 per cent) were illiterate.

*Solanki* (1990) reported that majority (86.85 per cent) of the fish farmers had below S.S.C. level of education.

*Nath* (1993) revealed that majority (43.34 per cent) of the fish farmers had education up to primary level.

*Patel* (1996) found that more than half of the respondents (57.50 per cent) were having secondary level of education.
Mankar et al. (2000) stated that majority (35.00 per cent) of the fish farmers were having education up to primary level.

### 2.1.3 Fish farming experience

Krishna (1988) concluded that the average experience of the fish farmers in the prawn farming was 12.58 years in northern region and average experience of the fish farmers in the prawn farming was 14.50 years in the southern region.

Solanki (1990) reported that 50 per cent of the fish farmers had experience of 3-5 years, while 42.11 per cent and 7.89 per cent of them had fish farming experience up to two years and above five years, respectively.

Nath (1993) stated that more than two-third of the fish farmers (68.33 per cent) were having experience of fish farming from 2.1 to 5 years followed by nearly one-third (31.67 per cent) of them were having experience more than five years.

Mankar et al. (2000) pointed out that majority (75.00 per cent) of the fish farmers were having experience of fish farming from 11 to 30 years.

### 2.1.4 Size of pond

Krishna (1988) found that the average size of pond holding possessed by fish farmers was 4.47 acres in the northern region, while average
size of pond holding possessed by fish farmers was 3.28 acres in the southern region.

Solanki (1990) reported that 55.26 per cent of the respondents leased in ponds measuring 1.1 to 3.0 hectares, while 26.32 per cent and 18.42 per cent leased in ponds measuring up to 1.0 hectares respectively.

Nath (1993) pointed out that nearly half of the fish farmers (45.00 per cent) had pond area up to 1 hectare, while nearly one-fifth (21.66 per cent) of them had 1.1 to 2.0 hectares of pond area and only 16.67 per cent of them had 2.1 to 3.0 hectares, of pond size.

2.1.5 Minimum depth of water in pond

Haque and Ray (1983) concluded that the requisite minimum depth of water level in the pond was found to be a crucial factor in adoption of recommended species of fish in composite fish culture.

Solanki (1990) reported that minimum depth of water in the ponds of the 50 per cent of the respondents was ranging from 7 to 12 feet; whereas 36.84 per cent and 13.16 per cent of them had up to 6 feet and above 12 feet depth of water in the ponds in summer respectively.

Nath (1993) stated that majority (58.33 per cent) of the respondents were having up to 7 feet (2.1 mt.) of minimum depth of water in their ponds.
2.1.6 Mass media exposure

Vyas (1995) found that majority (88 per cent) of the milk producers possessed medium to high level of exposure of mass media.

Patel (1997) stated that majority (55 per cent) of the respondents had favourable mass media exposure, whereas (45 per cent) of them had unfavourable mass media exposure.

2.1.7 Family size

Pitchaiah et al. (1987) found that the average size of fishermen's family was five.

Solanki (1990) reported that average numbers of majority of fish farmers (60.53 per cent) was 6 to 10.

Nath (1993) found that nearly three-fifth (58.33 per cent) of the fish farmers were having family size up to five members.

Mankar et al. (2000) stated that majority (70.00 per cent) of the fish farmers were having family members in the range of 5 to 11.

2.1.8 Socio-economic status

Sen and Das (1986) reported that nearly half (46.25 per cent) of the respondents had medium and 30.00 per cent of them had low level of socio-economic status.
Solanki (1990) found that 36.84 per cent and 31.58 per cent of the fish farmers belonged to upper-lower and middle level of socio-economic status, respectively.

Nath (1993) revealed that majority (65.00 per cent) of the respondents were from medium socio economic status group whereas, only 16.67 per cent and 18.33 per cent of them had low and high economic status respectively.

Mankar et al. (2000) pointed out that majority (43.33 per cent) of the fish farmers had medium level of socio-economic status.

**2.1.9 Annual Income**

Pitchaiah et al. (1987) stated that the average monthly income of the fishermen was Rs. 314.60.

Solanki (1990) reported that majority of the fish farmers (57.89 per cent) had monthly income below Rs. 500/-. 

Nath (1993) revealed that nearly half of the respondents (46.67 per cent) were having gross annual income from fish farming up to Rs. 25,000/- only.

Mankar et al. (2000) stated that majority (70.00 per cent) of the fish farmers were having annual income from Rs. 42,741 to 1,10,590/- only.
2.1.10 Level of achievement

Chauhan (1994) found that majority of the respondents (72.86 per cent) had low level of achievement, while more than one-fourth of them (27.14 per cent) had high level of achievement.

2.1.11 Economic motivation

Solanki (1990) revealed that 73.58 per cent of the respondents had medium level of economic motivation, whereas 15.79 per cent and 10.53 per cent had low and high level of economic motivation, respectively.

Nath (1993) pointed out that more than two-third of the fish farmers (71.67 per cent) had medium level of economic motivation, whereas, 10.00 per cent and 18.33 per cent of them had low and high level of economic motivation, respectively.

Patel (1996) found that majority of the respondents (70 per cent) had medium level of economic motivation, followed by 16.25 and 13.75 percent of them had low and high level of economic motivation, respectively.

2.1.12 Risk orientation

Solanki (1990) revealed that 76.31 per cent of the respondents had medium level of risk orientation, whereas 13.16 per cent and 10.53 per cent of them had high and low level of risk orientation, respectively.

Nath (1993) reported that majority (70.00 per cent) of the fish farmers were having medium level of risk orientation, whereas only 11.67 per
cent and 18.33 per cent of them were having low and high level of risk orientation, respectively.

Vyas (1995) found that majority (83.33 per cent) of the milk producers had medium to high level of risk orientation.

Wagle (1996) reported that majority (76.93 per cent) of the respondents with favourable farm televiewing behaviour had high level of risk orientation; whereas 89.09 per cent of the respondents with unfavourable farm televiewing behaviour had low level of risk orientation.

Mankar et al. (2000) stated that majority (80.00 per cent) of the fish farmers were having medium level of risk orientation.

2.1.13 Scientific orientation

Nath (1993) stated that more than two-third (71.67 per cent) of the respondents had medium level of scientific orientation.

Nanda (1995) reported that slightly more than half (51 per cent) of the respondents had medium level of scientific orientation.

Patel (1996) found that more than three-fifth of the respondents (62.50 per cent) had medium level of scientific orientation.

2.1.14 Innovation proneness

Prajapati (1993) reported that majority (72 per cent) of the respondents had high level of innovativeness.
Wagle (1996) found that majority (83.08 per cent) of the respondents had high level of innovativeness.

Patel (1997) revealed that majority (69.70 per cent) of the respondents with favourable mass media exposure had high level of innovation proneness.

2.1.15 **Attitude of fish farmers towards F.F.D.A.**

Solanki (1990) reported that 34.21 per cent of the respondents had neutral attitude towards F.F.D.A. (Fish Farmers’ Development Agency) followed by 23.68 per cent and 13.16 per cent of them with ‘favourable’ and ‘highly favourable’ attitude, respectively, where as 10.53 per cent and 18.42 per cent of them had ‘unfavourable’ and ‘highly unfavourable’ attitude towards F.F.D.A., respectively.

Nath (1993) pointed out that more than two-third of the respondents (68.33 per cent) were neutral, only 16.67 per cent had favourable attitude and 15.00 per cent had unfavourable attitude towards F.F.D.A., Vadodara.

2.2 **Level of adoption of fish farmers regarding improved practices of fish farming**

Sen and Das (1986) concluded that slightly more than half (51.25%) of the fish farmers had medium level of adoption of improved fish
farming technology followed by 27.50 per cent with high-level of adoption of improved fish farming technology.

Solanki (1990) reported that 81.58 per cent of the respondents had medium level of adoption of scientific inland fish farming technology, followed by 10.53 per cent with high level and 7.89 per cent with low level of adoption of scientific inland fish farming.

Nath (1993) stated that majority (78.33 per cent) of the fish farmers had medium level of adoption of scientific inland fish farming.

Patel (1996) reported that slightly more than three-fifth of the respondents (61.25 per cent) had medium level of adoption.

2.3 THE RELATIONSHIP BETWEEN ENTREPRENEURSHIP QUALITIES OF FISH FARMERS AND THEIR LEVEL OF ADOPTION OF IMPROVED PRACTICES OF FISH FARMING

2.3.1 Age and level of adoption

Solanki (1990) reported that age had non-significant relationship with level of adoption of fish farmers.

Patel (1996) revealed that age of the respondents was negatively correlated with their level of adoption.

Mathiyalagan (1997) found that age had negative and non significant relation with level of adoption of poultry farm practices.
2.3.2 **Education and level of adoption**

Solanki (1990) reported that education had not significant relationship with level of adoption of fish farmers.

Patel (1996) revealed that education was observed significantly correlated with level of adoption of respondents.

Mathiyalagan (1997) reported that education of poultry farmers had negative and significant relationship with their level of adoption of poultry farm practices.

2.3.3 **Fish farming experience and level of adoption**

Solanki (1990) reported that experience of fish farming had positive and non-significant relationship with level of adoption of fish farmers.

2.3.4 **Size of pond and level of adoption**

Solanki (1990) reported that size of pond had non-significant relationship with level of adoption of fish farmers.

Mathiyalagan (1997) reported that size of poultry farm had showed non-significant relationship with level of adoption of poultry farm practices by the poultry farmers.
2.3.5 Minimum depth of water in pond and level of adoption

Solanki (1990) revealed that minimum depth of water in pond of the fish farmers had positive but non-significant association with their level of adoption.

2.3.6 Mass media exposure and level of adoption

Chauhan (1994) reported that mass media exposure had significant relationship with adoption of the respondents.

Mathiyalagan (1997) reported that mass media exposure of poultry farmers had positive and significant relationship with their level of adoption of poultry farm practices.

2.3.7 Family size and level of adoption

Solanki (1990) reported that family size of the fish farmers had negative but non-significant relationship with their level of adoption.

2.3.8 Annual income and level of adoption

Solanki (1990) reported that level of income of fish farmers had negative and non-significant relationship with their level of adoption.

2.3.9 Level of achievement and level of adoption

Patel and Sangle (1993) reported that level of achievement of the respondents had showed positive and significant relationship with their level of adoption of selected agricultural practices.
Deshmukh et al. (1994) found that level of achievement had showed positive and significant relationship with level of adoption of the respondents.

2.3.10 Economic motivation and level of adoption

Solanki (1990) reported that economic motivation of the fish farmers had non-significant relationship with their extent of adoption.

Patel (1996) revealed that economic motivation had showed positive and significant relationship with level of adoption of the respondents.

2.3.11 Risk orientation and level of adoption

Solanki (1990) reported that risk orientation of fish farmers had non-significant relationship with their level of adoption of the fish farming.

Patel (1996) revealed that risk preference of the respondents had showed non-significant relationship with their level of adoption of recommended sugarcane production technology.

2.3.12 Scientific orientation and level of adoption

Solanki (1990) reported that scientific orientation of the respondents had non-significant relationship with their extent of adoption of fish farming.

Patel (1996) reported that there was non-significant relationship between scientific orientation of the farmers and their level of adoption of recommended sugarcane production technology.
2.3.13 Innovation proneness and level of adoption

Patel and Sangle (1993) reported that innovation proneness of the respondents had showed positive and significant relationship with their level of adoption of selected agricultural practices of tribal farming system.

2.4 CONSTRAINTS FACED BY FISH FARMERS IN ADOPTION OF IMPROVED PRACTICES OF FISH FARMING

Krishna (1988) reported that the lack of knowledge of technology, non-availability of seeds, in ability to draw periodical income from enterprise, lack of knowledge about availability of credit and difficulties in approaching the authority were the major constraints associated with the inland fish farming.

Vasanthakumar and Selvaraj (1989) concluded that the major constraints associated with the inland fish farming were the inadequacy of water, ultimately supply of seeds, inadequacy of seeds, costliness of seeds, poaching of fish, unremunerative price and lack of the transport facilities.

Solanki (1990) reported that the major constraints associated with the inland fish farming were the poaching of the fish from the pond, non-availability of quality seeds of desired varieties of fish, improper credit facility, untimely supply of seeds and unremunerative price of fish.

Nath (1993) pointed out that the inadequacy of water was the most important problem faced by the fish farmers followed by poaching of
fish, untimely supply of fish seeds, non availability of desired variety of fish seeds, inadequacy of fish seeds, high cost of feed and fertilizer, lack of knowledge about new technology and inadequacy of credit.

2.5 SUGGESTIONS OF FISH FARMERS FOR SUCCESSFUL INLAND FISH FARMING

Haque and Ray (1983) found that the important suggestions reported by the fish farmers for successful fish farming were provision should be made to supply of seeds of exotic carps, more technology of composite fish culture, pure seeds of indigenous carps and credit facility for fish culture.

Solanki (1990) reported that important suggestions reported by the fish farmers were efforts should be made to supply desired varieties and quality of fish seeds, timely fish seeds, legal provision to restrict poaching of fish, timely credit supply and proper method should be developed for counting the seeds.

Nath (1993) stated that majority (70.00 per cent) of the fish farmers had suggested to provide canal irrigation facility, while 60.00 per cent of them had suggested to take lower water charge. Other suggestions reported by fish farmers were timely supply of fish seeds, supply of desired fish variety, and provide adequate quantity of fish seeds.
2.6 THEORETICAL ORIENTATION

The review of literature given in the preceding section helped in formulating the theoretical orientation of the study, which consisted of

2.6.1 Conceptual framework of the study.

2.6.2 The paradigm.

2.6.3 Operationalization of concepts.

2.6.1 Conceptual framework of the study

The literature reviewed so far revealed that some of the entrepreneurship qualities are required in any individual as important pre-requisites to become successful fish farmer. These important entrepreneurship qualities affect the individual’s level of adoption.

2.6.2 The paradigm

The conceptual framework given in the preceding section may be presented paradigmatically which had been developed during the course of the study. The model shown in the fig.1 is a tentative and generalized one. The final form of such a model has been suggested at the end of this dissertation in the chapter of “Conclusion”.
2.6.3 Operationalization of concepts

1. **Entrepreneur**: An entrepreneur can be defined as a person who creates something new, undertakes risks, organizes production, and handles the economic uncertainty.

2. **Fish farming**: Rearing of fish for food, fish oil, recreation purpose, etc.

3. **Adoption**: It is the process to continue full use of an innovation.

4. **Constraints**: They refer to the difficulties faced by fish farmers in scientific fish farming.

5. **Mass media exposure**: It is defined as the nature and frequency of respondents involved in different mass media such as television, radio, newspapers, etc.

6. **Economic motivation**: It is defined as the occupational success in terms of profit maximization and relative value, an individual places on economic ends.

7. **Risk orientation**: It is the degree to which fish farmer is oriented towards encountering risks and uncertainty in adopting any new idea or innovation.
8. **Scientific orientation**: It is the degree to which a fish farmer is oriented to the use of scientific methods in decision making in relation to their adoption behaviour.

9. **Level of achievement**: It is defined as the respondents’ realistic estimate of the economic progress; he has made in his life over last ten years.

10. **Innovation proneness**: It is the degree of an individual’s interest and desire to seek changes in forming his own operations as and when found practicable and feasible.
METHODODOLOGY
Fig. 1: Conceptual model of the study

**KEY:**
- $X_1$: Age
- $X_2$: Education
- $X_3$: Experience in fish farming
- $X_4$: Pond size
- $X_5$: Minimum depth of water in pond
- $X_6$: Mass media exposure
- $X_7$: Family size
- $X_8$: Socio-economic status
- $X_9$: Income level
- $X_{10}$: Level of achievement
- $X_{11}$: Economic motivation
- $X_{12}$: Risk orientation
- $X_{13}$: Scientific orientation
- $X_{14}$: Innovation proneness
- $X_{15}$: Attitude of the fish farmers towards F.F.D.A.
CHAPTER III
METODOLOGY

This chapter deals with the description of procedure followed for carrying out this investigation. It contains the research design, the tools and the techniques of data collection. The selection of sample, sampling technique for investigation as well as devices used for analysis of data are also explained in this chapter and are discussed under following heads.

3.1 PLAN OF THE STUDY

Fish farming plays an important role in Indian economy. The importance of fish farming in the agricultural country like India has been well recognized from viewpoint of economic development.

The scientific management and high quality fish seeds have great potential for increasing the fish production. Besides technical knowledge and guidance of fish farming, certain entrepreneurship qualities in fish farmers like high level of education to understand the modern
Methodology

technology, good mass media exposure to get latest information, economic motivation to get high profit, risk orientation to bear risk in fish farming, scientific orientation for scientific consideration, high level of achievement to achieve high status are essential for better adoption.

With a view to analyze these, present investigation on “Study on entrepreneurship qualities pf fish farmers in Anand district of Gujarat state” was undertaken.

3.2 AREA OF THE STUDY

The present investigation was carried out in Anand district of Gujarat state, which is located in the middle Gujarat. It covers some part of Charotar area and some part of Bhal area. The southern boundary touches bay of Khambhat, while northern boundary touches Kheda district. The western boundary touches Kheda and Ahmedabad districts whereas eastern boundary touches Kheda and Vadodara districts. The investigator studied in this taluka and is aware of language and local people. Moreover very little work has been carried out related to fish farming in this area. Therefore Anand district is purposively selected for the study.

3.3 SAMPLING TECHNIQUE

In present investigation simple random sampling technique was employed.
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### 3.3.1 Selection of the talukas

There are total 8 talukas in Anand district viz., Anand, Umreth, Petlad, Sojitra, Borsad, Anklao, Khambhat, and Tarapur. For the present study Anand and Petlad taluka were selected purposively because:

1. Fish farming is one of the most important activities of rural people in these talukas of the district.
2. Majority of fish farmers of Anand district are situated in these talukas.
3. Significant numbers of fish farming activities by F.F.D.A. are being carried out in these talukas of district.
4. Very few scientific and systematic efforts have been made to know key and important entrepreneurship qualities of fish farmers of these talukas.
5. Investigator will be able to cover this area within the time limit.

### 3.3.2 Selection of fish farmer

The list of fish farmers situated in the selected talukas was taken from F.F.D.A. There were 84 and 54 fish farmers in Anand and Petlad taluka respectively. 60 per cent of the respondents were selected from each taluka randomly. Thus a random sample of total 82 fish farmers was selected. The village wise selected fish farmers are given in Table 1.
# Table 1: Village wise distribution of fish farmers

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Anand Taluka</th>
<th>Name of village</th>
<th>Selected number of fish farmer</th>
<th>Petlad Taluka</th>
<th>Name of village</th>
<th>Selected number of fish farmer</th>
</tr>
</thead>
<tbody>
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<td>Shahpur</td>
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<td>Silvai</td>
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</tr>
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<td>6</td>
<td>Vadadla</td>
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<td></td>
<td>Total</td>
<td>32</td>
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</table>
3.4 **RESEARCH DESIGN**

The present study was confined to ex-post-facto research design as the independent variables have already operated in the study area. Kerlinger (1976) stated that ex-post-facto research design is worthy to apply when the independent variables have already acted upon.

3.5 **TOOLS FOR THE STUDY**

The main instrument used for the study was an interview schedule. The information was collected from the respondents through personal interview so as to get valid and complete response. Keeping in mind the objectives of the study the interview schedule was developed. While making interview schedule investigator secured guidance from the available literature, major advisor and teaching staff of Extension Education Institute, Anand and F.F.D.A. Help of professors of department of Extension Education and post graduate students majoring in Extension Education at B.A. College of agriculture, Anand was also taken. The interview schedule was developed with five major parts as explained here.

First part of the interview schedule was devoted to study some of the entrepreneurship qualities of fish farmers, second part of the interview schedule was to know attitude of the fish farmers towards F.F.D.A., third part was to measure the level of adoption of selected improved fish farming practices of the fish farmers, fourth part was to study
the various constraints as perceived by the fish farmers and fifth part of the interview schedule was containing the suggestions to overcome the constraints in carrying out successful fish farming of the fish farmers.

3.6 PRE-TESTING OF THE SCHEDULE

In order to test the administrability of each question and statement and to remove ambiguity in measuring instrument, pre-testing was carried out with five non-sample fish farmers. The respondents were randomly selected from the list given by F.F.D.A. The respondents were informed about the importance and purpose of the study. After gaining their confidence and developing rapport with them, interview schedule was put forth on them.

On the basis of answer given by these respondents and hurdles faced during interviewing, necessary changes were made after consultation with the major advisor.

The final approved interview schedule has been given in Appendix.

3.7 COLLECTION OF THE DATA

The data were collected by personal interview method from all the 82 fish farmers and the responses were recorded in the schedule. Before asking question, the investigator had established rapport with the fish farmers and explained them the purpose of the interview and assured
them to keep their opinions confidential and finally closed the interview with a vote of thanks to the fish farmers. Thus, all possible efforts had been made to create a congenial atmosphere free from discomfort and distraction.

3.8 **SELECTION OF THE VARIABLES**

The variables under study were selected on the basis of extensive review of literature related to the topic of research and consultation with experts. Only those variables that were found most relevant to the present investigation were finally selected for the study.

3.8.1 **Dependent variable**

1. Adoption

3.8.2 **Independent variables**

1. Age
2. Education
3. Fish farming experience
4. Size of pond
5. Minimum depth of water in pond
6. Mass media exposure
7. Family size
8. Socio-economic status
9. Annual income
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10 Level of achievement
11 Economic motivation
12 Risk orientation
13 Scientific orientation
14 Innovation proneness
15 Attitude of the fish farmers towards F.F.D.A.

3.9 MEASUREMENT OF THE VARIABLES

3.9.1 Measurement of dependent variable i.e. Adoption

The information regarding the extent of adoption of each of the selected practices and potentiality of its adoption was collected. The adoption quotient developed by Chattopadhyay (1974) was used with slight modifications. The adoption quotient of each respondent for each of the selected practice was worked out with the help of following formula:

\[
A.Q. = \left( \frac{e_1 W_1 + e_2 W_2 + \ldots + e_n W_n}{P_1 + P_2 + \ldots + P_n} \right) \times 100
\]

Where A.Q. = Adoption quotient

\[\sum\] = Summation

\[e_1, e_2, \ldots, e_n\] = Extent of adoption in terms of score obtained by the respondent for the particular practice.

\[P_1, P_2, \ldots, P_n\] = Potential capacity of the respondents in terms of score obtained for the particular practice.

\[W_1, W_2, \ldots, W_n\] = Weightage of the particular practice.

\[W = W_1 + W_2 + \ldots + W_n\]
Total score obtained by each individual was worked out and totaled up. The respondents were grouped in to three categories viz., low (Below Mean-S.D), medium (Mean+/ S.D), and high (Above mean + S.D.).

The weightage of the particular practice was determined by seeking the opinion of 25 experts. The weightage of the particular practice was collected in percentage and with the help of arithmetic mean the weightage for the practices was derived as under:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the practice</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eradication of unwanted weeds</td>
<td>10.00</td>
</tr>
<tr>
<td>2</td>
<td>Eradication of unwanted fish</td>
<td>09.50</td>
</tr>
<tr>
<td>3</td>
<td>Stocking density of fish seeds</td>
<td>20.00</td>
</tr>
<tr>
<td>4</td>
<td>Use of manure</td>
<td>08.67</td>
</tr>
<tr>
<td>5</td>
<td>Use of chemical fertilizer</td>
<td>07.50</td>
</tr>
<tr>
<td>6</td>
<td>Use of supplement feed</td>
<td>12.17</td>
</tr>
<tr>
<td>7</td>
<td>Use of lime</td>
<td>07.34</td>
</tr>
<tr>
<td>8</td>
<td>Periodic examination of stocked fish</td>
<td>07.16</td>
</tr>
<tr>
<td>9</td>
<td>First harvesting</td>
<td>10.16</td>
</tr>
<tr>
<td>10</td>
<td>Use of iron net on input and output of pond</td>
<td>07.50</td>
</tr>
</tbody>
</table>
3.9.2 Measurement of independent variables i.e. entrepreneurship qualities of fish farmers

3.9.2.1 Age

Age refers to the total number of years attained by the respondent at the time of interview. The respondents were asked to indicate their age in term of completed years. The data regarding age of the respondents were collected and divided into three groups i.e.

a. Young age group (Up to 30 years)

b. Middle age group (31 to 55 years)

c. Old age group (Above 55 years)

3.9.2.2 Education

Information regarding formal education was collected according to their level of formal education and the respondents were categorized into six categories. The following scoring technique was followed to quantify the educational status of the respondents.

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Illiterate</td>
<td>0</td>
</tr>
<tr>
<td>b. Can read and write</td>
<td>1</td>
</tr>
<tr>
<td>c. Primary education (Up to 7 std.)</td>
<td>2</td>
</tr>
<tr>
<td>d. Secondary education (8 to 10 std.)</td>
<td>3</td>
</tr>
<tr>
<td>e. Higher secondary education (11 to 12 std.)</td>
<td>4</td>
</tr>
<tr>
<td>f. College (Above 12 std.)</td>
<td>5</td>
</tr>
</tbody>
</table>
3.9.2.3  *Fish farming experience*

The respondents were asked to reply the number of years of fish farming completed successfully by them in the inland fish farming. The years as such, were considered as the fish farming experience score for each respondent.

3.9.2.4  *Size of pond*

It was measured by asking the fish farmers to indicate the water area of pond that was leased in by them at the time of interview in terms of hectares. The areas in hectares as such were considered as the pond size score for each respondent.

3.9.2.5  *Minimum depth of water in pond*

It was measured by asking the fish farmers to record their minimum depth of water in pond in the peak summer in terms of feet. The depth of water in feet as such, was considered as the minimum depth of water in pond score for each respondent.

3.9.2.6  *Mass media exposure*

This refers to the frequency of reading newspaper, farm magazine and other literature relating to fish farming as well as use of radio and television by the fish farmers. This variable was quantified by using following procedure.

Score of five for always exposure, four for once in a week, three for once in a fortnight, two for once in a month, one for once in a year and zero for non exposure were separately assigned for newspaper, farm
magazine, agriculture literature, radio, television, exhibition and 
seminar/symposium. To know the final score of mass media exposure, 
score obtained by an individual for each media was summed up. There after 
fish farmers were grouped in to three categories viz., low (below mean- 
S.D.), medium (mean+/- S.D.) and high (above mean+S.D.).

3.9.2.7 **Size of family**

As regards to size of family, it was measured on the basis of 
the total number of members in respondent’s family. The information 
collected was categorized into two groups as under.

a. Small size (Up to 5 members) 
b. Large size (Above 5 members)

3.9.2.8 **Socio-economic status**

Socio-economic status is the category of the fish farmer 
classified according to some of the personal, social and economical 
independent variable that he possesses. The socio-economic scale 
developed by Bawajir and Nandapurkar (1985) was used for measuring the 
socio-economic status of the fish farmers with appropriate modification. 
The scale was used as such except changing the categories of income. The 
scoring procedure adopted was as such in the original scale (Appendix-I). 
The socio-economic status of the respondents was later classified in to three 
categories viz., low (below mean- S.D.), medium (mean± S.D.) and high 
(above mean + S.D.).
3.9.2.9  **Annual income**

The respondents were asked to indicate their annual income getting from all sources. The annual income in rupees as such, was considered as the annual income score for each respondent.

3.9.2.10  **Level of achievement**

Achievement is defined as respondent’s realistic estimate of the economic progress he has made in life over the last ten years.

Level of achievement was measured with the help of asking two questions to the respondents. First question was “On what step of the ladder of life do you stand today?” and second question was “On what step of ladder of life were you ten years ago?”. The reply of each question was collected in the form of number of steps from one to ten. One score to each step was assigned. In order to obtain total score of level of achievement, the score obtained on the answer of question first was subtracted from the score obtained on answer of question second. Maximum score an individual could obtain was ten and minimum was zero. The respondents were classified in to three categories viz., low (below mean- S.D.), medium (mean± S.D.) and high (above mean + S.D.).

3.9.2.11  **Economic motivation**

It refers to a drive that is based on consideration of wealth getting by adopting scientific inland fish farming technology as means of achieving status or survival by the fish farmers.
Methodology

Economic motivation was measured with the help of slightly modified scale developed by Supe (1969). The scale consisted of six statements, out of which first five were positive and sixth was negative. The responses of the fish farmers were obtained against each statement in terms of their agreement or disagreement with the statement on a five point continuum ranging from strongly agree to strongly disagree.

The positive and negative statements were scored as follows:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Negative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The economic motivation of an individual fish farmer was worked out by the total of the scores of all the statements included in the scale. The respondents have been categorized in to three categories viz., low (below mean \( \pm \) S.D.), medium (mean \( \pm \) S.D) and high (above mean \( \pm \) S.D.).

3.9.2.12 *Risk orientation*

It refers to the degree to which an individual fish farmer is oriented towards the risk and uncertainty in the fish farming on his leased in pond.
Fish farmers' willingness to take risk was measured with the help of slightly modified risk orientation scale developed by Supe (1969). The scale consisted of six statements. The first and the fifth statements were negative whereas, remaining was positive.

The responses of the fish farmers were obtained against each item in terms of their agreement or disagreement on a five point scale ranging from strongly agree to strongly disagree. The positive and negative statements were scored as under:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Negative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The risk orientation of an individual fish farmer was worked out by the total of the scores of all the statements included in the scale. The respondents have been categorized in to three categories viz., low (below mean- S.D.), medium (mean± S.D) and high (above mean + S.D.)

3.9.2.13 **Scientific orientation**

It refers to the orientation of an individual fish farmer towards the scientific approach and method of inland fish farming.
Fish farmers’ scientific orientation was measured with the help of slightly modified scale developed by Supe (1969). The scale consisted of six statements, out of which only second statement was negative while rest were positive. The positive and negative statements were scored as under:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Negative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The scientific orientation score of an individual fish farmer was the total of the scores of all the statements included in the scale. The respondents were categorized in to three categories viz., low (below mean- S.D.), medium (mean± S.D.) and high (above mean + S.D.).

3.9.2.14 **Innovation proneness**

To measure the innovation proneness of the fish farmers, the scale developed by Feaster (1968) was used with three-response categories viz., ‘yes’, ‘undecided’ and ‘no’. For first four statements, score of ‘2’ was assigned to ‘yes’, ‘1’ for ‘undecided’ and ‘0’ for ‘no’. The scoring procedure was reversed in the last four statements. Summation of score gives total innovation proneness score, which could be between 0-16. The fish farmers were later classified in to three categories viz., low (below mean- S.D.), medium (mean± S.D.) and high (above mean + S.D.).
3.9.3 Constraints faced by fish farmers in adoption of improved practices of fish farming

To know the constraints in adoption of modern fish farming, a simple ranking technique was applied. Each fish farmer was asked to indicate his problems in adopting modern inland fish farming. Multiple choices were given to them. Rank order was given on the basis of higher percentage.

3.9.4 Suggestions of fish farmers for successful inland fish farming

To record the important suggestions made by the fish farmers they were individually asked to give some valuable suggestions for successful inland fish farming. To measure the suggestions a simple ranking technique was applied. Suggestions given by fish farmers were marked in the interview schedule and frequency and percentage were calculated. Rank order was given on the basis of higher percentage.

3.10 Statistical framework for the analysis of data

All the responses in the interview schedule were transferred to the master table to describe entrepreneurship qualities of the fish farmers. For various items frequencies were marked and percentages were calculated.
3.9.2.15 **Attitude of fish farmers towards F.F.D.A.**

Attitude refers to the degree of positive or negative feeling of a fish farmer towards the Fish Farmers’ Development Agency (F.F.D.A.).

The fish farmers’ attitude towards F.F.D.A. was measured with the help of teacher made attitude scale specially constructed for this study. (Appendix-II).

The scale consisted ten statements of which second, third, fifth, eighth, and ninth statements were negative while the rest were positive. The responses of the fish farmers were obtained against each item in terms of their agreement or disagreement on a five point scale ranging from strongly agree to strongly disagree. The positive and negative statements were scored as under:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Negative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The attitude score for an individual fish farmer was the sum total of the scores obtained for each statement included in the scale. The fish farmers were later classified according to their attitude in to three categories viz., favourable (below mean- S.D.), neutral (mean± S.D.) and unfavourable (above mean + S.D.).
Methodology

The following statistical tools were used for interpreting data.

1  
**Frequency and percentage**

The simple comparison was made on the basis of frequency and percentage.

2  
**Mean score**

It was obtained by total number of score divided by total number of fish farmer.

\[
X = \frac{\sum X_i}{N}
\]

Where,

\[
X = \text{Mean} \\
N = \text{Total number of fish farmers}
\]

3  
**Standard deviation**

It was obtained by the square root of the average of the square deviation from mean by the following formula.

\[
\text{S.D.} = \sqrt{\frac{\sum (X_i - \bar{X})^2}{n-1}}
\]

Where,

\[
\text{S.D.} = \text{Standard deviation.} \\
X_i = \text{Individual score.} \\
\bar{X} = \text{Mean of the sample.} \\
n = \text{Total number of respondents.}
\]
3. **Correlation co-efficient (r)**

The Pearson’s product moment method suggested by Chandel (1964) for computing correlation co-efficient will be used to study the relationship between independent variables and dependent variable by using following formula:

\[
r = \frac{n \sum XY - \sum X \cdot \sum Y}{\sqrt{[n \sum X^2 - (\sum X)^2] \cdot [n \sum Y^2 - (\sum Y)^2]}}
\]

Where,

- \( r \) = Correlation coefficient
- \( X \) = Independent variable
- \( Y \) = Dependent variable
- \( \sum XY \) = Sum of product of the deviation of \( X \) and \( Y \) from their mean
- \( \sum X^2 \) = Sum of the square of deviation of \( X \) from their mean
- \( \sum Y^2 \) = Sum of the square of deviation of \( Y \) from their mean
- \( n \) = Number of observations
FINDINGS AND DISCUSSION
CHAPTER IV
FINDINGS AND DISCUSSION

The information related to this study was collected from the respondents by personal interview with the help of interview schedule. The data, thus collected were classified, tabulated, analyzed and presented in light of the objectives of the study. The appropriate statistical procedures were applied wherever necessary. The facts and findings derived after analyzing the information have been presented in this chapter under the following major heads.

4.1 Entrepreneurship qualities of fish farmers.
4.2 Level of adoption of fish farmers regarding improved practices of fish farming.
4.3 The relationship between entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming.
4.4 Constraints faced by fish farmers in adoption of improved practices of fish farming.
4.5 Suggestions of fish farmers for successful inland fish farming.

4.1 ENTREPRENEURSHIP QUALITIES OF FISH FARMERS

The level of adoption of fish farming is viewed as a complex process, which is influenced by their different entrepreneurship qualities. It
was beyond the scope of present study to include majority of entrepreneurship qualities of fish farmer. However, on the basis of review of literature and observations during study, some important qualities were identified and the findings have been presented as under.

4.1.1 Age

On the basis of their age, the respondents were classified into three groups viz., (i) Young age (Up to 30 years), (ii) Middle age (From 31 to 55 years), and (iii) Old age (Above 55 years). The data with respect to age are presented in table 2.

Table 2 Distribution of respondents according to their age.

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Fish farmers</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young age group</td>
<td></td>
<td>05</td>
<td>06.09</td>
</tr>
<tr>
<td>Middle age group</td>
<td></td>
<td>76</td>
<td>92.69</td>
</tr>
<tr>
<td>Old age group</td>
<td></td>
<td>01</td>
<td>01.22</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>82</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The data presented in table 2 reveal that majority of the fish farmers (92.69 per cent) were belonged to middle age group followed by 6.09 per cent with young age and 1.22 per cent with old age.
Findings and discussion

From the table it can be summarized that majority of the fish farmers were from middle age group.

The possible reason for less involvement in fish farming by old age group might be due to the fact that fish farming requires hard work that old age persons are unable to do. The reason for less involvement of young age group might be due to the fact that fish farming in Gujarat state is not liked by all the classes in the society and also the youngsters are unable to go against the decision of the senior members of the family. In this regard, the middle-aged persons are advantageously placed to take their own decision to go for this business.

This finding is in the line with the findings reported by Nath (1993), Patel (1996), and Mankar et al. (2000).

4.1.2 Education

Education is a process of producing desired changes in the behaviour of the people. High level of education is considered as one of the most important entrepreneurship qualities to understand modern technology of fish farming in fish farmers. Looking to this fact information was collected on educational level of fish farmers.

The information of formal education received by respondents was collected and classified as (i) Illiterate, (ii) Can read and write, (iii) Primary (Up to 7 standard), (iv) Secondary (8 to 10 standard), (v) Higher
secondary (11 to 12 standard) and (vi) College. The data in this regards are presented in table 3.

Table 3  Distribution of respondents according to their level of education.

<table>
<thead>
<tr>
<th>Education level</th>
<th>Fish farmers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Illiterate</td>
<td>21</td>
<td>25.61</td>
</tr>
<tr>
<td>Can read and write</td>
<td>00</td>
<td>00.00</td>
</tr>
<tr>
<td>Primary (Up to 7 standard)</td>
<td>23</td>
<td>28.04</td>
</tr>
<tr>
<td>Secondary (8 to 10 standard)</td>
<td>25</td>
<td>30.49</td>
</tr>
<tr>
<td>Higher secondary (11 to 12)</td>
<td>10</td>
<td>12.19</td>
</tr>
<tr>
<td>College</td>
<td>03</td>
<td>03.67</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.00</td>
</tr>
</tbody>
</table>

It is seen in the table 3 that slightly less than one-third (30.49 per cent) of the respondents had secondary level of education followed by 28.04 per cent with primary level, 25.61 per cent with no education, 12.19 with higher secondary level and only 3.76 per cent with college level education.
Findings and discussion

From the above facts it can be concluded that more than half (58.53 per cent) of the respondents had secondary or less than that level of education.

The probable reason for this might be due to unavailability of education facilities and transport facilities in the villages for higher level of education.

This finding is similar to the findings of Solanki (1990), Nath (1993), and Mankar et al. (2000).

4.1.3 Fish farming experience

It is well known fact that man can learn much from his own experiences. So the data were collected in respect to experience of the respondents in fish farming. On the basis of experience in fish farming, the respondents were categorized in to three groups viz., (i) Up to 2 years, (ii) 2.1 to 5 years and (iii) More than five years. The data were presented in table 4.

The data presented in table 4 indicate that more than two-third of the respondents (63.42 per cent) were having experience from 2.1 to 5 years followed by 26.82 per cent and 9.76 per cent with above 5 years and up to 2 years of fish farming experience respectively.
Table 4  Distribution of respondents according to their fish farming experience.

<table>
<thead>
<tr>
<th>Experience</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Up to 2 years</td>
<td>08</td>
</tr>
<tr>
<td>2.1 to 5 years</td>
<td>52</td>
</tr>
<tr>
<td>Above 5 years</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

It can be inferred that majority (89.84 per cent) of the respondents had in between 2 to 5 years of experience in fish farming. The fish farming being a newly introduced occupation in Anand taluka, majority of the fish farmers had five years or less than that level of experience in fish farming.

4.1.4 Size of pond

It is obvious from the table 5 that 63.42 per cent of the fish farmers had leased in ponds up to 1.0 hectare, whereas 31.70 per cent and 4.88 per cent of them had leased in ponds from 1.1 to 3.0 hectares and above 3.0 hectares, respectively.
Table 5  Distribution of respondents according to their size of pond.

<table>
<thead>
<tr>
<th>Pond size holding</th>
<th>Fish farmers</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>Up to 1 hectare</td>
<td>52</td>
<td>63.42%</td>
<td></td>
</tr>
<tr>
<td>1.1 to 3.0 hectares</td>
<td>26</td>
<td>31.70%</td>
<td></td>
</tr>
<tr>
<td>Above 3.0 hectares</td>
<td>04</td>
<td>04.88%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.00%</td>
<td></td>
</tr>
</tbody>
</table>

The data in table 5 indicate that more than half of the fish farmers had leased in ponds up to 1 hac. The probable reason for this might be due to unavailability of big sized pond in villages of the Anand district because of heavy pressure on land use for industrialization and civilization process.

This finding is in the line with the finding reported by Nath (1993).

4.1.5  Minimum depth of water in pond

The data presented in table 6 clearly suggested that minimum depth of water in ponds of majority (80.48 per cent) of the fish farmers was ranging from 6.1 to 12 feet, whereas 17.08 per cent and 2.44 per cent of
Findings and discussion

them had the minimum depth of water above 12 feet and up to 6 feet, respectively.

Table 6  Distribution of respondents according to minimum depth of water in their ponds.

<table>
<thead>
<tr>
<th>Minimum depth of water level</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Up to 6 feet</td>
<td>02</td>
</tr>
<tr>
<td>6.1 to 12 feet</td>
<td>66</td>
</tr>
<tr>
<td>Above 12 feet</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

This data clearly show that good quantity of water was available for continuing the fish farming in the ponds due to expected level of average rainfall in the area of the study.

This finding is in agreement with the findings of Solanki (1990) and Nath (1993).

4.1.6 Mass media exposure

Mass media exposure is also an important entrepreneurship quality; fish farmers need to have to get latest information on fish farming.
Findings and discussion

The data collected about mass media exposure of the respondents were categorized into three groups, such as low (Below mean – standard deviation), medium (Mean ± standard deviation) and high (Above mean + standard deviation). The categorization is depicted in table 7.

The data presented in table 7 indicate that majority (75.60 per cent) of the respondents had medium level of mass media exposure, followed by 13.42 per cent with low level and 10.98 per cent of with high level of mass media exposure.

Table 7: Distribution of respondents according to their mass media exposure.

<table>
<thead>
<tr>
<th>Level of mass media exposure</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Low (Score below 7.83)</td>
<td>11</td>
</tr>
<tr>
<td>Medium (Score from 7.83 to 17.45)</td>
<td>62</td>
</tr>
<tr>
<td>High (Score above 17.45)</td>
<td>09</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

In general, it was observed that 75.60 per cent of the fish farmers possessed medium level of mass media exposure. This might be
due to availability of mass media and awareness in the fish farmers regarding importance of radio, television, film and agricultural literature as useful means to get information on modern methods of fish farming.

4.1.7 Family size

The size of family was decided on the basis of total number of members in the fish farmer’s family. The respondents were grouped into two categories based on the total number of members in their family viz. (i) Small family (Up to 5 members) and (ii) Large family (Above 5 members). The data regarding this are presented in table 8.

The data presented in table 8 indicate that slightly more than half (57.32 per cent) of the fish farmers had small size of family. While 42.68 per cent of them had large size of family.

Table 8 Distribution of respondents according to family size.

<table>
<thead>
<tr>
<th>Family size</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Small (Up to 5 members)</td>
<td>47</td>
</tr>
<tr>
<td>Large (Above 5 members)</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

This finding is in agreement with the findings of Pitchaiah et al. (1987) and Nath (1993).
4.1.8 Socio-economic status

As discussed in the earlier chapter, the socio-economic status was measured with the help of ‘socio-economic status scale’ developed by Bawajir and Nandapurkar (1985) with appropriate modifications and it was categorized into three groups, such as low (Below mean – standard deviation), medium (Mean ± standard deviation) and high level of socio-economic status (Above mean + standard deviation). The categorization is depicted in table 9.

Table 9 Distribution of respondents according to their socio-economic status.

<table>
<thead>
<tr>
<th>Socio-economic status</th>
<th>Fish farmers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Low (Score below 25.25)</td>
<td>15</td>
<td>18.29</td>
</tr>
<tr>
<td>Medium (Score from 25.25 to 44.67)</td>
<td>57</td>
<td>69.52</td>
</tr>
<tr>
<td>High (Score above 44.67)</td>
<td>10</td>
<td>12.19</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The data presented in table 9 reveal that nearly two-third of the respondents (69.52 per cent) had medium level of socio-economic
status followed by only 18.29 per cent and 12.19 per cent of them with low and high level of socio-economic status, respectively.

The medium level of productivity and profit from the fishponds due to medium level of adoption, up to five years or less than that level of experience of fish farming and small size of land holding might be the reasons for the above finding.

This finding is in perfect agreement with the findings of Sen and Das (1986), Solanki (1990), Nath (1993) and Mankar et al. (2000).

4.1.9 Annual income

The data collected about income level of the respondents in a year were categorized in to three groups, such as low (Below mean – standard deviation), medium (Mean ± standard deviation) and high level of income (Above mean + standard deviation). The information regarding this is given in table 10.

It is clearly seen from the table 10 that majority (79.26 per cent) of the respondents had medium level of annual income followed by 13.42 per cent and 7.32 per cent with low and high level of annual income, respectively.

Thus, result clearly shows that majority (79.26 per cent) of the respondents had medium to low level of annual income. The lack of fully favourable situation for fish farming in the district and medium level
of adoption of modern methods of fish farming by the fish farmers might have played a role to have medium level of annual income among majority of the fish farmers.

Table 10 Distribution of respondents according to their annual income.

<table>
<thead>
<tr>
<th>Income level annually</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Low (Score below 13424.22)</td>
<td>11</td>
</tr>
<tr>
<td>Medium (Score from 13424.23 to 64258.71)</td>
<td>65</td>
</tr>
<tr>
<td>High (Score above 64258.71)</td>
<td>06</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

This finding is in line with the findings of Pitchaiah et al. (1987), Solanki (1990) and Nath (1993).

4.1.10 Level of achievement

The data collected about level of achievement of the respondents were categorized into three groups, such as low (Below mean – standard deviation), medium (Mean ± standard deviation) and high level of achievement (Above mean + standard deviation). The categorization is depicted in Table 11.
Table 11  Distribution of respondents according to their level achievement.

<table>
<thead>
<tr>
<th>Level achievement</th>
<th>Fish farmers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Low (Score below 1.71)</td>
<td>07</td>
<td>08.53</td>
</tr>
<tr>
<td>Medium (Score from 1.71 to 3.58)</td>
<td>56</td>
<td>68.29</td>
</tr>
<tr>
<td>High (Score above 3.58)</td>
<td>19</td>
<td>23.18</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The data presented in table 11 show that majority (68.29 per cent) of the respondents had medium level of achievement, followed by 23.18 per cent with high level of achievement and 8.53 per cent of the fish farmers with low level of achievement.

From the above finding it can be said that majority of the respondents had medium to high level of achievement.

4.1.11 Economic motivation

The economic motivation is defined as the occupational success in terms of profit maximization and value an individual places on economic ends. This entrepreneur quality is essential in fish farmers to gain high profit in fish farming.
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The data collected about economic motivation of the respondents were categorized into three groups, such as low (Below mean – standard deviation), medium (Mean ± standard deviation) and high level of economic motivation (Above mean + standard deviation). The categorization is depicted in Table 12.

Table 12 Distribution of respondents according to their economic motivation.

<table>
<thead>
<tr>
<th>Economic motivation</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Low (Score below 16.55)</td>
<td>05</td>
</tr>
<tr>
<td>Medium (Score from 16.55 to 22.42)</td>
<td>71</td>
</tr>
<tr>
<td>High (Score above 22.42)</td>
<td>06</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

It is seen from the Table 12 that majority (86.59 per cent) of the respondents had medium level of economic motivation followed by 7.32 per cent and 6.09 per cent with high and low level of economic motivation, respectively.
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The probable reason for above situation might be that majority of the fish farmers might have considered fish farming as remunerative enterprise.

This finding is similar to the findings of Solanki (1990), Nath (1993) and Patel (1996).

4.1.12 Risk orientation

In addition to other entrepreneurship qualities, risk orientation has been also considered as an important entrepreneurship quality in fish farmers to bear risk involved in fish farming.

The data collected about risk orientation of the respondents were categorized in to three groups, such as low (Below mean – standard deviation), medium (Mean ± standard deviation) and high level of risk orientation (Above mean + standard deviation). The categorization is depicted in table 13.

The data presented in table 13 reveal that 75.60 per cent of the fish farmers had medium level of risk orientation, whereas 13.42 per cent and 10.98 per cent of them had high and low level of risk orientation, respectively.

It can be said that three-fourth of the fish farmers had medium to high level of risk orientation.
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Table 13 Distribution of respondents according to their risk orientation.

<table>
<thead>
<tr>
<th>Risk orientation</th>
<th>Fish farmers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Low (Score below 16.69)</td>
<td>09</td>
<td>10.98</td>
</tr>
<tr>
<td>Medium (Score from 16.69 to 22.88)</td>
<td>62</td>
<td>75.60</td>
</tr>
<tr>
<td>High (Score above 22.88)</td>
<td>11</td>
<td>13.42</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.00</td>
</tr>
</tbody>
</table>

This might be due to the fact that fish farmers have preferred to take risk because they must have considered fish farming as profit making business.

The above finding was in conformity with the findings of Solanki (1990), Nath (1993) and Mankar et al. (2000).

4.1.13 Scientific orientation

Fish farming is such a field, where one has to use science and modern technology for its high degree of success. It is therefore, fish farmers should have desired degree of orientation towards science and technology.

The data collected about scientific orientation of the respondents were categorized in to three groups, such as low (Below mean
Findings and discussion

- standard deviation), medium (Mean ± standard deviation) and high level of scientific orientation (Above mean ± standard deviation). The categorization is depicted in table 14.

Table 14 Distribution of respondents according to their scientific orientation.

<table>
<thead>
<tr>
<th>Scientific orientation</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Low (Score below 19.38)</td>
<td>15</td>
</tr>
<tr>
<td>Medium (Score from 19.38 to 25.73)</td>
<td>61</td>
</tr>
<tr>
<td>High (Score above 25.73)</td>
<td>06</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

The table 14 indicates that majority (74.39 per cent) of the fish farmers had medium level of scientific orientation, followed by 18.29 per cent and 7.32 per cent of them with low and high level of scientific orientation, respectively.

Thus, from the above finding, it can be concluded that majority of the fish farmers had low to medium level of scientific orientation. It is natural that to understand science and technology,
everyone needs certain level of education but more than half of the respondents had either primary or no formal education. This might be the reason for above finding.

This finding is in the line with the findings reported by Nath (1993) and Solanki (1990).

4.1.14 **Innovation proneness**

Innovation proneness has been considered as an important entrepreneurship quality in any individual for positive inclination towards any innovation.

For presenting the information about innovation proneness the data were categorized in to three categories, such as low (Below mean – standard deviation), medium (Mean ± standard deviation) and high level of innovation proneness (Above mean + standard deviation). The categorization is depicted in table 15.

The data in table 15 reveal that majority (73.18 per cent) of the respondents had medium level of innovation proneness, followed by equal percentage (13.41 per cent) of the respondents with high and low level of innovation proneness.
Table 15 Distribution of respondents according to their level of innovation proneness.

N=82

<table>
<thead>
<tr>
<th>Level of innovation proneness</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Low (Score below 7.44)</td>
<td>11</td>
</tr>
<tr>
<td>Medium (Score from 7.44 to 12.45)</td>
<td>60</td>
</tr>
<tr>
<td>High (Score above 12.45)</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

The probable reason for the above situation might be due to the fact that to get good success through fish farming, majority of the fish farmers might have shown medium degree of interest and desire to seek change in forming their operations as and when found practicable and feasible.

4.1.15 Attitude of fish farmers towards F.F.D.A.

To know the attitude of the fish farmers towards working pattern of the F.F.D.A., Anand, a teacher made scale was used to collect the information as well as to calculate attitude score. Based on the score obtained, the respondents were classified into three groups viz., (i)
Favourable (above mean + standard deviation), Neutral (mean ± standard deviation) and Unfavourable attitude towards F.F.D.A. (below mean - standard deviation). The classification is presented in table 16.

The information presented in table 16 reveals that slightly less than two-third of the respondents (59.76 per cent) were neutral. Only 21.95 per cent and 18.29 per cent of them had unfavourable and favourable attitude towards working pattern of F.F.D.A., respectively.

This can be attributed to the fact that the respondents were mostly from lower caste having medium to low education. They were unable to understand the limitations of the agency. So their expressions or feelings towards F.F.D.A. were simply neutral.

Table 16  Distribution of respondents according to their attitude towards F.F.D.A.

<table>
<thead>
<tr>
<th></th>
<th>Fish farmers</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>Favourable (score above 38.45)</td>
<td>15</td>
<td>18.29</td>
<td></td>
</tr>
<tr>
<td>Neutral (Score between 26.69 and 38.45)</td>
<td>49</td>
<td>59.76</td>
<td></td>
</tr>
<tr>
<td>Unfavourable (Score below 26.69)</td>
<td>18</td>
<td>21.95</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>
This might be due to the fact that majority of the respondents had medium level of economic motivation, scientific orientation and risk orientation.

Table 17  Distribution of respondents according to their level of adoption of improved practices of fish farming.

<table>
<thead>
<tr>
<th>Adoption level</th>
<th>Fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Low (Score below 54.33)</td>
<td>08</td>
</tr>
<tr>
<td>Medium (Score from 54.33 to 77.54)</td>
<td>65</td>
</tr>
<tr>
<td>High (Score above 77.54)</td>
<td>09</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
</tr>
</tbody>
</table>

This finding is in the line with the findings of Sen and Das (1986), Solanki (1990) and Nath (1993).
The above finding is in agreement with the findings of Solanki (1990) and Nath (1993).

4.2 LEVEL OF ADOPTION OF FISH FARMERS REGARDING IMPROVED PRACTICES OF FISH FARMING

The success of fish farming depends upon adoption of basic principles of weeding, fertilizer application, liming, periodical examination, etc. Hence, it was felt necessary to know that up to what extent the fish farmers had adopted the improved practices of fish farming.

To measure the level of adoption of scientific inland fish farming adoption quotient for each individual respondent was calculated. Based on the adoption quotient respondents were categorized into three groups, such as low (Below mean – standard deviation), medium (Mean ± standard deviation) and high extent of adoption (Above mean + standard deviation). The categorization is depicted in Table 17.

The distribution as shown in Table 17, indicates that more than three-fourth of the respondents (79.27 per cent) had medium level of adoption, whereas only 10.97 per cent of the respondents had high and remaining 9.76 per cent of them had low level of adoption.
Fig. 2: Distribution of fish farmers according to their level of adoption of improved practices of fish farming.
4.3 THE RELATIONSHIP BETWEEN ENTREPRENEURSHIP QUALITIES OF FISH FARMERS AND THEIR LEVEL OF ADOPTION OF IMPROVED PRACTICES OF FISH FARMING.

Adoption behaviour of fish farmers is influenced by their different entrepreneurship qualities. Based on the past literature reviewed, the following independent variables were selected for the present study. They were age, education, family size, economic motivation, scientific orientation, risk orientation, pond size, income level, minimum depth of water in pond, experience in the fish farming, level of achievement, innovation proneness, mass media exposure, socio-economic status and attitude. Further to test the null hypothesis (H_0) that there is no relationship between the selected entrepreneurship qualities of fish farmers and their level of adoption, correlation coefficient was computed with the help of computer. Results have been presented as under.

4.3.1 Age and level of adoption

The data presented in table 18 reflect that level of adoption of fish farmers was found non significant with their age. This indicated that age of the fish farmers did not play any role in improving their level of adoption of selected improved practices of fish farming.

Hence, the null hypothesis (H_0) in case of age was accepted.
This finding is similar to the finding reported by Solanki (1990).

4.3.2 Education and level of adoption

The data presented in table 18 reveal that education of the fish farmers was found non-significant with level of adoption of the fish farming. It meant that education of the fish farmers did not play any role in improving their level of adoption of modern fish farming.

The probable reason for above finding might be due to fish farming has not been popular business among educated people. Educated people like to do other business or government job.

Hence, the null hypothesis ($H_1$) is accepted.

This finding is in partially agreement with the findings of Haque and Ray (1983), Balasubramanium and Kaul (1985) and Solanki (1990).

4.3.3 Fish farming experience and level of adoption

The data presented in table 18 indicated that fish farming experience of the fish farmers had negative and non-significant relationship with level of adoption of the fish farming. It meant that fish farming experience of the fish farmers did not play any role in improving their level of adoption of modern fish farming. The result shows that even after some
experience of fish farming, fish farmers had not shown any interest in adopting technology leading to higher production of fish.

Hence, the null hypothesis ($H_1$) is accepted.

The above finding is in the line with the findings reported by Solanki (1990) and is not in the line with the finding reported by Nath (1993).

4.3.4 Size of pond and level of adoption

The data presented in table 18 indicated that size of pond had non-significant relationship with the level of adoption of fish farmers.

The result indicated that size of pond of the fish farmer did not play any role in improving their level of adoption of the improved practices of the fish farming. It shows that respondents with irrespective of pond size had more or less similar level of adoption of modern practices of fish farming.
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Hence, the null hypothesis (H₁) is accepted.

The above result is in the line with the finding reported by Solanki (1990).

Table 18  Relationship between entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Entrepreneurship qualities</th>
<th>Correlation coefficient (r = value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td>0.0241 NS</td>
</tr>
<tr>
<td>2</td>
<td>Education</td>
<td>0.1412 NS</td>
</tr>
<tr>
<td>3</td>
<td>Fish farming experience</td>
<td>-0.0757 NS</td>
</tr>
<tr>
<td>4</td>
<td>Size of pond</td>
<td>0.0152 NS</td>
</tr>
<tr>
<td>5</td>
<td>Minimum depth of water in pond</td>
<td>-0.0683 NS</td>
</tr>
<tr>
<td>6</td>
<td>Mass media exposure</td>
<td>0.1449 NS</td>
</tr>
<tr>
<td>7</td>
<td>Family size</td>
<td>0.3427*</td>
</tr>
<tr>
<td>8</td>
<td>Socio-economic status</td>
<td>0.2356*</td>
</tr>
<tr>
<td>9</td>
<td>Annual income</td>
<td>0.4570*</td>
</tr>
<tr>
<td>10</td>
<td>Level of achievement</td>
<td>0.1460 NS</td>
</tr>
<tr>
<td>11</td>
<td>Economic motivation</td>
<td>-0.1344 NS</td>
</tr>
<tr>
<td>12</td>
<td>Risk orientation</td>
<td>0.0230 NS</td>
</tr>
<tr>
<td>13</td>
<td>Scientific orientation</td>
<td>-0.1971 NS</td>
</tr>
<tr>
<td>14</td>
<td>Innovation proneness</td>
<td>-0.0094NS</td>
</tr>
<tr>
<td>15</td>
<td>Attitude of the fish farmers towards F.F.D.A.</td>
<td>-0.1627 NS</td>
</tr>
</tbody>
</table>

*Significant at 0.05 level of probability
4.3.5 Minimum depth of water in pond and level of adoption

The data presented in table 18 reflect that minimum depth of water in pond of the fish farmers had negative and non-significant relationship with level of adoption of the fish farming. It meant that depth of water in pond of the fish farmers did not play any role in improving their level of adoption of modern fish farming.

Hence, the null hypothesis (H₁) is accepted.

The above finding is in line with the finding reported by Solanki (1990) and is not in line with the finding reported by Nath (1993).

4.3.6 Mass media exposure and level of adoption

The data presented in table 18 reflect that mass media exposure of the fish farmers was found non-significant with level of adoption of the fish farmers. It meant that mass media exposure of the fish farmers did not play any role in improving their level of adoption of modern practices of fish farming.

The probable reason for the above finding might be due to homogeneity in mass media exposure in irrespective types of adapters of modern practices of fish farming.

Hence, the null hypothesis (H₁) is accepted.

This finding is not in line with the finding of Chauhan (1994).
4.3.7 Family size and level of adoption

The data presented in table 18 reveals that family size of the fish farmers had positive and significant relationship with their level of adoption of scientific inland fish farming.

From the above finding, it can be said that level of adoption was observed better among those fish farmers, who had more number of family members in their families. In other words it can also be concluded that level of adoption of improved methods of fish farming was better among those fish farmers who had joint type of family.

In general it is observed that among joint type of families, there are more number of family members. So, a fish farmer by using them in the fish farming can better adopt scientific inland fish farming technology. This might have played a role to have better level of adoption among those fish farmers who had large size of family or joint type of family.

Hence, the null hypothesis (H₁) in case of family size is accepted.

The above finding is not similar to the finding reported by Nath (1993).
4.3.8 Socio-economic status and level of adoption

The data presented in table 18 indicated that socio-economic status of the fish farmers had positive and significant relationship with level of adoption of the fish farming.

It can be attributed to the fact that the person who has better socio-economic status can afford the cost-intensive inputs of scientific inland fish farming, comes forward to adopt the technology on a complete basis.

Hence, the null hypothesis (H₁) in case of socio-economic status is rejected.

This finding is similar to the finding reported by Nath (1993).

4.3.9 Annual income and level of adoption

The data presented in table 18 indicated that annual income of the fish farmers had positive and significant relationship with level of adoption of the fish farming. It meant that higher level of annual income of fish farmers; higher would be their extent of adoption of modern methods of fish farming.

It may be due to the fact that the farmers get direct experience of the profit obtained from fish farming. So he becomes more interested in taking up the technology to a greater extent.
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Hence, the null hypothesis \( H_1 \) in case of annual income is rejected.

The above finding is in line with the finding reported by Nath (1993).

4.3.10 Level of achievement and level of adoption

The data presented in Table 18 reflect that level of adoption of fish farmers was found non-significant with their level of achievement. This indicated that level of achievement of the fish farmers did not play any role in improving their level of adoption of selected improved practices of fish farming.

In other words, it can be said that to get best result from fish farming fish farmers should be motivated to have higher level of achievement motivation because in many cases such kind of motivation had played a major role in accelerating the rate of adoption of modern technology. The drive to excel in any enterprise could motivate farmers to increase rate of adoption.

Hence, the null hypothesis \( H_1 \) in case of level of achievement was accepted.

This finding is not in line with the findings of Patel and Sangle (1993) and Deshmukh et al. (1994).
4.3.11 Economic motivation and level of adoption

The data presented in table 18 reveals that economic motivation of the fish farmers had negative and non-significant relationship with level of adoption of the fish farming. It meant that economic motivation of the fish farmers did not play any role in improving their level of adoption of modern fish farming. Expected level of economic motivation comes in an individual through the indirect effect of achievement motivation, but it was not observed up to significant level in fish farmers. Thus above result was observed.

Hence, the null hypothesis (H\textsubscript{0}) is accepted.

The above finding is in line with the finding reported by Solanki (1990) but not in line with the finding reported by Patel (1996).

4.3.12 Risk orientation and level of adoption

The data presented in table 18 indicated that risk orientation had non-significant relationship with the level of adoption of fish farmers.

The result indicated that risk orientation of the fish farmers did not play any role in improving their level of adoption of the improved practices of the fish farming.

Risk orientation is expressed as the degree to which farmer is oriented to take risk and has courage to face uncertainties in adoption of improved technology. Such type of orientation comes as a result of good
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education, economic condition and positivism in many other psychological variables among the farmers. In this study, majority of the fish farmers did not have such type of positivism. Therefore, above result was observed.

Hence, the null hypothesis \( H_1 \) is accepted.

The above result is in line with the finding reported by Solanki (1990).

4.3.13 **Scientific orientation and level of adoption**

The data presented in table 18 reveal that scientific orientation of the fish farmers had negative and non-significant relationship with level of adoption of the fish farming. It meant that scientific orientation of the fish farmers did not play any role in improving their level of adoption of modern fish farming.

Hence, the null hypothesis \( H_0 \) is accepted.

The probable reason for the above finding might be due to homogeneity in scientific orientation in irrespective levels of adopters of modern fish farming.

This finding is in the line with the finding of Saiyad (1986).

4.3.14 **Innovation proneness and level of adoption**

The data presented in table 18 reveals that innovation proneness of the fish farmers had negative and non-significant relationship
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with level of adoption of the fish farming. It meant that innovation
proneness of the fish farmers did not play any role in improving their level
of adoption of modern fish farming. It can also be said that fish farmers
involved in fish farming have not get expected degree of interest in getting
useful information regarding new technology of fish farming. Therefore,
innovation proneness did not play any positive role in improving their level
of adoption.

Hence, the null hypothesis ($H_1$) in case of innovation
proneness is accepted.

The above finding is opposite to the finding reported by Patel
and Sangle (1993).

4.3.15 Attitude of fish farmer and level of adoption

The data presented in table 18 reveal that attitude of the fish
farmers towards F.F.D.A. had negative and non-significant relationship
with level of adoption of the fish farming. It meant that attitude of the fish
farmers did not play any role in improving their level of adoption of
modern fish farming.

Hence, the null hypothesis ($H_1$) in case of attitude is accepted.

The above finding is not in line with the finding reported by
4.4 CONSTRAINTS FACED BY FISH FARMERS IN ADOPTION OF IMPROVED PRACTICES OF FISH FARMING

The adoption of fish farming influenced by many constraints. Constraints refer to the difficulties faced by the fish farmers in adoption of the fish farming. Constraints may be inside or outside, and they are inter-related within themselves.

The fish farmers were asked to report the constraint faced by them in adoption of fish farming, which are presented in table 19.

It is evident from the table 19 that major constraints faced by fish farmers in adoption of improved fish farming practices in descending order of rank were poaching of the fish from the pond (rank I), inadequacy of water (rank II), social harassment from the other villagers (rank III), improper credit facility (rank IV), non-availability of desired variety of fish seed (rank V), untimely supply of fish seeds (rank VI), unrenumarative price of fish (rank VII), costliness of fish seeds (rank VIII), lack of preservation and curing facility (rank IX), high cost and poor quality of inputs (rank X), difficulties in approaching the authority (rank XI) and disease in fish (rank XII).
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Table 19 Constraints faced by fish farmers in adoption of improved practices of fish farming.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Constraints</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poaching of the fish from the pond</td>
<td>60</td>
<td>73.17</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Inadequacy of water</td>
<td>58</td>
<td>70.73</td>
<td>II</td>
</tr>
<tr>
<td>3</td>
<td>Harassment from the other villagers</td>
<td>48</td>
<td>58.53</td>
<td>III</td>
</tr>
<tr>
<td>4</td>
<td>Improper credit facility</td>
<td>42</td>
<td>51.21</td>
<td>IV</td>
</tr>
<tr>
<td>5</td>
<td>Non-availability of desired variety of fish seed</td>
<td>38</td>
<td>46.34</td>
<td>V</td>
</tr>
<tr>
<td>6</td>
<td>Untimely supply of fish seeds</td>
<td>32</td>
<td>39.02</td>
<td>VI</td>
</tr>
<tr>
<td>7</td>
<td>Unrenumartive price of fish</td>
<td>30</td>
<td>36.58</td>
<td>VII</td>
</tr>
<tr>
<td>8</td>
<td>Costliness of fish seeds</td>
<td>27</td>
<td>32.92</td>
<td>VIII</td>
</tr>
<tr>
<td>9</td>
<td>Lack of preservation and curing facility</td>
<td>24</td>
<td>29.26</td>
<td>IX</td>
</tr>
<tr>
<td>10</td>
<td>High cost and poor quality of inputs</td>
<td>22</td>
<td>26.82</td>
<td>X</td>
</tr>
<tr>
<td>11</td>
<td>Difficulties in approaching the authority</td>
<td>16</td>
<td>19.51</td>
<td>XI</td>
</tr>
<tr>
<td>12</td>
<td>Disease in fish</td>
<td>11</td>
<td>13.41</td>
<td>XII</td>
</tr>
</tbody>
</table>

N=82

It can be concluded that major constraints associated with the adoption of improved fish farming technology were poaching of the fish from the pond, inadequacy of water and harassment of the other villagers.
While disease in fish, difficulties in approaching the authority and high cost and poor quality of inputs were the least focused constraints expressed by the fish farmers.

4.5 SUGGESTIONS OF FISH FARMERS FOR SUCCESSFUL INLAND FISH FARMING

Constraints are the difficulties faced by individuals to adopt fish farming technology. How the individual thinks to remove the constraints or which are the probable ways to overcome constraints have been studied. The fish farmers were asked to pinpoint suggestions. The data collected were analyzed and presented with the help of rank in table 20.

Data presented in table 20 clearly indicate that the suggestions expressed by the fish farmers for successful inland fish farming were legal provision to restrict poaching of fish (rank I), timely supply of fish seeds (rank II), timely credit supply (rank III), provision of insurance (rank IV), supply adequate quantity of fish seeds (rank V), arrangement for providing water for the pond in summer (rank VI), panchayat should solve the problem of harassment of the other villagers (rank VII) and remunerative price for the fish (rank VIII).
**Table 20**  Suggestions of fish farmers for successful inland fish farming.

N=82

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Suggestions</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Legal provision to restrict poaching of fish</td>
<td>63</td>
<td>76.82</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Timely supply of fish seeds</td>
<td>59</td>
<td>71.95</td>
<td>II</td>
</tr>
<tr>
<td>3</td>
<td>Timely credit supply</td>
<td>52</td>
<td>63.41</td>
<td>III</td>
</tr>
<tr>
<td>4</td>
<td>Provision of insurance</td>
<td>46</td>
<td>56.09</td>
<td>IV</td>
</tr>
<tr>
<td>5</td>
<td>Supply adequate quantity of fish seeds</td>
<td>40</td>
<td>48.78</td>
<td>V</td>
</tr>
<tr>
<td>6</td>
<td>Arrangement for providing water for the pond in summer</td>
<td>34</td>
<td>41.46</td>
<td>VI</td>
</tr>
<tr>
<td>7</td>
<td>Panchayat should solve the problem of harassment from the other villagers</td>
<td>30</td>
<td>36.58</td>
<td>VII</td>
</tr>
<tr>
<td>8</td>
<td>Remunerative price for the fish</td>
<td>22</td>
<td>26.82</td>
<td>VIII</td>
</tr>
</tbody>
</table>

*Findings and discussion*
SUMMARY AND CONCLUSION
CHAPTER V
SUMMARY AND CONCLUSION

This chapter includes in nutshell the summary, conclusions, suggestions for action and future research.

5.1 SUMMARY

Besides huge marine resources, India has vast inland water resources capable of producing fish. But the fish production is hardly making match with its capability. In order to deal with such situation on recommendation of the technical committee on inland fisheries, Govt. of India launched a pilot project on Fish Farmers’ Development Agency at district level during the fifth five-year plan. In Gujarat the first Fish Farmers’ Development Agency has been started in 1976 in Surat whereas, in Kheda district it was started in 1986 at Nadiad.

In fact the protein deficiency is the most human nutritional problem today. To supplement our ill balanced cereal diet, fish serves as the cheapest source of animal protein. In addition to this, fish farming has a special significance in view of the potential for employment generation and export earnings.

Despite vast advantages of fish farming, inland fish farming has remained under exploited and yet there is a gap between potential and actual yield.
Summary and conclusion

It is therefore the proper adoption of the fish farming technology with many other capabilities in terms of entrepreneurship qualities, one need as the pre-requisites to be a successful fish farmer.

Looking to the above facts “Study on entrepreneurship qualities of fish farmers in Anand district of Gujarat state” was undertaken with the following objectives:

1. To study entrepreneurship qualities of fish farmers.
2. To study level of adoption of fish farmers regarding improved practices of fish farming.
3. To ascertain the relationship between entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming.
4. To study the constraints faced by the fish farmers in adoption of improved practices of fish farming.
5. To obtain suggestions of fish farmers for successful fish farming.

On the basis of review of literature having direct or indirect bearing on the problem, the following null hypothesis was also formulated.

H1: There is no relationship between the selected entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming.
The methodological procedure consisted of determination of dependent variables, setting and selection of the fish farmers, analysis of the data and various statistical measures used to test the hypothesis. The statistical measure such as percentage, mean score, standard deviation, coefficient of correlation and ranking were used.

In order to measure the selected variables of fish farmers, scale developed and adopted by various researchers were used with due modifications. In the present investigation, a random sample of 82 fish farmers was selected. The data were collected with the help of interview schedule by conducting personal interview. The data so collected were coded, classified, tabulated and analyzed in order to make the findings meaningful.

5.2 MAJOR FINDINGS AND CONCLUSIONS

The important findings of the study are summarized as under.

5.2.1 Entrepreneurship qualities of fish farmers

5.2.1.1 Age

Majority (92.69 per cent) of the fish farmers were observed from middle age group.

5.2.1.2 Education

Majority (84.14 per cent) of the fish farmers had either secondary level or less than that level of education.
5.2.1.3 Fish farming experience

More than two-third (63.42 per cent) of the fish farmers were having experience of fish farming from 2.1 to 5 years.

5.2.1.4 Size of pond

Majority (63.42 per cent) of the fish farmers had up to 1.0 ha. of pond size.

5.2.1.5 Minimum depth of water in pond

Minimum depth of water in ponds of majority (80.48 per cent) of the fish farmers was ranging from 6.1 to 12 feet.

5.2.1.6 Mass media exposure

Majority (75.60 per cent) of the fish farmers had medium level of mass media exposure.

5.2.1.7 Family size

Slightly more than half (57.32 per cent) of the fish farmers had small size of family.

5.2.1.8 Socio-economic status

Nearly two-third (69.52 per cent) of the fish farmers had medium level of socio-economic status.

5.2.1.9 Income level

Majority (79.26 per cent) of the fish farmers had medium level of annual income.
Summary and conclusion

5.2.1.10 Level of achievement

Majority (68.29 per cent) of the fish farmers had medium level of achievement.

5.2.1.11 Economic motivation

Majority (86.59 per cent) of the fish farmers had medium level of economic motivation.

5.2.1.12 Risk orientation

Three-fourth (75.60 per cent) of the fish farmers had medium level of risk orientation.

5.2.1.13 Scientific orientation

Majority (74.39 per cent) of the fish farmers had medium level of scientific orientation.

5.2.1.14 Innovation proneness

Majority (73.18 per cent) of the fish farmers had medium level of innovation proneness.

5.2.1.15 Attitude of the fish farmers towards F.F.D.A

Slightly less than two-third (59.76 per cent) of the fish farmers were neutral in their attitude towards F.F.D.A.
5.2.2 Level of adoption of improved practices of fish farming

Majority (79.27 per cent) of the fish farmers had medium level of adoption of scientific inland fish farming.

5.2.3 The relationship between entrepreneurship qualities of fish farmers and their level of adoption of improved practices of fish farming

Six entrepreneurship qualities of fish farmers namely age, education, size of pond, mass media exposure, risk orientation and level of achievement had positive and non significant relationship with level of adoption of improved fish farming technology, while their entrepreneurship qualities like economic motivation, scientific orientation, innovation proneness, fish farming experience and minimum depth of water in pond were negatively and non significantly correlated with their level of adoption of improved fish farming technology. Attitude of the fish farmers towards F.F.D.A had negative and non-significant relationship with their level of adoption of improved fish farming technology. Three entrepreneurship qualities of fish farmers’ namely socio-economic status, level of income and family size had positive and significant relationship with their level of adoption of improved fish farming technology.
Summary and conclusion

Fig. 3: Entrepreneurship qualities of the fish farmers related with level of adoption of improved practices of fish farming

KEY:
$X_1$ = Family size
$X_2$ = Socio-economic status
$X_3$ = Income level
Summary and conclusion

5.2.4 Constraints faced by fish farmers in adoption of improved practices of fish farming

Major constraints faced by fish farmers in adoption of improved fish farming practices were poaching of the fish from the pond (rank I), inadequacy of water (rank II), harassment from the other villagers (rank III), improper credit facility (rank IV), non-availability of desired variety of fish seed (rank V), untimely supply of fish seeds (rank VI), unrenumerative price of fish (rank VII), costliness of fish seeds (rank VIII), lack of preservation and curing facility (rank IX), high cost and poor quality of inputs (rank X), difficulties in approaching the authority (rank XI) and disease in fish (rank XII).

5.2.5 Suggestions of fish farmers for successful inland fish farming

Important suggestions pointed out by the fish farmers for successful inland fish farming were legal provision to restrict poaching of fish (rank I), timely supply of fish seeds (rank II), timely credit supply (rank III), provision of insurance (rank IV), supply adequate quantity of fish seeds (rank V), arrangement for providing water for the pond in summer (rank VI), panchayat should solve the problem of harassment from the other villagers (rank VII) and remunerative price for the fish (rank VIII).
Summary and conclusion

5.3 Implications

The following implications are suggested on the basis of the findings of the study.

1. The study facilitates in knowing the entrepreneurship qualities of the fish farmers that will serve as guidance for the planner and extension agency for planning and implementing programmes related to the modernization of fish farming.

2. Some entrepreneurship qualities like age, socio-economic status, economic motivation, scientific orientation, risk orientation, mass media exposure, innovation proneness and level of achievement were observed in middle aged group. It is therefore, suggested that extension agencies may concentrate their efforts in persuading and motivating middle aged persons to adopt fish farming technology for effective results.

3. For supplying the desired varieties and quantity of fish seeds to the fish farmers, Government should encourage the fish seeds centers to culture more fish seeds especially of the varieties having great demand.
Summary and conclusion

4. The government should plan the scheme for fish farming insurance and exert pressure on banks to supply credit especially for fish farming.

5. A special law should be framed against the poaching of fish from the ponds.

6. For providing fish seeds easily and timely, the government should establish the fish seeds centers at taluka level which also helps in motivating the people to adopt inland fish farming.

7. The fish Farmers’ Development Agency should have to be practical by helping the beneficiaries at every stage during the fish farming in time.

8. The people should be motivated to adopt the inland fish farming by using different mass media like radio, television and other extension media.

9. Model fishing centers should be established to demonstrate the result of the technology and the success stories should be communicated to the fish farmers through different media.

10. Fish farming training programmes should be organized to enrich knowledge and modern skill to fish farmers.
11. It is also recommended that banking services, input service, marketing services should be improved. The government should provide assistance for purchasing inputs to the small and medium fish farmers.

5.4 SUGGESTIONS FOR FURTHER STUDY

From the results of the study, researcher feels to suggest certain points to carry out studies in the area of inland fish farming.

1. More number of entrepreneurship qualities of fish farmers may be studied.

2. Training need of the fishery extension personal should be identified so that fish farmers can be adequately trained to meet the challenge of fish farming.

3. The time lag, if any, between knowledge acquisition/acceptance and the recommendations by the authority and the factors responsible for such lag, if studied, will be interesting and useful.

4. A deeper probe in to other aspects such as motivation, aspiration and expectation of the fish farmers in accepting the recommended fish farming technology may be undertaken.

5. To strengthen the findings of this study, similar study may be carried out in other areas of the country.
6. To generalize the conclusions, area of research may be extended to cover relatively more area. Similarly size of sample of the respondents may be enlarged so as to draw more general conclusions.

7. To remove existing constraints in the inland fish farming, the economic, technical, psychological and situational solutions need to be investigated.

8. Similar studies may be repeated periodically.
REFERENCES


*Maha.J.Ext.Edn.*, **16**: 100-103.


References


References


APPENDICES
APPENDIX-I

A STUDY ON ENTREPRENEURSHIP QUALITIES OF FISH FARMERS OF ANAND DISTRICT OF GUJARAT STATE

INTERVIEW SCHEDULE

1. Interview schedule no. ______________________
2. Name of village ______________________
3. Name of fish farmer ______________________

PART-I

ENTREPRENEURSHIP QUALITIES OF FISH FARMERS

1. Age: Years ___________
2. Education: Std. ___________
   Illiterate (0)
   Can read and write (1)
   Primary education up to VII std. (2)
   Secondary education from VIII to X std. (3)
   Higher secondary education from XI to XII std. (4)
   College education and above (5)
3. Experience in fish farming: Years 1 score for each year
4. Size of pond: Hectares 1 score for each ha.
5. Minimum depth of water in pond: Feet 1 score for each foot
6. Mass media exposure:
   Which of the following mass media is used by you please indicate:
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Media</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Always</td>
</tr>
<tr>
<td>1.</td>
<td>Newspaper</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Farm magazine</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Agril. Literature</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Radio</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Television</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Exhibition</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Seminar</td>
<td></td>
</tr>
</tbody>
</table>

7. Number of family members: __________

8. Annual income: Rs. __________/-

9. Level of achievement:
   a. On what step of the ladder of life do you stand today?
   b. On what step of ladder of life were you five years ago?
10. **Economic motivation:**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A fish farmer should work towards larger yield and economic profit</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>The most successful fish farmer is one who makes the most profits.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>A fish farmer should try any new idea which may earn him more money.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>A fish farmer should grow exotic varieties with indigenous to increase monetary profits.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>It is difficult for the fish farmer’s children to make good start unless he provides them economic assistance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>A fish farmer must earn his living but the most important thing in the life can not be defined to economic items.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. **Risk orientation:**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A fish farmer should grow different types of varieties having different food habits with the Zinga.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>A fish farmer should rather take more of a chance in making big profit than to be content with a smaller, but less risky</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
III A fish farmer who is willing to take greater risks than the average fish farmer usually does better financially.

IV It is good for a fish farmer to take risk when he knows his chance of success is fairly high.

V It is better for a fish farmer not to try new methods unless most other fish farmers have used them with success.

VI Trying an entirely new method in fish farming by a fish farmer involves risk but it is worth to try.

12. Scientific orientation:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>New methods of fish farming give better results to a fish farmer than the old methods.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>The way a fish farmer’s forefathers growing the fish is still the best way to growing the fish today.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Even a fish farmer with lots of experience should use new methods of fish farming.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Though it takes time for a fish farmer to learn new methods, it is worth to try.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>A good fish farmer experiments with</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
new ideas.

Traditional methods of fish farming have to be changed in order to raise the level of living of fish farmers.

13. **Innovation proneness:**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Statements</th>
<th>Yes (2)</th>
<th>UD (1)</th>
<th>No (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Do you want to learn an advance way of fish farming?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>If the extension worker gives a talk on improved fish farming technology, would you attend?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>If the Govt. helps you to establish a new pond elsewhere, would you go?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Do you want a change in your way of life?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>A fish farmer should try to form the way his parents did.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Do you want your sons to be the fish farmers?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td>It is better to enjoy today and let tomorrow take care of it?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIII</td>
<td>Do you believe that fortune is in the hand of the God?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Statements</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
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<td>---------</td>
<td>---------------------------------------------------------------------------</td>
<td>----</td>
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<td>----</td>
</tr>
<tr>
<td>I</td>
<td>It is because of the F.F.D.A. the necessary supplies are available to the fish farmers.</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>II</td>
<td>The funds of the F.F.D.A. are not being properly used for improvement of the fish farmers.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>There is little work and more of its propaganda done by F.F.D.A.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>It is only because of F.F.D.A. that the credit facilities are available to the fish farmers.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>The work of F.F.D.A. is done on papers and very little in villages.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Because of facilities provided by F.F.D.A., the income of fish farmer has increased.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td>The F.F.D.A. is well through out and benefiting approach for the fish farmers’ development.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIII</td>
<td>So far F.F.D.A. has not been able to succeed in convincing the fish farmers about its programme.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>The training given by the agency is only theoretical and not practical.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>The institutional training is appropriate and necessary.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
PART-II
ADOPTION OF FISH FARMERS REGARDING IMPROVED PRACTICES OF FISH FARMING

1. Eradication of unwanted weeds:
   a. Do you eradicate unwanted weeds from your pond?
      Yes (1)
      No (0)
   b. If yes, how?
      From whole pond (3)
      From half of the pond (2)
      From less than half of the pond (1)

2. Eradication of unwanted fish:
   a. Do you eradicate unwanted fish from your pond?
      Yes (1)
      No (0)
   b. If yes, how?
      All (3)
      All most half (2)
      Less than half (1)

3. Stocking density of fish seeds:
   a. Do you stock the fish seeds in your pond?
      Yes (1)
      No (0)

4. Manuring:
   a. Do you apply farmyard manure in your pond?
      Yes (1)
      No (0)
b. When?
   At recommended time (1)
   Not at recommended time (0)

c. In how much application?
   According to recommendation (1)
   Not according to recommendation (0)

d. How much FYM do you apply in a year?
   According to recommendation (1)
   Not according to recommendation (0)

5. Fertilizer application:
   a. Do you apply fertilizer in your pond?
      Yes (1)
      No (0)
   b. In what doses do you apply?
      According to recommended dose (1)
      Not according to recommended dose (0)

6. Supplemental feeding:
   a. Do you apply supplement feed for your fish in the pond?
      Yes (1)
      No (0)

7. Liming:
   a. Do you give lime treatment to your pond?
      Yes (1)
      No (0)
   b. If yes, how much lime do you apply?
      According to recommendation (1)
      Not according to recommendation (2)
8. **Periodical examination of stocked fish:**
   a. Do you check the fish in your pond at regular time?
      Yes (1)
      No (0)

9. **Harvesting:**
   a. When do you harvest the fish from the pond for the first time?
      According to recommended time (1)
      Not according to recommended time (0)

10. **Use of iron net at the input and output of pond:**
    a. Do you use iron net at the input and output of pond?
       Yes (1)
       No (0)
PART-III

CONSTRAINTS FACED BY FISH FARMERS IN ADOPTION OF IMPROVED
PRACTICES OF FISH FARMING

Please mention difficulties or constraints in adoption of improved practices of fish farming:
1. 
2. 
3. 
4. 
5. 

PART-IV

SUGGESTIONS OF FISH FARMERS FOR SUCCESSFUL INLAND FISH
FARMING

Please give your suggestion for successful inland fish farming:
1. 
2. 
3. 
4. 
5. 

x
KEY to Appendix-II:

\( X_1 = \text{Age} \)
\( X_2 = \text{Education} \)
\( X_3 = \text{Experience in fish farming} \)
\( X_4 = \text{Pond size} \)
\( X_5 = \text{Minimum depth of water in pond} \)
\( X_6 = \text{Mass media exposure} \)
\( X_7 = \text{Family size} \)
\( X_8 = \text{Socio-economic status} \)

\( X_9 = \text{Income level} \)
\( X_{10} = \text{Level of achievement} \)
\( X_{11} = \text{Economic motivation} \)
\( X_{12} = \text{Risk orientation} \)
\( X_{13} = \text{Scientific orientation} \)
\( X_{14} = \text{Innovation proneness} \)
\( X_{15} = \text{Attitude of the fish farmers towards F.F.D.A.} \)
\( X_{16} = \text{Adoption quotient} \)
### APPENDIX-II

**INTER CORRELATION OF SELECTED VARIABLES**

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**CRITICAL VALUE (1-tail, .05) = + Or - 0.18302**

**CRITICAL VALUE (2-tail, .05) = +/- 0.21705**

N=82