ASSESSMENT OF SOCIO PSYCHOLOGICAL CONSTRUCTS IN POST FLOOD SITUATION: THE CASE OF KUTTANAD RICE FARMERS

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(2018-11-060)

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by

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(2018-11-060)

THESIS

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DECLARATION

I, hereby declare that this thesis entitled **"Assessment of socio psychological constructs in post flood situation: The case of Kuttanad rice farmers"** is a bonafide record of research work done by me during the course of research and the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other University or Society.

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Certified that this thesis entitled **"Assessment of socio psychological constructs in post flood situation: The case of Kuttanad rice farmers"** is a record of research work done independently by Ms. Chippy Xavier under my guidance and supervision and it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to her.

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LIST OF ABBREVIATIONS

Abbreviations	Full form
%	Percentage
et al	Co-workers
FAO	Food and Agriculture Organization
GoI	Government of India
SSLC	Secondary School Leaving Certificate
KAU	Kerala Agricultural University
No.	Number
EI	Emotional Intelligence
EQ	Emotional Quotient
SRI	System of Rice Intensification

CHAPTER 1

INTRODUCTION

Ever since the formation of Kerala in 1956 it did not face major natural disasters. However, in 2004 this myth was shattered by a tsunami. But even then, people opined it as a once-in-a-millennium bizarre incident. But with the onset of the cyclone Okhi in 2017, Kerala has been incessantly hit by copious oddities of nature and it's now time for the state to take note of how to make ends meet and get back to an irrepressible trajectory.

The prodigious disaster in Kerala's recent archive is no doubt the floods and landslides of 2018. The floods of August 2018 were so profound that most people now are unable to hark back that they constituted only the ultimate act in a sequence of disasters that hit Kerala from June 2018 onwards. Unseasonal heavy rains had kicked off in April 2018 and untimely floods were recorded in Kuttanad in June. By July, landslides in hundreds occurred in the high ranges and death toll started to surge.

The scenario took an unexpected flip in August when during the first three weeks, the state witnessed torrential rainfall, 164% above customary - the worst flooding ever recorded in nearly a century. The floods and landslides in August 2018 hit large parts of Kerala, at one time directly affecting nearly 5.4 million people out of which 2 million were children, literally one in every six of the state's population. It was the most catastrophic disaster the Kerala state and the current generations have ever witnessed (The Hindu, 2018).

Between June 1 and August 18, 2018, Kerala experienced the worst floods ever since 1924. The state got an aggregate precipitation that was 42% in overabundance amid this period. The heaviest spell of rain was during 1-20 August and the state received 771mm of rain. The extreme showers activated avalanches and caused the discharge of surplus water and forced the release of excess water from

37 dams across the state, aggravating the flood impact. First time ever in 26 years all the five flood gates of the Idukki dam were unlocked.

As per available government sources, the seven worst affected districts were Alappuzha, Ernakulam, Idukki, Kottayam, Pathanamthitha, Thrissur, and Wayanad, where the whole district was devastated by flood. As per the information bestowed by Government of Kerala, 433 people lost their lives between 29 May 2018 and 29 August 2018, among which 64 were children. There was a point of time when more than 14.5 lakh people were displaced and sheltered in the relief camps. The prolonged flooding and ravaging landslides ensued in hefty damage to houses, roads, and agricultural land. Over 17,000 homes were completely shattered while 2.17 lakh was partially damaged.

Under this frame of reference the study was undertaken with the following specific objectives

1. Assess the socio psychological constructs of rice farmers of Kuttanad after flood

2. Explore and analyse the factors that influence flood as perceived by the farmers

3. Delineate the strategies to mitigate the post flood situation as perceived by the farmers and officials.

1.2 Scope and importance of the study

Kuttanad, a region spread across both Kottayam and Alappuzha districts has the lowest altitude in the country. The place lays several metres below sea level, which is a rare phenomenon and is considered as a Globally Important Agricultural Heritage System by the Food and Agriculture Organization (FAO). Known for its extensive paddy fields, Kuttanad is also a major flood-prone area in Kerala.

The floods of 2018 battered the region extensively. Water from the first flood

of July 2018 had not dwindled completely when the second flood hit Kuttanad in August making the lives arduous across the region. Spoliation of the outer bunds in several areas due to heavy rain made the situation even worse in Kuttanad. Hundreds of hectares of paddy fields got inundated and thousands in the region had to live in relief camps for several months. Motor pumps in the paddy fields that were supposed to draw off the water also got destroyed in the heavy flooding. There are certain pockets in Kuttanad like R-Block where human habitation is impossible anymore. People are still staying in temporary shelters on the bunds since the government and the residents are yet to reach a common ground on resettlement options. Kainakari, Pulinkunnu, Kavalam, Nedumudi, Chambakulam, Ramankary, Thakazhi, etc. were some of the worst-affected panchayats in the region.

Climate change is an intricate process where one change will feed into another, making the results incalculable. It is noteworthy straight forward admission that Kuttanad will never be the same again and that its people need to attune to the climate change that is to stay. Lessons learnt from the adversities are pivotal in evolving a more in to response and nurturing a resilient society. Hence it is important to conduct socio-psychological studies related to flood management in order to devise appropriate strategy for preparedness and mitigation.

1.3 Limitations of the study

The findings of this study have to be seen in light of some limitations. The possible methodological limitations of the study include lack of ample research studies on the topic. The study also had constraints like time and meager resources. The study was also clampdown to restricted sites purposefully. Finally the study results are based on responses obtained from the respondents verbally.

CHAPTER 2
REVIEW OF LITERATURE

Review of literature provides a comprehensive summary of previous research on the topic "Assessment of socio psychological constructs in post flood situation: the case of Kuttanad rice farmers". Theoretical definitions, explanations, concepts and thoughts have been explained in detail in this chapter and additionally helps to perceive and link our research effort with others related efforts. It acts as a benchmark for the researcher while per forming the study. An effort has been made to study and analyze the material associated with the topic, having direct and oblique bearing on the subject matter. In this chapter, the information gathered has been critically analyzed, and each work is placed in the context of its contribution to understand the research problem that is being studied.

2.1. Concept of emotional intelligence

2.2. Profile characteristics of farmers

2.1. Concept of emotional intelligence (EI)

The concept of EI was first proposed by Salovey and Mayer (1990) and they described it as "social intelligence that includes the capacity to screen our individual feelings and sentiments and those of others, to differentiate among them and at last utilize this data to direct one's thoughts and actions".

Goleman (1995) defined EI as the potential of managing emotions in oneself and ones relationships with others, making fine teamwork, leading others, and forecasting the future. Self-awareness, motivation, self-regulation, empathy, and social talents are factors associated with productive emotional intelligence

Mayer and Geher (1996) expound EI as one's ability to identify emotions, to access and generate emotions, to realize and understand emotions and emotional meanings and to regulate emotions so as to promote better emotion and thought.

According to Cooper (1997) people with superior levels of emotional insights build more grounded personal relationships, enjoy improved well being, has more successful leadership skills and are more likely to excel in career compared to those

with weaker emotional intelligence.

Goleman (1998) opined that EI is the best predictor of work and life success.

Pandey and Tripathy (2004) in their study on development of EI found that effect of age on EI was highly significant.

Tyagi (2004) in his study on EI in relation to gender and age identified that the level of EI is low and independent of age.

Gardner (2005) characterised EI as the ability to distinguish, utilize, recognise and oversee feelings and emotions.

Deore (2006) in her study on association between EI and stress stated that EI is the ability to perceive, evaluate and control ones emotions.

Bala (2011) recognised that older children showed higher proficiency compared to younger equivalents. Further, it was noticed that greater the emotional intelligence with advanced age. Moreover, it was detailed that emotional maturity was emphatically related to psychological development.

Bhuvaneswari (2013) in her study on impact of emotional intelligence of business executives at work stated that EI and work outcomes are significantly correlated.

Serrat (2017) defined Emotional intelligence as the skill, capacity and competence, to distinguish and oversee the feelings and sentiments of oneself and others.

2.2. Profile characteristics of Farmers
2.2.1. Age

Thomas (2004) reported that majority (56.4%) of Kuttanadan rice farmers are middle aged followed by old aged (26%) and then young aged

Obaiah (2004) revealed that more than half of the rice growers (52.14%) were middle aged followed by young age (26.43%) and old aged (21.43%).

Kumar (2008) found out majority of farmers in Palakkad district (59%) in the old aged group followed by middle age (38%) and young age (3%).

Nirmala (2012) identified that a major part of the SRI (System of Rice

Intensification) paddy cultivators belonged to middle age group (57.5%) followed by young age (32.5%) and old age group (10%).

Chayal *et al.,* (2013) reported (detailed) that 52.50 per cent of the respondents belonged to middle age group while 30.83 per cent belonged to young age and 16.67 per cent were from old age group.

According to Samarpita (2016) majority of the farmers (64.17%) were middle aged followed by old age (33.33%) and young age (2.5 %).

Arya (2018) reported that 42.50 per cent of the rice farmers belonged to middle age group while 32.50 percent were from old age group and 25 per cent were from young age group.

2.2.2. Education

Thomas (2004) found out 96.43 per cent of literacy rate among the farmers of Kuttanad taluk in Kerala.

According to Rahman (2007) nearly all of the rice farmers (47.3%) received secondary education followed by those with higher secondary level education (2.7%) and college level education (2.7%).

Kiran (2010) identified that majority of the rice farmers (64%) had school level education followed by college level (24%) and illiterate (12%).

Balakrishnan (2011) categorized majority of the rice farmers (45.83%) under high school level of education followed by higher secondary (20%), college level (15%), primary school (4.17%) and functionally literate (1.67%).

According to Samarpita (2016) majority of the farmers (41.67%) were educated upto SSC (Senior Secondary School) to intermediate level followed by those with primary level education (26.67%), illiterates (20.83%) and graduates (10.83%).

Nair (2017) revealed that majority of the farmers (30%) were having middle school education followed by high school (26.67%), primary school (23.33%) and college level education

Arya (2018) reported that 31.67 per cent of the farmers completed their middle schools whereas 30% had primary level education , 20% illiterate and 18.33 % had high school and above education.

2.2.3. Gender

According to Prasidha (2006) gender is a relationship system in contrast to an attribute that distinguish as male and female.

Babu *et al.,* (2011) observed that majority of the farmers were male (98.40%) followed by females (1.60%).

Crowfard (2011) reported that men comprised about 70 per cent of the farming population while females constituted only 30 per cent.

Poojakumari (2015) opined that in general as farm managers both male and female farmers are equally efficient.

Wakhet (2019) identified that majority of the rice farmers (98.34%) were male followed by female farmers (1.66%).

2.2.4. Farming Experience

Lekshmi (2006) identified that larger part of the rice farmers (38.33%) had greater experience in farming followed by average (31.67%) and reduced (30%) experiences.

Rabari (2006) observed that majority of the rice farmers (54.00%) had medium level of farming experience followed by low (26.00%) and high (20.00%).

Ahire and Thorat (2007) revealed that majority of the farmers (40%) had more than ten years of farming experience followed by five to ten years (34.17%) and less than five years (25.83%).

Kiran (2010) categorized majority of the rice farmers (44%) under medium farming experience, followed by low (29%) and high category (27%).

Thiyagu (2011) observed medium level of farming experience among majority (46.7%) of the SRI paddy farmers followed by low (30.80%) and high (22.50%) level of farming experience.

Balakrishnan (2011) found that majority of the rice farmers (49.17%) had medium level of experience followed by high (30%) and low (20.83%).

Samarpita (2016) reported that 32.50 per cent of the farmers were having 11 to

20 years of farming experience, 31.67 per cent had 21 to 30 years, 25. 83 per cent had greater than 30 years of experience while 10 per cent had up to 10 years of experience in rice cultivation.

2.2.5. Annual Income

Bankar (2004) identified that major share of the rice farmers (49.33%) were found to be having medium annual income followed by low level (30.00%) and high annual income (20.67%).

Deore (2006) found that majority of the respondents (43.00%) had medium annual income followed by low (36.50%) and high level of annual income (20.50%).

Nirban (2006) observed that 85.92 per cent of the respondents belonged to medium category of annual income while 10.00 per cent was low and 4.08 per cent had high level of annual income.

Ranaware (2009) reported that 80.83 per cent of the farmers were having medium annual income whereas 11.67 per cent had low and 7.50 per cent had high level of annual income.

Bhosale (2010) categorized majority of the rice farmers (44.29%) into medium income group followed by high (37.14%) and low (18.57%).

Thakur (2011) observed that majority of the rice farmers (49.17%) were having medium annual income followed by low (39.17%) and high annual income (11.66%).

Wadekar (2013) found that 43.33 per cent of the rice farmers belonged to low annual income category whereas 32.50 per cent and 24.16 per cent had medium and high level of annual income respectively.

2.2.6. Area under Cultivation

Ramesh and Govind (2004) revealed that 48 per cent of the rice farmers were under medium farm size group while 32 per cent were under low and 20 per cent under high farm size group.

Adewale (2007) observed that majority of the rice farmers (55.00%) were

marginal farmers followed by an equal proportion of small and large farmers (22.50%).

Rahman (2007) categorized majority of the rice farmers under medium farm size (53.60%) followed by small (23.60%) and large farmers (22.70%).

Manjunatha (2010) identified that majority of the rice farmers (32.57%) belonged to medium category followed by semi medium (23.43%), small (17.72 %), marginal (14.28%) and big farmers (12.00%)

Balakrishnan (2011) found that majority of the rice farmers (54.17%) belonged to marginal farmer category followed by small farmers (30.00%) and big farmers (15.83%)

Meena and Sharma (2012) opined that about 72 per cent of the rice farmers were big farmers while 23 per cent were small farmers and 5 per cent were marginal farmers.

Karangami (2017) classified more than half of the respondents (52.50%) under medium area under rice cultivation followed by low (37.50%) and high area under rice cultivation (10.00%).

2.2.7. Self Confidence

Vimalraj (2010) reported that half of the respondents (50%) had medium degree of self confidence followed by high level of self confidence (6.5%) and low level of self confidence (44.5%).

Wakhet (2019) stated that majority of the rice farmers (76.67%) had medium level of self confidence followed by high level of self confidence (20.83%) and low level of self confidence (2.50%).

Nair (2017) opined that majority of the farmers belonged to medium category of self confidence irrespective of small or marginal farmers.

2.2.8. Innovation Proneness

Sanjaykumar (2003) categorized more than half (72.50%) of the farmer respondents under medium level of innovation proneness while few belonged to high

(16.25%) and low (11.25%) level of innovation proneness.

Patel (2006) observed that almost half of the respondents (41.20%) had medium level of innovation proneness while some (31.60%) had high level of innovation proneness and little (27.20%) had low level of innovation proneness.

Vimalraj (2010) found that majority of the farmers (46.70%) belonged to medium level of innovation proneness whereas some farmers (36.70%) belonged to high level of innovation proneness and a few (16.70%) belonged to low level of innovation proneness.

Reghunath (2016) revealed that majority of the farmers (54.17%) belonged to medium level of innovation proneness followed by low level of innovation proneness (25.00%) and high level of innovation proneness (20.83%).

Athira (2017) observed that most of the farmers are keen to know about new thoughts and practices and new methods to reap higher outcomes in their farm.

Anju (2018) categorized majority of the farmers under medium level of innovation proneness (70.00%) followed by low level of innovation proneness (16.67%) and high level of innovation proneness (13.33%).

2.2.9. Risk Propensity

Santhi (2006) found that about two-third of the rice farmers (65.83%) belonged to medium category of risk orientation followed by high level of risk orientation (19.17%) and low level of risk orientation (15.00%).

Kiran (2010) established that majority of the rice farmers (86.00%) had medium level of risk orientation followed by high level of risk orientation (19.17%) and low level of risk orientation (15.00%).

Vimalraj (2010) noted that 16.7 per cent of the farmers are by no means equipped to take any threat in their ventures also none of the farmers preferred to take 100 per cent risk.

Kumar (2012) opined that majority of the SRI farmers (75.00%) had medium level of risk orientation followed by low level of risk orientation (14.17%) and high level of risk orientation (10.83%).

Birla (2016) reported that majority of the rice farmers (47.50%) had medium risk orientation followed by low risk orientation (35.83%) while only few (16.67%) had high risk orientation.

Arya (2018) classified majority of the respondent farmers (45.00%) under low level of risk orientation followed by medium level of risk orientation (31.67%) and high risk orientation (23.33%).

2.2.10. Problem Solving Ability

According to Vimalraj (2010) more than half of the farmers (56.70%) had high level of problem solving ability followed by medium level of problem solving ability (40.00%) and low level of problem solving ability (3.30%).

Sundaran (2016) observed that more than half of the respondents had medium problem solving ability (64.45%) followed by low level of problem solving ability (20.00%) and high level of problem solving ability (15.55%).

2.2.11. Optimism

According to Nes and Segerstrom (2006) optimism was found to be positively correlated with coping techniques ideated to dispose of and reduce, or control the stressful situations.

In contrast to pessimist optimist tend to use coping techniques that focalize on the problem more frequently (Rasmussen, 2003).

Anantarao (2018) identified that more than half of the respondents (70.83%) were in medium level of optimism followed by low level of optimism (15.00%) and high level of optimism (13.33%).

Shambharkar (2018) opined that majority of the farmers (66.39%) belonged to medium category of optimism level followed by low level (19.72%) and high level of optimism (13.89%).

CHAPTER 3
METHODOLOGY

This chapter provides an idea on various approaches and techniques followed in the study. It emphasizes on the research methodology adopted for the study which includes the particulars on research design, sampling procedure, variables and their quantification, data collection methods and the statistical tools employed under the following subheadings.

3.1 Research design

3.2 Locale of the study

3.3 Selection of respondents

3.4 Operationalisation and measurement of variables

3.5 Factors influencing flood as perceived by farmers

3.6. Measures taken by farmers during and post to mitigate flood

3.7. Strategies to mitigate the post flood situation according to farmers and officials

3.8. Change in rice area and rice yield

3.9. Material and non-material changes

3.10. Methods and tools for collection of data

3.11. Statistical tools used for the study

3.1. RESEARCH DESIGN

The design of a research topic explains the type of research and techniques chosen by a researcher in carrying out the research. It furnishes guidelines for data collection in order to acquire answers to the research problem.

For the study of the research problem Ex-post-facto research design was followed. This is the type of research design where the investigation is carried out after the phenomenon. Kerlinger (1973) remarked that researchers do not have direct control over the variables as they are already exposed and no manipulation is possible.

3.2. LOCALE OF THE STUDY

The study was conducted in the Kuttanad region of Alappuzha district. Chambakulam block and Veliyanad block were purposively selected as these were the worst flood affected blocks with respect to rice cultivation in Kuttanad.

3.3. SELECTION OF RESPONDENTS

The respondent groups of the study comprises of 40 farmers each from Chambakulam block and Veliyanad block. From each of the blocks two most severely flood affected grama panchayats were chosen as the study area. The panchayats thus selected were Chambakulam, Nedumudi, Pulikunnu and   Ramankary. From each of these panchayats 20 farmers were selected, thus forming a total sample size of 80 farmers.

The second category of respondent group comprised of 30 officers from State Department of Agriculture, working in that area. Thus a total of 80 farmers and 30 officers were selected for the study.
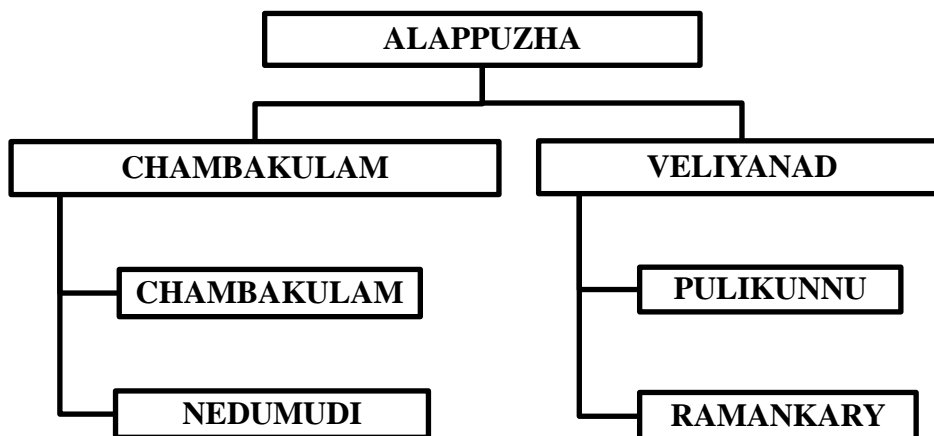
80 Farmers + 30 officials =110

Fig 3.2 Sampling design of the study
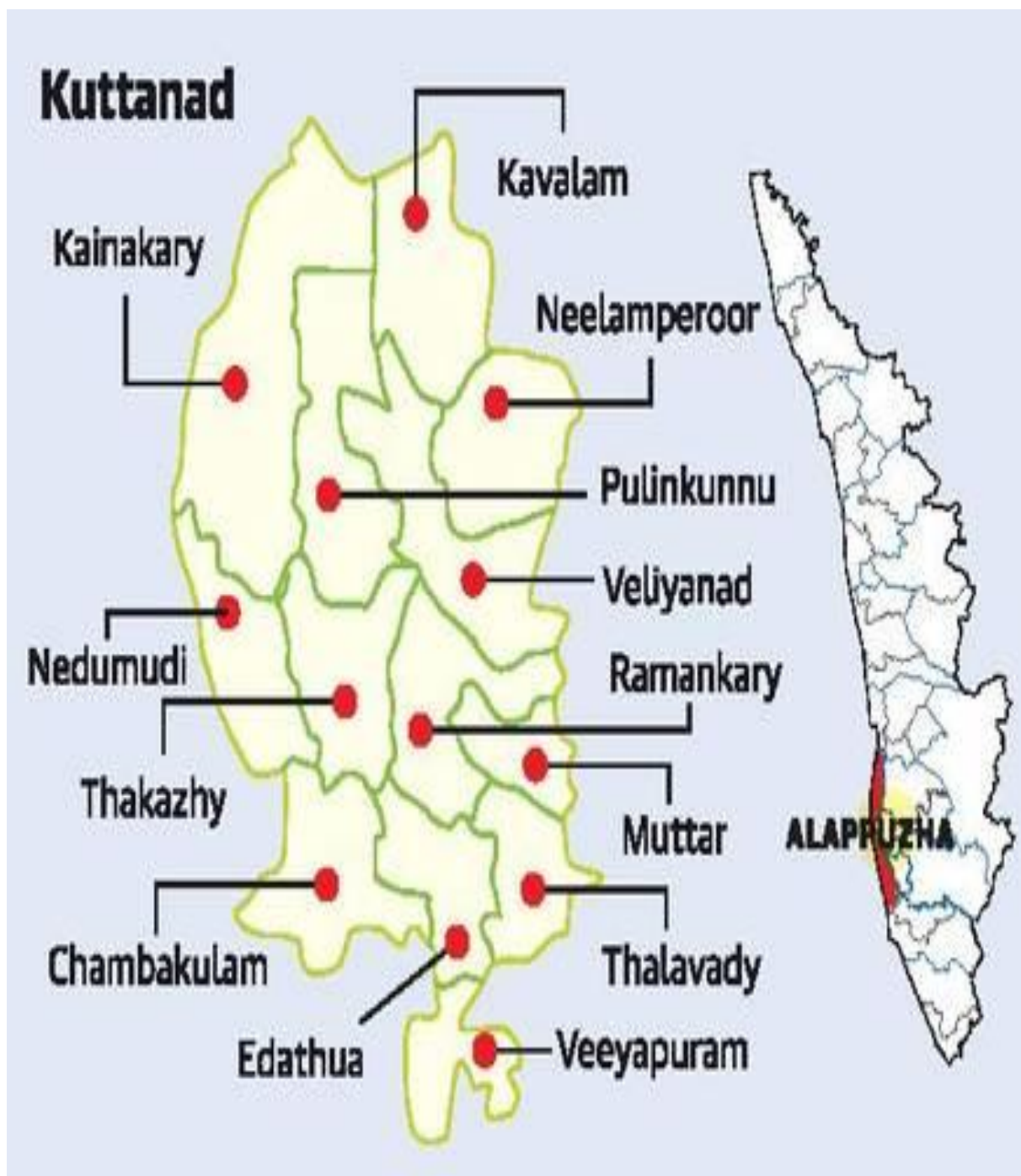
Fig 3.1 Map showing locale of the study

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3.4. OPERATIONALISATION AND MEASUREMENT OF VARIABLES

3.4.1. Independent variable

The following independent variables were chosen for the study.

3.4.1.1. *Age*

Age indicates the number of calendar years completed by the farmers at the time of interview. The age of farmers was categorized into three groups based on the median value obtained as shown below. The result on categorization of respondents based on age was expressed in frequency and percentage analysis.

SL. No	Category	Score
1.	Below median age	1
2.	Median age	2
3.	Above median age	3

3.4.1.2. *Education*

Functionally identified as, the level as the level of formal education received by the farmers. Measured using the scoring procedure developed by Trivedi (1963) and followed by Sobha (2013). Frequency and percentage analysis was performed to interpret the data. The scoring pattern is as shown below.

SL. NO	Category	Score
1	Illiterate	1
2	Can read and write	2
3	Primary	3
4	Middle	4

5	High School	5
6	College	6
7	Professional degree	7

3.4.1.3. *Gender*

According to gender, the respondents were grouped as males and females. A code of 1 for males and 2 for females was followed. Categorization was done using frequency and percentage.

3.4.1.4. *Farming Experience*

Farming experience refers to the number of years the respondent has been engaged in farming. The farming experience of the farmers was categorized into three groups based on the mean value obtained. Categorization was done using frequency and percentage.

SL. No	Category	Score
1.	Below mean experience	1
2.	Mean experience	2
3.	Above mean experience	3

3.4.1.5. *Area under cultivation*

Operationally defined as, the total land cultivated by the respondent during the time of conducting survey. This was then categorized into three groups on the basis of mean value obtained. Categorization was done using frequency and percentage.

SL. No	Category	Score
1.	Below mean area	1
2.	Mean area	2
3.	Above mean area	3

3.4.1.6. *Income*

Income refers to the annual income of the family *i .e,* the total earnings of the family for one year from agriculture and other sources expressed in terms of rupees. Categorization was done as shown below. Frequency and percentage analysis was performed to interpret the data.

SL. No	Category	Score
1.	Below mean income	1
2.	Mean income	2
3.	Above mean income	3

3.4.1.7. *Self Confidence*

Self confidence was defined as the feeling of an individual's ability about initiative and zeal to achieve his goal or aim. The scale developed by Basavana (1971) and used by Thasneem (2016) consisting of 10 statements, with four positive and six negative statements was used in measuring self confidence of farmers. The responses were obtained on a five point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2, 1 respectively for positive statements and the reverse for negative statements. The scale used for data collection is enclosed in the appendix (2). The minimum and maximum score likely for each respondent was 10 and 50 respectively. The respondents were categorized into low, medium and high self confidence based on range.

3.4.1.8. *Problem Solving Ability*

Operationally defined as the ability of the respondent to recognise the problem, find the solution, decide on the best one and employ it. To measure the problem solving ability, the procedure developed by Sundaran (2016) was used. The scale consists of eight statements, with six positive statements and two negative statements. The responses were obtained in five continuums viz., strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2, 1 respectively

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for positive statements and the reverse for negative statements. The scale used for data collection is enclosed in the appendix (2). The possible range of scores was 8 to 40. After data collection the students were categorized as low, medium and high level of problem solving ability based on range.

3.4.1.9. *Risk Propensity*

Risk propensity can be defined as the degree to which an entity is willing to take chances with respect to risk of loss. A test consisting of six statements was made for measuring the risk propensity of farmers and the responses were recorded on a five point continuum namely, strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2, 1 respectively for positive statements and the reverse for negative statements. The scale used for data collection is enclosed in the appendix (2). The possible range of scores was 6 to 30. Further the data was categorized into low, medium and high level of attitude based on range.

3.4.1.10. *Innovation Proneness*

Innovation proneness was conceptualized as the degree to which the respondent is comparatively quicker in adopting new ideas. Innovation proneness was measured using the scale followed by Gurubalan (2007). The scale comprised of five statements of which 2 are positive and 3 are negative statement and rated on a five point continuum such as strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2, 1 respectively for positive statements and the reverse for negative statements. The scale used for data collection is enclosed in the appendix (2).

The possible range of scores was 5 to 25. After data collection the farmers were then categorized into low, medium and high level of innovation proneness in accordance with range.

3.4.1.11. *Optimism*

Optimism refers to the hopefulness and confidence about the future or the success of something. A test consisting of five statements was made for measuring the optimism of farmers and the responses were recorded on a five point continuum

namely, strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2, 1 respectively for positive statements and the reverse for negative statements. The scale used for data collection is enclosed in the appendix (2). The possible range of scores was 5 to 25. The data obtained was interpreted using frequency and percentage analysis.

3.4.2. Dependent Variable

Emotional feeling in terms of Emotional Quotient (EQ) which is also known as Emotional Intelligence (EI) was the major dependent variable of the study.

3.4.2.1. *Emotional Quotient (EQ)*

EQ was operationalized as the ability to recognize one's own sentiments and of others, managing emotions and motivating ourselves. EQ was measured in terms of self awareness, self regulation, motivation, empathy and social skills on the basis of framework of five elements developed by Goleman (1995) with sufficient modification.

1. Self-Awareness: Knowing what we are feeling at the moment and using those priorities to direct one's decision making; having a sensible evaluation of one's own abilities and a well-grounded sense of self-confidence.

2. Self Regulation: The ability to respond to the constant requirements of experience with the range of emotions in a way that is generally acceptable and susceptible to allow impulsive reactions and the skill to postpone impulsive responses as necessary.

3. Motivation: Using one's innermost priorities to proceed towards one's objective, seize opportunities and strive to advance, and to have perseverance in the face of failures and disappointments.

4. Empathy: The ability to understand or feel what another person is experiencing from within their frame of reference and being able to take their perspective. That is, the capacity to position oneself in another's situation and cultivating rapport and attune with others.

5. Social Skills: Communication with others in which relations and social rules are created, communicated, and changed in verbal and nonverbal ways.

The scale had 50 statements of which 25 appropriate statements was selected and used for the study. The responses were recorded on a five point continuum namely, strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2 and1 respectively. The scale employed is enclosed in the appendix (2). Interpretation of data was done using frequency and percentage analysis.

3.5 Factors influencing flood as perceived by farmers

To study the factors influencing flood as perceived by the farmers they were requested to rank among the options listed out. Ranking was given to each factor from which the weighted average was taken to identify the most important factor influencing flood as perceived by the farmers.

3.6. Measures taken by farmers during and post to mitigate flood

Measures taken by farmers were identified through pilot study and based on this the measures taken by farmers were listed out and responses were taken as Fully, Partially, Not at all. Frequency and percentage analysis was followed to interpret the data.

3.7. Strategies to mitigate the post flood situation according to farmers and officials

To study the strategies to mitigate the post flood situation according to farmers and officials, the respondents were asked to indicate their responses against the options on a three point continuum as Very important, Important and Not important and given scores as 3, 2, 1 respectively. The data was then interpreted using frequency and percentage analysis.

3.8. Change in rice area and rice yield

To study the change in rice area and rice yield the respondents were asked about the rice area and rice yield during 2017, 2018 and 2019. To analyze the variation in rice area and rice yield t- test was performed by the investigator.

3.9. Material and Non-Material changes

Material and Non-Material changes was measured by asking the respondents regarding the effect of flood on farm, home, other material changes, social changes, economic changes and effect of flood on health, education and spiritual changes. The responses were taken as either Yes or No and given scores 2 and 1 respectively. The data obtained was interpreted using frequency and percentage analysis.

3.10 METHODS AND TOOLS FOR DATA COLLECTION

After consulting with the experts to meet the objectives of the study an interview schedule was developed. Suggestions made by the experts were incorporated and the final schedule was used for data collection. The schedule is enclosed in the appendix (2).

3.11 STATISTICAL TOOLS USED FOR THE STUDY

The data gathered was itemised and then scrutinised using suitable parametric and non-parametric tools.

3.11.1. Range

From the scores obtained for each variable range was calculated. It was the difference between maximum value and minimum value obtained. Range provides an idea about the dispersion of the data collected.

3.11.2 Median

Median is the value that separates the data into higher half and lower half and it was used to compare the data with various frequencies obtained for corresponding categories.

3.11.3. Percentage Analysis

Percentage analysis was performed to group the respondents when and where required. This was obtained by dividing the frequency of responses of each group with the total number of responses and then dividing it with hundred.

3.11.4. Weighted Average

Weighted average was used to classify the factors influencing flood as perceived by farmers based on rank given by the farmers and weighted score obtained for each constraint.

3.11.5. Simple Correlation Analysis

It is a statistical technique used to study the relationship between two variables. It was applied in this study to determine the relationship between the dependent variable and the independent variable of the study.

3.11.6. t-Test

It is a statistical method used to verify whether the difference between mean of two groups is significant or not.

3.11.7. Principal Component Analysis

Principal component analysis is the statistical procedure that is mainly used for data reduction. In case of large data sets it helps the investigator in reducing the dimensionality. It transforms large set of variables into smaller one without lose of important information. Principal component analysis was performed to analyse the influence of sub components of emotional intelligence on the total score of emotional intelligence.

3.11.8. Hypothesis testing

Following hypothesis were framed on the basis of review of literature and specific objectives of the study.

H_1: The emotional intelligence of farmers was found to be low.

H_2: There is no significant relationship between the independent and dependent variable of the study

H$_3$: There is no significant change in rice yield before and after flood

For testing the hypothesis, appropriate statistical analysis like correlation and t- Test were followed by the investigator.

Plate1. Conceptual framework of the study

CHAPTER 4

RESULTS AND DISCUSSION

The findings of the study along with its interpretation are presented in this chapter. The results are presented under the following subheadings.

4.1 Profile characteristics and distribution of farmers

4.2 Emotional intelligence of farmers

4.3 Correlation between profile characteristics of the farmers and emotional intelligence

4.4 Factors influencing flood as perceived by farmers

4.5 Measures taken by farmers during and post flood to mitigate flood

4.6 Strategies to mitigate the post flood situation according to farmers and officials

4.7 Change in rice area and yield

4.8 Material and non-material changes

4.1 Profile characteristics of the farmers

This segment contains the distribution of farmers based on profile characteristics like age, gender, education, farming experience, area under cultivation, income, self confidence, problem solving ability, risk propensity, optimism and innovation proneness.

4.1.1 Age

Age refers to the number of calendar years completed by the farmers at the time of interview. According to age of the farmers they were grouped into three categories such as young age, middle age and old age on the basis of frequency and percentage analysis. Distribution of farmers according to their age is given in table 4.1.

Table 4.1 Distribution of farmers based on age (n=80)

Sl. No	Categories	Frequency	Percentage
1	Young Age (<47)	11	13.75
2	Middle Age(47-67)	55	68.75
3	Old Age (>67)	14	17.5
Average	57		

From table 4.1 it is evident that a major share of the farmers (68.75 per cent) were middle aged followed by old aged (17.5 per cent) and then young aged (13.75 per cent). The maximum and minimum age of the respondents was 80 and 41.

The results were in line with the findings of Arya (2018) where more than half of the farmers were in middle aged category (47-67). The findings reflect the declining interest of younger generation towards rice farming. The results are represented in figure 4.1.

4.1.2 Education

Education was operationally defined as the extent of formal education received by the farmers. Distribution of farmers according to their educational status is given in table 4.2

Table 4.2 Distribution of farmers based on education (n=80)

Sl. No	Categories	Frequency	Percentage
1	Less than or equal to middle school	0	0
2	High School	32	40
3	College	38	47.5
4	Professional degree	10	12.5

Majority of the rice farmers (47.5 per cent) were educated up to college level followed by high school level (40 per cent) and professional degree level (12.5 per cent). Also none of the farmers were illiterate (Fig 4.2). The findings of the study reveal the high educational status of the farmers which is also reflected in the literacy rate of the state in as per 2011 census report.
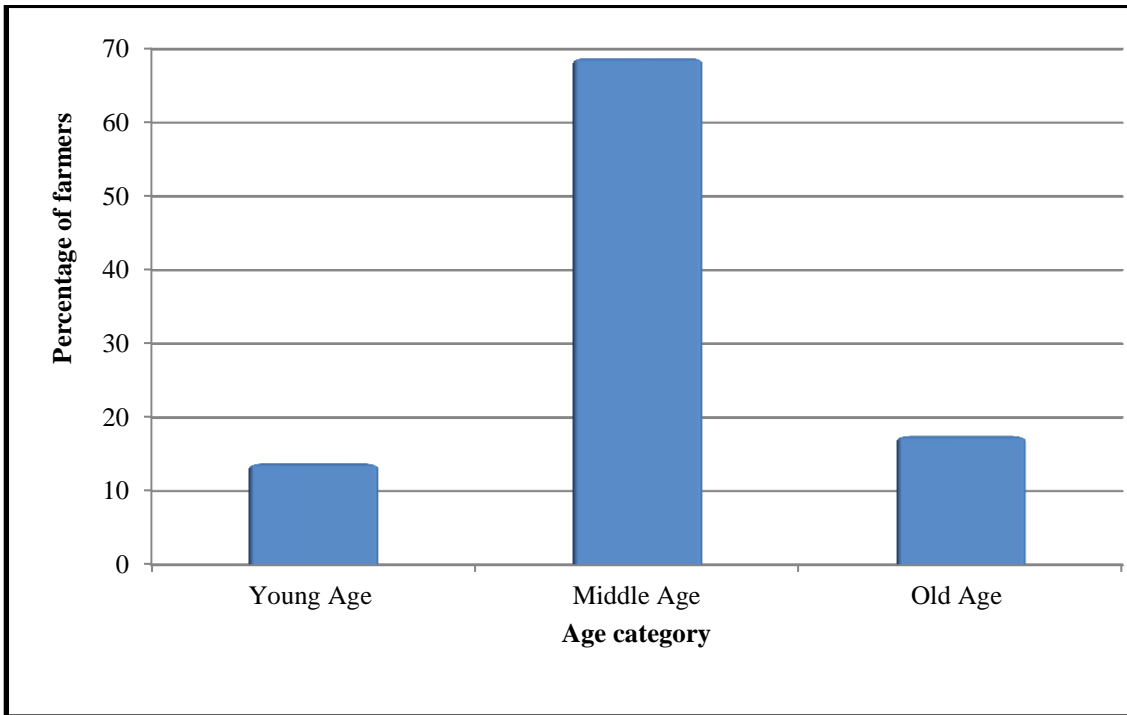
Fig 4.1 Distribution of farmers based on age
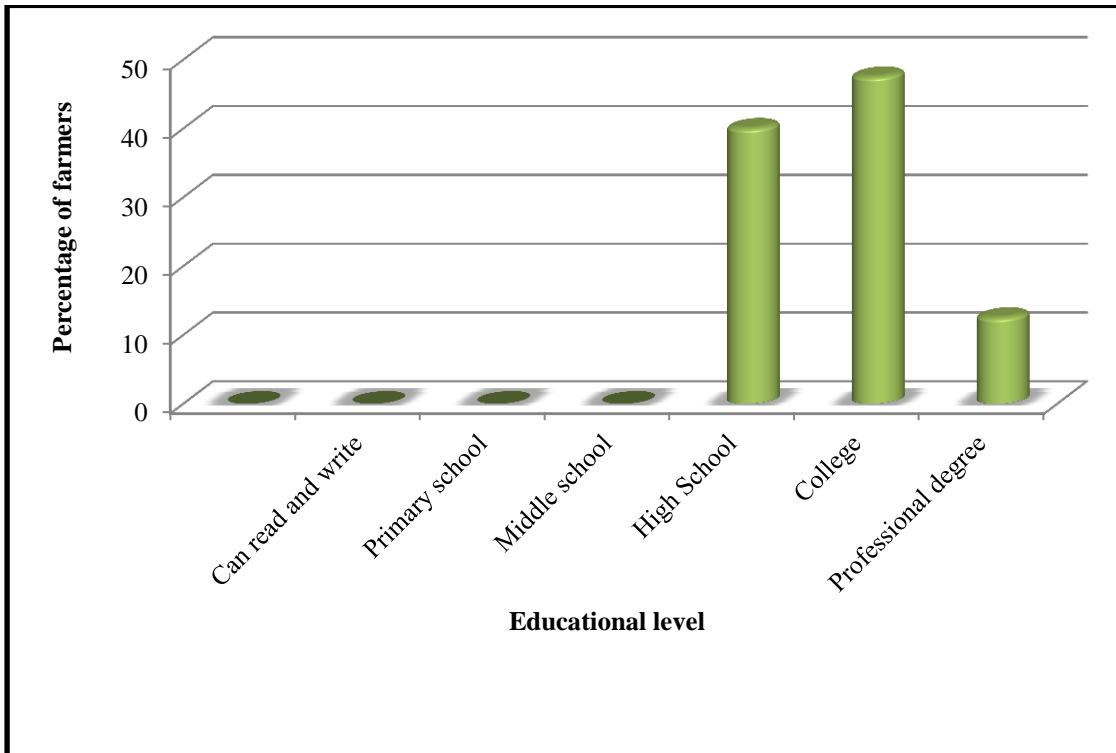
Fig 4.2 Distribution of farmers based on education

4.1.3 Gender

Distribution of farmers according to their gender is given in table 4.3

Table 4.3 Distribution of farmers based on gender (n=80)

Sl. No	Categories	Frequency	Percentage
1	Male	61	76
2	Female	19	24

From table 4.3 it is clear that majority of the rice farmers were males (76 per cent) followed by females (24 per cent). The results are presented in figure 4.3.

The rationale behind fewer women participation in rice cultivation may be because they have to take care of various household chores and look after their children. These findings are in adherence with the results of the studies carried out by Wakhet (2019).

4.1.4 Farming Experience

Farming experience refers to the number of years the respondent has been actively involved in farming. Farming experience was categorized into three groups namely low, medium and high based on range. Categorization of rice farmers according to their farming experience is given in table 4.4

Table 4.4 Distribution of farmers based on their farming experience (n=80)

Sl. No	Categories (Years)	Frequency	Percentage
1	Low(17-25)	14	17
2	Medium (25-46)	51	64
3	High(46-60)	15	19
Average		35	
Maximum experience		60	
Minimum experience		17	

From the table 4.4 it can be inferred that majority of the farmers were having medium level farming experience (64 per cent) followed by high (19 per cent) and low (17 per cent) level farming experience. The results are presented in figure 4.4

It could be inferred from the above table that most of the farmers had medium farming experience followed by those with high and low level of farming experience. The possible reason for this type of distribution might be the fact that most of the farmers belonged to middle age category. The younger generation were interested in white collar jobs and other activities hence their interest towards agriculture was low. The trend of distribution of farmers on the basis of farming experience was in compliance with Balakrishnan (2011).

4.1.5 Area under cultivation

Operationally defined as the total land cultivated by the respondent at the time of conducting survey. Area under cultivation was categorized into three groups namely low, medium and high based on range. Categorization of rice farmers according to the area under cultivation is given in table 4.5.

Table 4.5 Distribution of farmers based on their area under cultivation (n=80)

Sl. No	Categories (acre)	Frequency	Percentage
1	Low (0.5-3)	12	15
2	Medium (3-20)	60	75
3	High(20-38)	8	10
Average		12 acre	
Maximum area		38	
Minimum area		0.50	
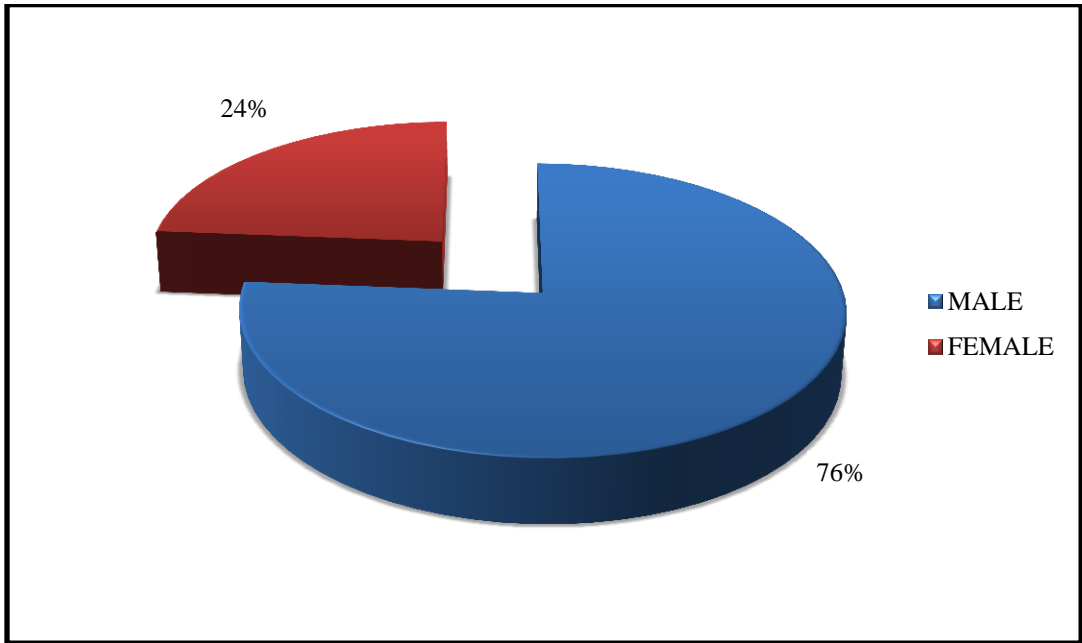
Fig 4.3 Distribution of farmers based on gender
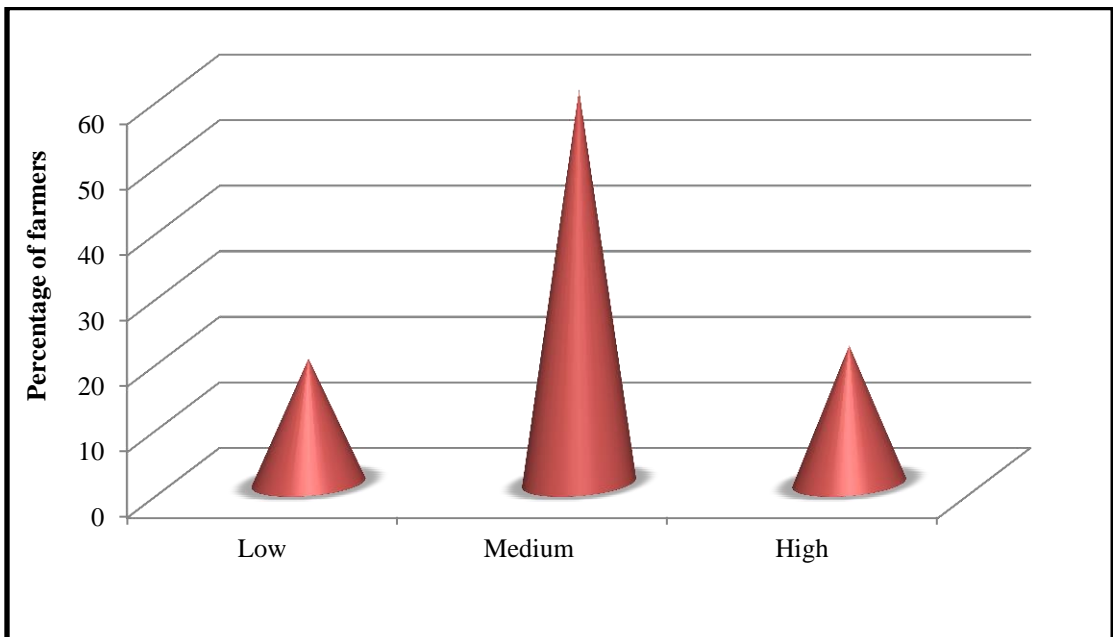
Fig 4.4 Distribution of farmers based on farming experience

From the table 4.5 it can be concluded that more than half of the rice farmers (75 per cent) belonged to medium category of area under cultivation followed by low (15 per cent) and high (10 per cent) area under cultivation. The results are presented in figure 4.5.

Most of the farmers belonged to medium category of area under cultivation followed by low and high category. Fragmentation of land could be the probable reason behind this type of distribution of rice farmers. Conversion of rice fields into commercial spaces could also be a reason for this. The results are comparable with the findings of Karangami (2017).

4.1.6 Income

Income refers to the total earnings of the household for one year from agriculture and other sources expressed in terms of rupees. On the basis of income rice farmers were categorized into three groups such as low, medium and high based on range. Categorization of rice farmers according to their income is given in table 4.6

Table 4.6 Distribution of farmers based on their income (n=80)

Sl. No	Categories (Rupees)	Frequency	Percentage
1	Low (Below 83,000)	7	9
2	Medium (83,000-5,50,000)	62	77
3	High (Above 5,50,000)	11	14
Average		3,23,000 Rupees	

From the table 4.6 it is evident that more than half of the rice farmers (77 per cent) belonged to medium category of income followed by high (14 per cent) and low (9 per cent) level of income. The results are presented in figure 4.6.

Majority of the rice farmers had medium and small land holdings this might have resulted in their medium level of income. The findings are in assent with Bhosale (2010).

4.7 Self confidence

Self confidence was defined as the feeling of an individual's ability about

initiative and zeal to achieve his goal or aim. On the basis of self confidence rice farmers were categorized into three groups such as low, medium and high based on range. Categorization of rice farmers according to their self confidence is given in table 4.7

Table 4.7 Distribution of farmers based on their self confidence (n=80)

Sl. No	Categories	Frequency	Percentage
1	Low (25-32)	16	20
2	Medium (32-42)	50	62
3	High (42-47)	14	18
Average		37	

A perusal of the table 4.7 indicates that more than half of the rice farmers (62 per cent) belonged to medium category of self confidence followed by low (20 per cent) and high (18 per cent) level of self confidence. The results are presented in figure 4.7. Majority of the rice farmers were having low to medium level of self confidence. In all these years of farming the farmers might have faced various vagaries of nature and might have incurred loss even after toiling hard. Uncertainty of the desired net return has also worsened the situation. All these factors might be the grounds for their reduced level of self confidence.

The result is in agreement with Nair (2017).

4.8 Problem solving ability

Problem solving ability was defined as the capability of the respondent to identify the problem, find the solution, select the best one and implement it. On the basis of problem solving ability rice farmers were categorized into three groups such as low, medium and high based on range. Categorization of rice farmers according to their problem solving ability is given in table 4.8

Table 4.8 Distribution of farmers based on their problem solving ability (n=80)

Sl. No	Categories	Frequency	Percentage
1	Low (25-29)	18	22
2	Medium (29-36)	50	63
3	High (36-40)	12	15
Average		32	

From the table 4.8 it is clear that more than half of the rice farmers (63 per cent) belonged to medium category of problem solving ability followed by low (22 per cent) and high (15 per cent) level of problem solving ability. The results are presented in figure 4.8.
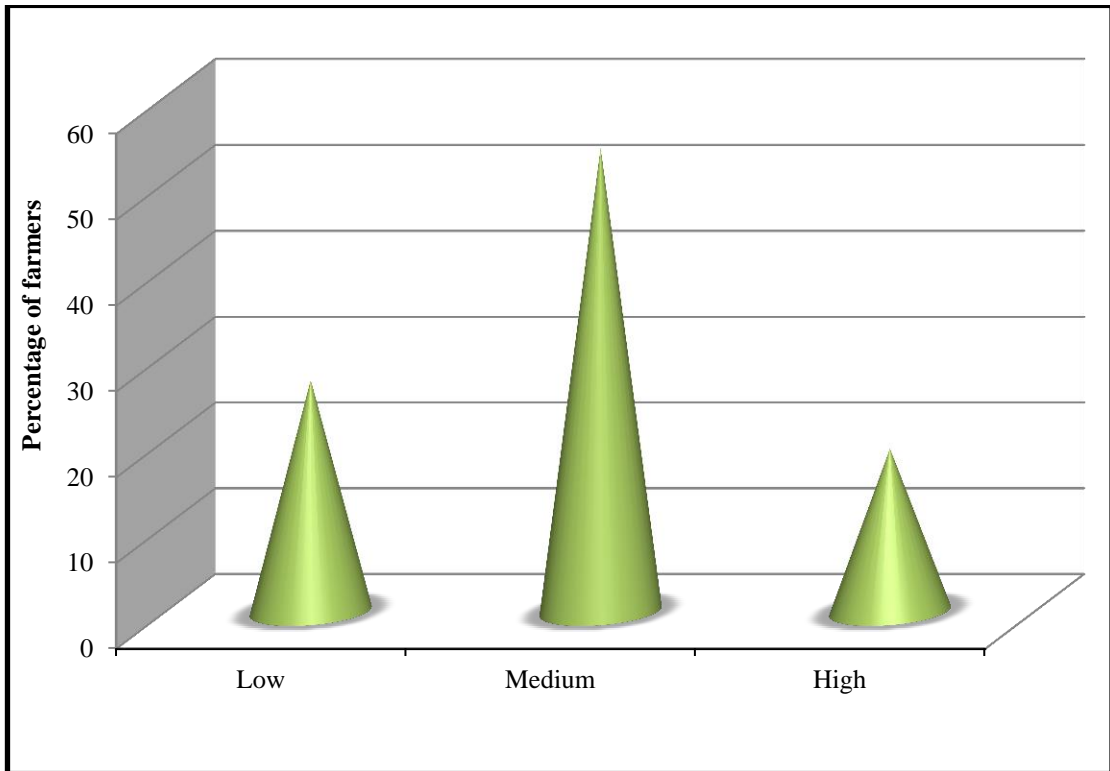
Fig 4.5 Distribution of farmers based on area under cultivation
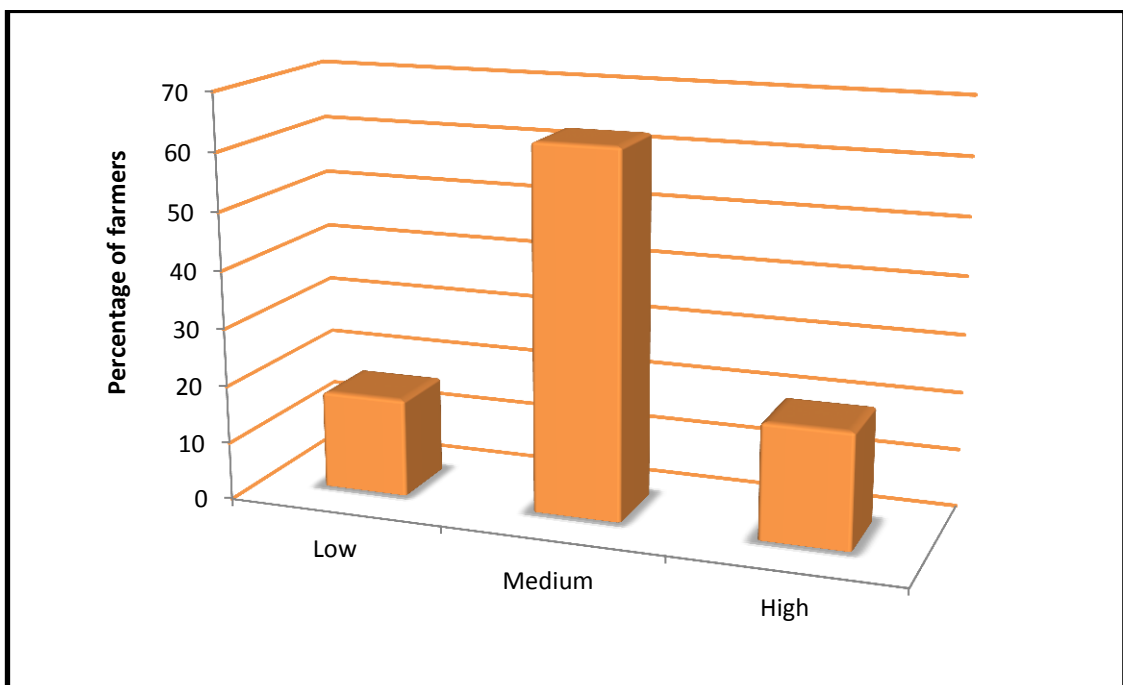
Fig 4.6 Distribution of farmers based on income

Most of the rice farmers surveyed in the study comprised of medium aged farmers. Instead of being fatalistic they look for reasons to solve their problems. This might be the reason for their medium level competencies in solving an issue.

The observations are parallel with the findings of Sundaran (2016).

4.9 Risk propensity

Risk propensity was characterised as the degree to which an entity is prepared to take chances with respect to risk of loss. On the basis of risk propensity rice farmers were classified into three groups such as low, medium and high based on range. Categorization of rice farmers corresponding to their risk propensity is given in table 4.9

Table 4.9 Distribution of farmers based on their risk (hazard) propensity (n=80)

Sl. No	Categories	Frequency	Percentage
1	Low (12-15)	22	27
2	Medium (15-24)	43	54
3	High (24-27)	15	19
Average		19	

From the table 4.9 it is obvious that more than half of the rice farmers (54 per cent) belonged to medium category of risk propensity followed by low (27 per cent) and high (19 per cent) level of risk propensity. The results are presented in figure 4.9. A close look of the above table indicates that the farmers are not that prepared to take up risk. The potential reason for this type of distribution pattern might be the medium age and farming experience of the farmers which curbs them from taking calculated risks. The result is in agreement with the findings of Birla (2016).
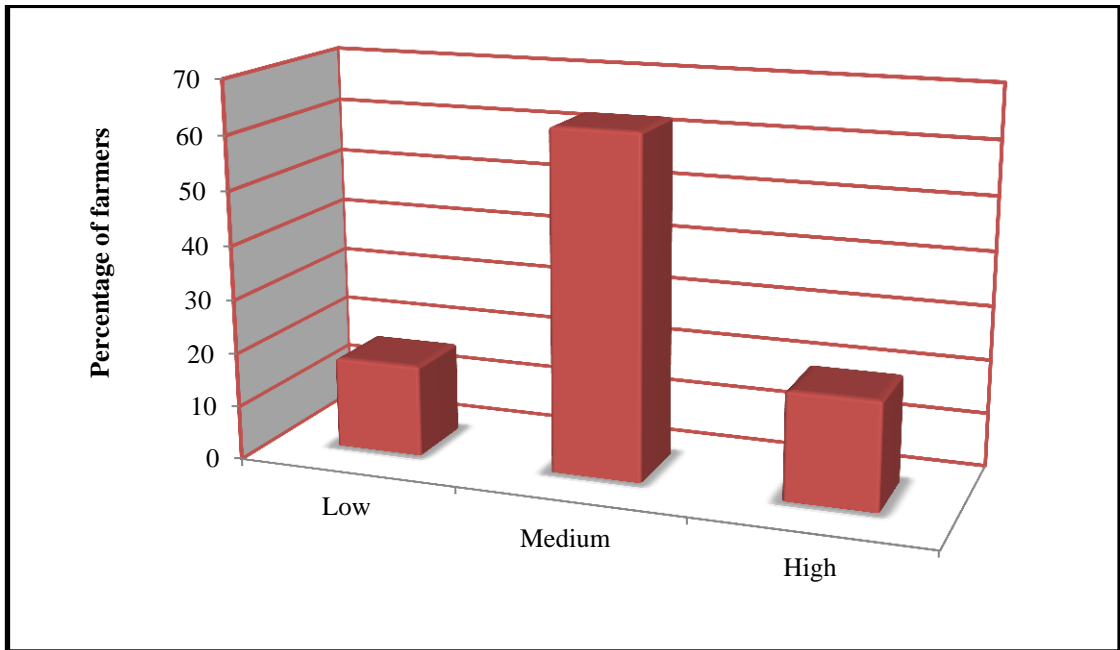
Fig 4.7 Distribution of farmers based on self confidence
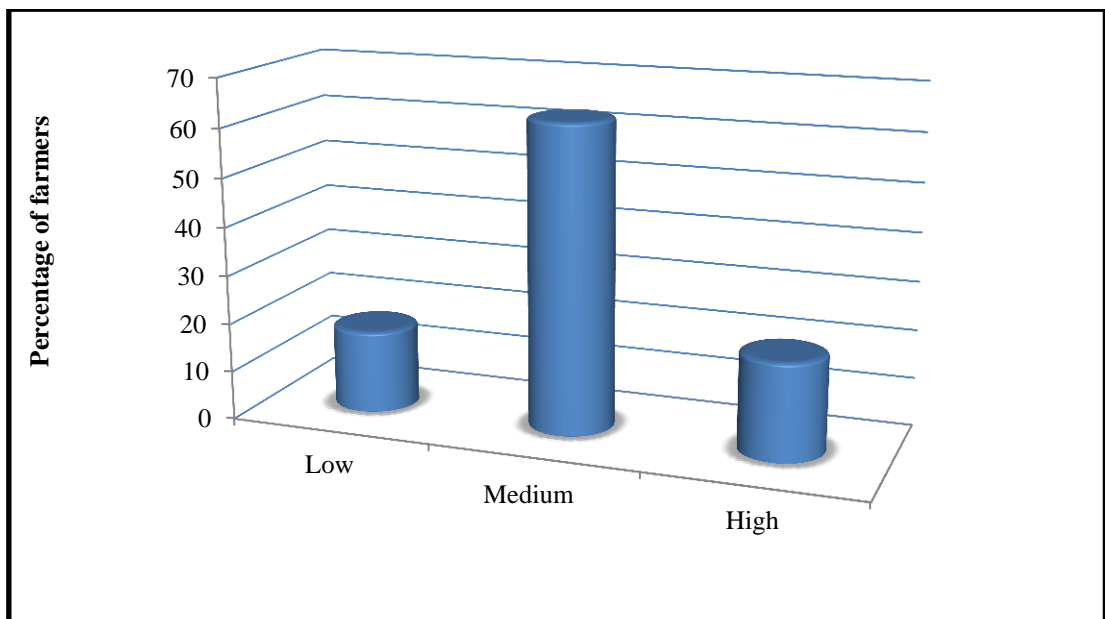
Fig 4.8 Distribution of farmers based on problem solving ability

4.10. Innovation proneness

Innovation proneness was conceptualized as to what extent the respondent is comparatively earlier in embracing novel concepts. On the basis of innovation proneness rice farmers were classified into three groups such as low, medium and high based on range. Categorization of rice farmers in accordance with their innovation proneness is given in table 4.10.

Table 4.10 Distribution of farmers based on their innovation proneness (n=80)

Sl. No	Categories	Frequency	Percentage
1	Low (8-12)	15	19
2	Medium (12-19)	48	60
3	High (19-23)	17	21
Average		15	

From the table 4.10 it is clear that more than half of the rice farmers (60 per cent) belonged to medium category of innovation proneness followed by high (21 per cent) and low (19 per cent) degree of innovation proneness. The results are presented in figure 4.10.

The possible reason behind this type of distribution pattern might be the lack of information about new technologies. Also the medium to high farming experience of the farmers made them stick to traditional practices.

The finding is in agreement with the result of the study done by Sanjaykumar (2003).

4.11. Optimism

Optimism refers to the hopefulness and confidence about the future or the success of something. On the basis of optimism rice farmers were classified into three groups such as low, medium and high based on range. Categorization of rice farmers according to their optimism is given in table 4.11
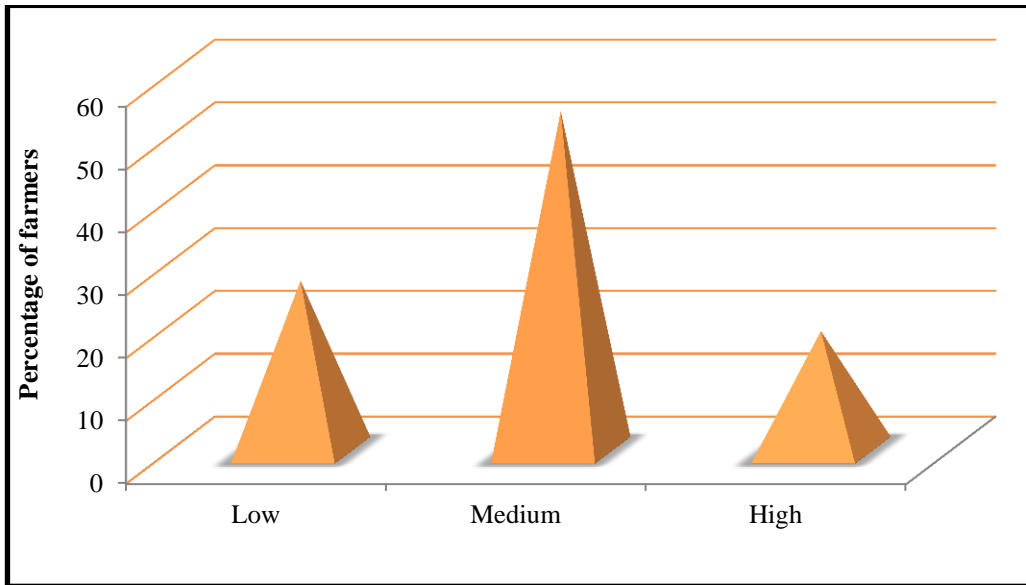
Fig 4.9 Distribution of farmers based on risk propensity
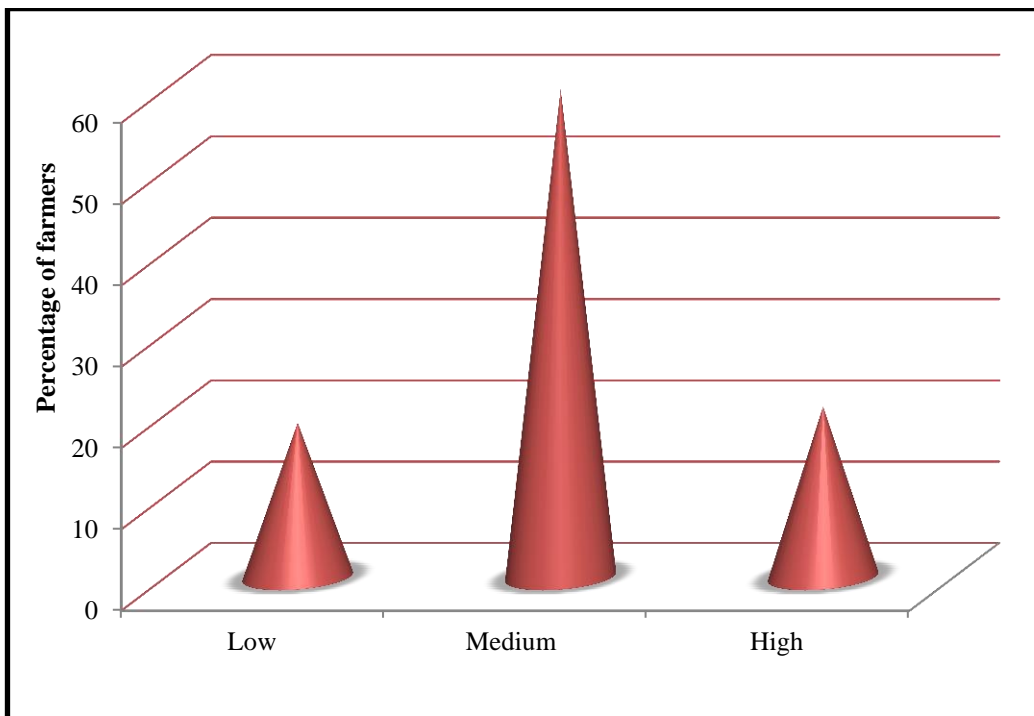
Fig 4.10 Distribution of farmers in reference to innovation proneness

Table 4.11 Allocation of farmers based on their optimism (n=80)

Sl. No	Categories	Frequency	Percentage
1	Low (10-17)	11	14
2	Medium (17-22)	48	60
3	High (22-24)	21	26
Average		19	

On the basis of table 4.11 it can be inferred that major share of the rice farmers (60 per cent) belonged to medium category of optimism succeeded by high (26 per cent) and low (14 per cent) level of optimism. The results are presented in figure 4.11.

The probable reason behind this type of distribution pattern might be the medium to high age of farmers and their experience in farming which helps them to stay optimistic even in adverse conditions.

4.2 Emotional intelligence of farmers

The distribution of farmers on the basis of their emotional intelligence is presented in table 4.12 and figure 4.12

Table 4.12 Distribution of farmers based on their emotional intelligence

Sl. No	Categories	Frequency	Percentage
1	Low (<96)	14	17
2	Medium (96-110)	50	63
3	High (>110)	16	20
Average		103	

A close look into the table of distribution of farmers on the basis of emotional intelligence revealed that majority of the farmers (63 per cent) belonged to the medium category of emotional intelligence followed by high (20 per cent) and low (17 per cent). The results are presented in figure 4.12.
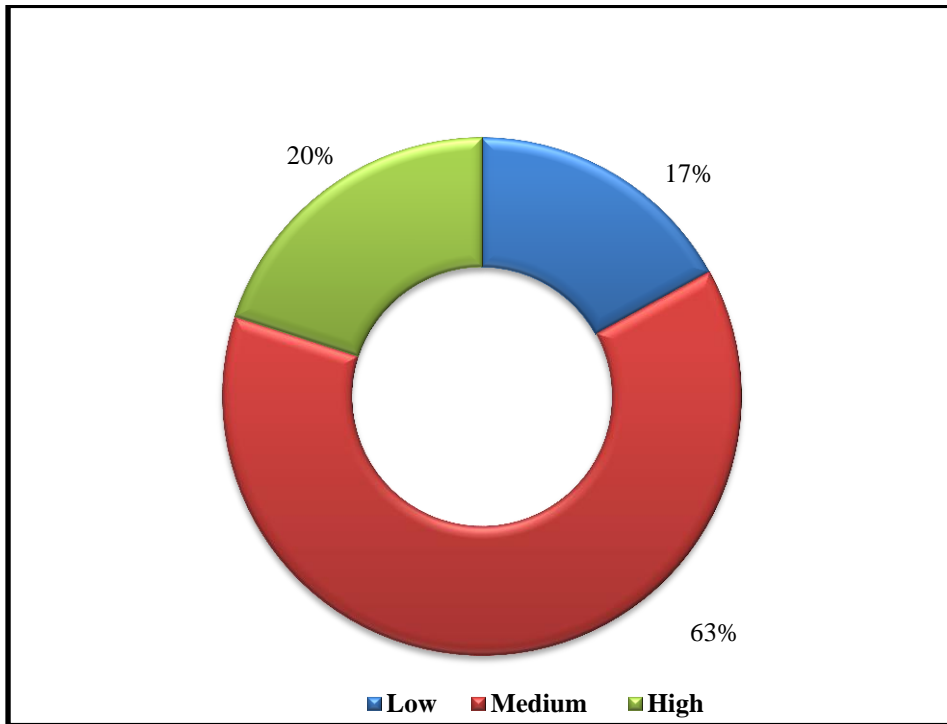
Fig 4.11 Distribution of farmers based on optimism
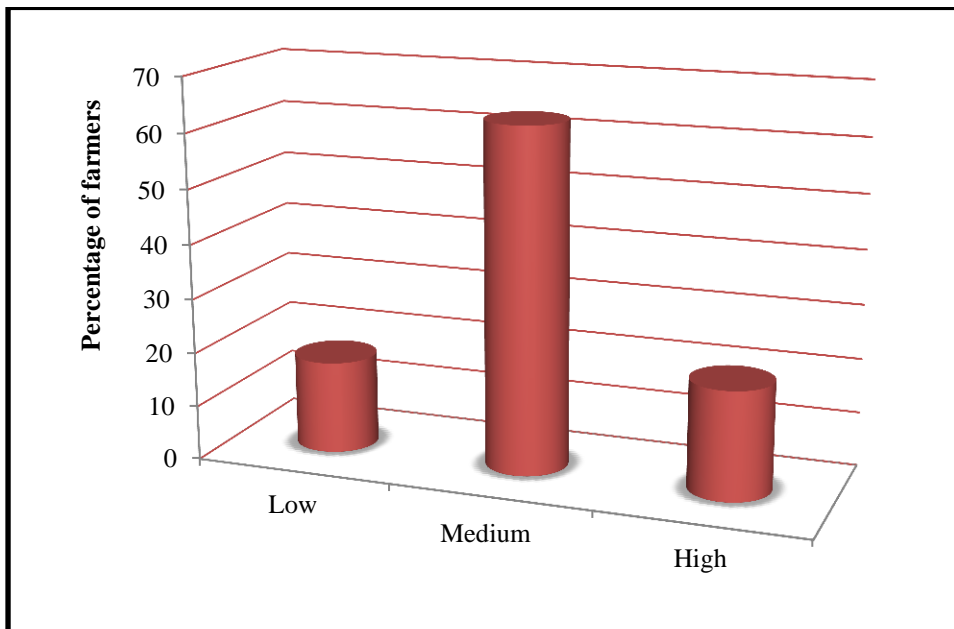
Fig 4.12 Allocation of farmers based on emotional intelligence

Possible reason behind this type of distribution pattern may be the fact that significant number of the farmers were included in the medium to high age category and were having medium to high experience in farming. The farmers could motivate themselves as well as manage their emotions admirably. The result of the study is in line with the findings of Victor (2018).

To analyse the influence of the sub components of emotional intelligence on the total score of emotional intelligence principal component analysis was performed by the investigator. On performing principal component analysis it was found that self awareness, motivating oneself and empathy were found to be the principal components having influence on emotional intelligence. This is also evident from the eigen values of these components *i.e.,* these are either greater than one or nearing one. Self awareness is the ability to manage ones inner world- their thoughts and feelings. A person who is self aware of his capabilities is always mindful and this enables him to notice subtle but important signals of life. This helps them to view problems as they arise rather than being swept away by them.

To be flexible and to manage change is critical in achieving success. A person who is motivated will focus on the benefits and output they envision. Barriers and insecurities never hold them back .Rather they anticipate the occasional setbacks and realize that goals worth achieving will have complications.

Empathy helps a person to manage his emotions effectively. An empath will be able to establish better relation with others. This makes an empath to be highly intuitive and emotionally intelligent.

Table 4.13 Principal component analysis of dimensions of emotional intelligence

	PC1	PC2	PC3	PC4	PC5
Eigen values	1.736	1.148	0.990	0.647	0.479
Proportion	0.347	0.230	0.198	0.129	0.096
Cumulative Proportion	0.347	0.577	0.775	0.904	1.000

PC 1-Self awareness   PC 2-Motivating oneself

PC 3-Empathy   PC 4-Social skills

PC 5-Managing emotions

Dimensions/component	Eigen value (Total)	Cumulative Variance (%)	Weightage
Self Awareness	1.736	34.7	0.772
Motivating Oneself	1.148	57.7	0.707
Empathy	0.990	77.5	0.716
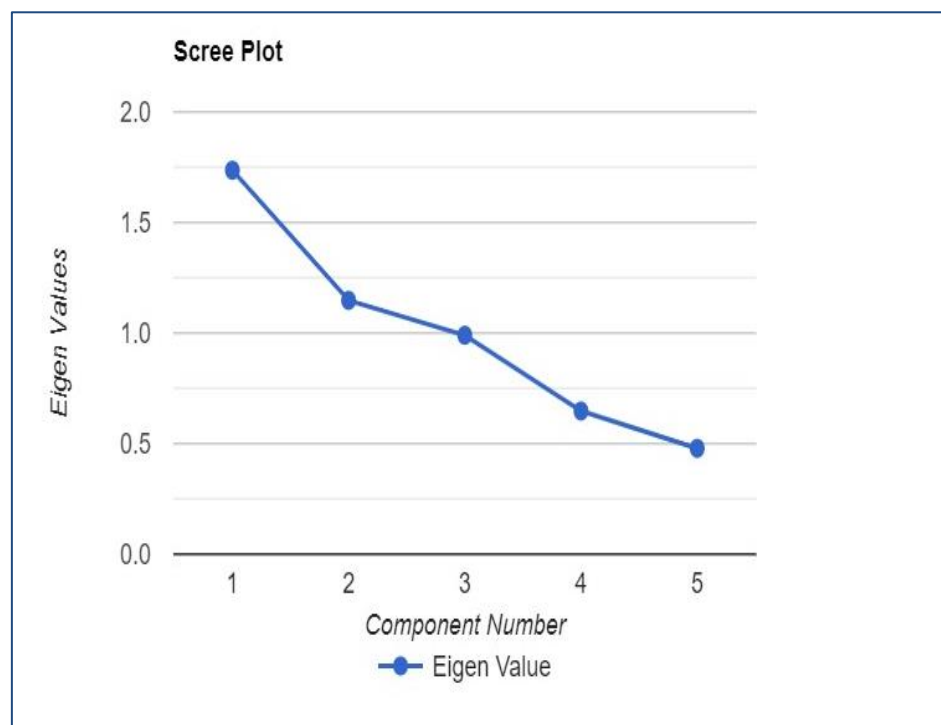
Figure 4.13 Scree plot

4.3 Correlation amongst profile characteristics of the farmers and emotional intelligence

A correlation study was performed to analyse the relationship of the profile characteristics of farmers with emotional intelligence. Correlation coefficients were calculated and examined for significance with the help of table values. The factors that affected the emotional intelligence of the farmers are presented in table 4.14.

Table 4.14 Factors that affected the emotional intelligence of the farmers.

Name of the independent variable	Correlation Coefficient
Age	0.065
Education	0.074
Gender	-0.142
Farming experience	0.095
Annual income	0.122
Area under cultivation	-0.049
Self confidence	**0.705****
Problem solving ability	**0.686****
Risk propensity	0.087
Innovation proneness	0.023
Optimism	**0.432***

**Significant at 1% level of significance

*Significant at 5% level of significance

From the above table it is lucid that self confidence *ie.,* self worth and problem solving ability(capability to resolve problems) of the farmers is having positive as well as significant relationship with the emotional intelligence of the farmers at 1 per cent level of significance. Whereas optimism is positively and significantly related to emotional intelligence at 5 per cent level of significance. Conversely other variables like age, education, gender, farming experience, annual income, area under cultivation, risk propensity and innovation proneness are not significantly related with the emotional intelligence of the farmers.

4.3.1 Self confidence and emotional intelligence of the farmers

The correlation analysis revealed that the farmers with high self confidence also had high emotional intelligence. Self confidence reflects the emotional component of an individual's personality. It is a positive and balanced attitude having to do with the self dimension. It is also the most significant factor that determines how an individual feel, think and behave. A person with high self confidence will not depend on others for his emotional sustenance. Despite of all the odds faced by a farmer, if he has high level of self confidence he could make things in his way and do all that is needed to produce the desired outcome. So the result obtained is logical because a self confident person will have more control over his emotions.

The above results are in line with results of the study conducted by Laborde *et al.,* (2013).

4.3.2 Problem solving ability and emotional intelligence of the farmers

From the correlation analysis it is clear that farmers with high problem solving ability also had high emotional intelligence. It involves effectively solving problems of personal and impersonal nature. People with low emotional intelligence jump into solutions, avoid dealing with problems, ignores emotional information and feels overwhelmed. Whereas it is the opposite in the case of people with high emotional intelligence, they use a measured approach in problem solving.

The more effective a farmer's problem solving ability, greater will be his emotional intelligence. This enables the farmer to see a problem from different perspective. Moreover a farmer with better problem solving ability makes use of information coming from emotional cues and reactions and then decides to use a particular coping method. This in turn develops a farmer's emotional intelligence and provides him with more resources to be used while solving a problem. The results obtained are hence justifiable.

The above results are in line with results of the study conducted by Rahim and Minors (2003).

4.3.3. Optimism and emotional intelligence of the farmers

In spite of the adverse situation in a farmer's life optimism enables him to be hopeful and cheerful and help him to maintain a positive attitude in all his activities. A farmer's level of optimism is the best predictor of how healthy, happy, wealthy and long lived he will be. An optimistic farmer will be better at work, have stronger relationship, and more resilient. Being optimistic increases a farmer's emotional strength. Optimism forms a part of the positive psychological domain and contributes to overall emotional competence of a farmer.

The above findings are pursuant to the results of the study conducted by Lee (2016).

4.4 Factors influencing flood as perceived by farmers

The data provided in table 4.15 shows the factors influencing flood as perceived by farmers. The factors were ranked on the basis of weighted mean score.

Table 4.15 Factors influencing flood as perceived by farmers

Sl. No.	FACTORS	Weighted mean score	Rank based on weighted mean
1	Unusually high rainfall	8.63	1
2	Overflowing of rivers	8.19	2
3	Opening of dams	7.25	3
4	Lack of vegetation	7.175	4
5	Urbanisation	6.81	5
6	Build up of sediments	6.8	5
7	Modification of flood plain like clearing of vegetation	6.525	7
8	Climate change	6.51	8
9	Deforestation	6.44	9
10	Others (Scanty rainfall, scattered rainfall, untimely rainfall)	5.61	10

From the table 4.15 it is clear that majority of the farmer's opined unusually high rainfall as the prime factor influencing flood and was ranked 1 according to the weighted mean scores. This could be because people believed rains could transform even a small stream to a raging sea of water in minutes and could lead to dangerous floods.

Whereas overflowing of rivers, opening of dams, lack of vegetation, urbanisation and build up of sediments were ranked 2, 3, 4 and 5 based on weighted mean scores. However modification of flood plain like clearing of vegetation, climate change, deforestation and other reasons like scanty rainfall, scattered rainfall and untimely rainfall were ranked 7, 8, 9 and 10 accordingly.

4.5 Measures taken by farmers during and post to mitigate flood

4.5.1 Measures undertaken by farmers during flood

The table below shows the measures taken by farmers during the flood which is ranked on the basis of weighted mean score.

Table 4.16 Measures taken by farmers during flood

MEASURES	Weighted mean score	Rank based on weighted mean
Self help – Did not wait for others to reach for help	35	1
Reaching out for mutual help	32	2
Relying on moral economy	30.83	3
Moving/ evacuating the elderly, children and animals	29.33	4
Moving/ evacuating the electrical goods lighter valuables and cooking utensils	26.83	5
Utilizing communication technology	26	5
Moving/ evacuating clothes and mattresses	22.66	7
Moving/ evacuating lighter valuables and cooking utensils	22.33	7

From the above table it is evident that majority of the farmers were self helping at the time of flood and was ranked 1 according to the weighted mean scores. Being the people of Kuttanad they used their own efforts and resources during the flood as they were having previous experience of fighting floods. While measures like reaching out for mutual help, relying on moral economy, moving/ evacuating the elderly, children and animals were ranked 2, 3 and 4 according to weighted mean scores. Whereas measures like moving/ evacuating the electrical goods lighter valuables and cooking utensils, utilizing communication technology, moving/ evacuating clothes and mattresses and moving/ evacuating lighter valuables and cooking utensils were ranked 5, 6 and 7 accordingly.

4.5.2 Measures taken by farmers post flood

The table below shows the measures taken by farmers post flood which is classified in accordance with the weighted mean score.

Table 4.17 Measures taken by farmers post flood

Measures	Weighted mean score	Rank based on weighted mean
Repairing damages	37.33	1
Creating stronger bunds	35.33	2
Draining out water from fields	35.00	2
Sharing their concerns and seek help - counselling	28	4
Economic diversification	26.66	5
Forming groups of affected victims-give them a venting out platform	26.33	5
Optimal utilization of the existing resources	26	5
Formation of farmer groups	25.33	8

From the above table it is clear that repairing damages, creating stronger bunds and draining out water from fields were the most important measures taken by farmers post flood and were ranked 1 and 2 on the basis of weighted mean scores. After all the chaos to move forward and bring life back to normal was people's first priority. For this it was essential to get the damages repaired because during flood much damage was caused to their house and agricultural land. However sharing their concerns, seeking help (counselling), economic diversification and forming groups of affected victims were the measures later followed by farmers. Whereas optimal utilization of the existing resources and formation of farmer groups were the final measures adopted by farmers in the post flood situation.

4.6 Strategies to mitigate the post flood situation according to farmers and officials

4.6.1 Strategies to mitigate the post flood situation according to farmers

Table 4.18 Strategies to mitigate the post flood situation according to farmers

STRATEGIES According to Farmers	Weighted mean score	Rank based on weighted mean
Insuring the crops	31.66	1
Explore the possibilities of creating suitable storage reservoirs	31.00	1
Growing tolerant varieties	30.66	3
Construction of structures to control or withstand flooding	30.33	3
Establishing disaster management cells at flood prone areas	29.5	5
Long term land use planning and regulation	28.66	5
Understanding, documenting and popularization of traditional coping methods	27.83	5

Crop diversification	27.66	8
Increasing the water holding capacity of soil	27.5	8
Popularisation of innovative approaches like sponge roads and house on stilts	27.16	9
Building regulations for new developments	26.83	10
Short term monitoring, forecasting, and emergency response planning	26.33	10
Educational awareness programs related to floods	25.16	13
Afforestation	24.16	14
Flood plain zoning	23.166	15

A further analysis of the above table discloses that, in the farmers perspective the most important strategy to mitigate the post flood situation is insuring their crops and exploring the possibility of creating a suitable storage reservoir and this was ranked 1 on the basis of weighted mean score. From the farmers point of view insurance was a very effective strategy as it helps them to tide over the loss to an extent. Also 2018 floods was emphasised with opening of dams, so the possibilities of creating suitable storage reservoir is to be noted. While strategies like growing tolerant varieties, construction of structures to control or withstand flooding, establishment of disaster management cells, long term land use planning and regulation, understanding documenting and popularization of traditional coping methods were ranked 3 to 5.However crop diversification, increasing the water holding capacity of soil, popularisation of innovative approaches like sponge roads and house on stilts, building regulations for new developments and short term monitoring, forecasting, and emergency response planning were ranked 8 to 10. Strategies like educational awareness programs related to floods, afforestation and flood plain zoning were ranked 13 to 15.

4.6.2 Strategies to mitigate the post flood situation according to officials

Table 4.19 Strategies to mitigate the post flood situation according to officials

STRATEGIES According to officials	Weighted mean score	Rank based on weighted mean
Long term land use planning and regulation	35.65	1
Explore the possibilities of creating suitable storage reservoirs	33.52	2
Establishing disaster management cells at flood prone areas	31.75	3
Construction of structures to control or withstand flooding	30.38	4
Increasing the water holding capacity of soil	29.5	4
Insuring the crops	27.87	6
Understanding, documenting and popularization of traditional coping methods	27.83	6
Crop diversification	27.66	8
Growing tolerant varieties	27.5	8
Popularisation of innovative approaches like sponge roads and house on stilts	25.87	10
Building regulations for new developments	25.43	10
Short term monitoring, forecasting, and emergency response planning	24.98	10
Educational awareness programs related to floods	23.42	13
Afforestation	22.2	14
Flood plain zoning	20.56	15

According to officials long term land use planning and regulation, exploring the possibilities of creating suitable storage reservoirs and establishing disaster management cells at flood prone areas ranked 1, 2 and 3 according to weighted mean scores. According to officials long term planning might help in mitigating the post flood situation. More regulations are to be made and proper planning and implementation is also to be done. Also the officials agreed with the farmers with the strategy of creating suitable storage reservoir. Also the officials highlighted about the need for establishment of disaster management cells. However construction of

structures to control or withstand flooding, increasing the water holding capacity of soil, insuring the crops and understanding, documenting and popularization of traditional coping methods were ranked 4 to 6. While crop diversification, growing tolerant varieties, popularisation of innovative approaches like sponge roads and house on stilts, building regulations for new developments and short term monitoring, forecasting, and emergency response planning were ranked 8 to 10. Strategies like educational awareness programs related to floods, afforestation and flood plain zoning were ranked 13, 14 and 15 on the basis of weighted mean scores.

4.7 Change in rice area and rice yield

4.7.1 Change in rice area

To study the change in rice area farmers were asked about their area under rice in the years 2017, 2018 and 2019

Mean area was found to be 10.89 acre in 2107, 11.23 acre in 2018 and 11.73 acre in 2019.

To analyse the variation in rice area t- test was performed by the investigator in which the variation in rice area in the years before and after flood was found to be non significant.

- **t- Test- 2017&2018**

The *t*-value is -0.254. The *p*-value is .400047

The result is not significant at p < .05.

- **t-Test- 2018&2019**

The *t*-value is 0.357. The *p*-value is .360727. The result is not significant   at p < .05.

- **t-Test- 2017&2019**

The *t*-value is -0.613. The *p*-value is .270334. The result is not significant at p < .05.

4.7.2 Change in rice yield

To study the change in rice yield farmers were asked about their yield/acre of rice in the years 2017, 2018 and 2019

To analyse the change in rice yield/acre t test was performed by the investigator. On

performing t- test it was found that there was significant change in rice yield before and after flood. The reason can be attributed to the deposition of sediments on the fields. No doubt floods were a blessing in disguise for the farmers of Kuttanad (The Times of India,2019).

The *t*-value is -4.66778. The result is significant at *p* < .01 .Which implies that there was significant change in rice yield before and after flood. The average yield per acre prior flood was 21.28 and after flood it was 24.53.

4.8 Material and Non-Material changes

4.8.1 Material changes

4.8.1.2 Effect of flood on farm changes

Table 4.20 Effect of flood on farm changes

	Frequency		Percentage	
Effect of flood on farm changes	**YES**	**NO**	**YES**	**NO**
Purchase of new lands	3	77	3.75	96.25
Improved existing lands	53	27	66.25	33.75
Leased in land for cultivation	0	80	0	100
Leased out land for cultivation	0	80	0	100
Kept land uncultivated	0	80	0	100
Returned leased out land to the Owner	0	80	0	100
Purchased new tractor	0	80	0	100
Purchased/received relief additional livestock	0	80	0	100
Purchased new implements	24	56	30	70

The most noticeable fact from the above table is that a larger part of farmers (66.25%)

improved their existing land. Also very few of the farmers were engaged in purchase of new lands (3.75%) and implements (30%). Another matter of fact is that none of the farmers leased in land for cultivation, leased out land for cultivation, kept land uncultivated, returned leased out land to the owner and purchased new tractor.

4.8.1.3 Effect of flood on home changes

Table 4.21 Effect of flood on home changes

	FREQUENCY		PERCENTAGE	
Effect of flood on Home changes	YES	NO	YES	NO
Purchase of new home/Govt. Provided new home	0	80	0	100
Modified existing home	45	35	56.25	43.75
Disintegration of joint family	0	80	0	100

It is obvious from the table above that more than half of the farmers (56.25%) modified their existing home. Also none of the farmers had purchased new home and also there was no disintegration of joint family.

4.8.1.4 Effect of flood on other material changes

Table 4.22 Effect of flood on other material changes

	FREQUENCY		PERCENTAGE	
Other Material Changes	YES	NO	YES	NO
Purchased new utensils	32	48	40	60
Purchased household appliances	28	52	35	65
Purchased jewels	0	80	0	100
Purchased new vehicles	0	80	0	100
Purchased household items like radio, TV, phone	0	80	0	100

From the above table it can be inferred that about 40 per cent of the farmers purchased new utensils and about 35 per cent of the farmers purchased household appliances. Also none of the farmers purchased jewels, vehicles or any household items.

4.8.2 Non-Material changes

4.8.2.1 Effect of flood on social changes

Table 4.23 Effect of flood on social changes

	FREQUENCY		PERCENTAGE	
Social Changes	YES	NO	YES	NO
Better relations developed with extension workers	22	58	27.5	72.5
Organizational participation increased	27	53	33.75	66.25
Many farmers approached you for farm related advice	18	62	22.5	77.5
Emerged as a leader	8	72	10	90
Became effective communicator	25	55	31.25	68.75
Outside contact increased	12	68	15	85
Subscribed for farm publication and general publications	6	74	7.5	92.5

As a result of flood only less than half of the farmers had certain social changes like better relations developed with extension workers (27.5%), organizational participation increased (33.75%), many farmers approached you for farm related advice (22.5%), emerged as a leader (10%), became effective communicator (31.25%), outside contact increased (15%), subscribed for farm publication and general publications(7.5%).

4.8.2.2 Effect of flood on economic changes

Table 4.24 Effect of flood on economic changes

	FREQUENCY		PERCENTAGE	
Economic changes	YES	NO	YES	NO
Repaid old loans	0	80	0	100
Increased saving/deposit	15	65	18.75	81.25
Invested money on other agriculture related enterprises	8	72	10	90
Diversified the cultivation	0	80	0	100
Incurred loss and debts	66	14	82.5	17.5

As a result of flood majority of the farmers incurred loss and debts (82.50%). None of the farmers repaid old loans or diversified their cultivation. Less than one fourth of the farmers increased saving/deposit (18.75%) and invested money on other agriculture related enterprises (10%).

4.8.2.3 Effect of flood on health, education and spiritual changes

Table 4.25 Effect of flood on health, education and spiritual changes

	FREQUENCY		PERCENTAGE	
Health, education and spiritual changes	YES	NO	YES	NO
Provided higher education to children	7	73	8.75	91.25
Had better health care	6	74	7.5	92.5
Had better nutritional food	22	58	27.5	72.5
Spent more for food / clothing	0	80	0	100
Spent more for religious and other ceremonies	12	68	15	85

From the above table it is evident that flood did not cause much change in the health, education or spirituality of the farmers. Very few of the farmers provided higher education to children (8.75%), had better health care (7.5%), had better nutritional food (27.5%) and spent more for religious and other ceremonies (15%).

VALIDATION OF THE HYPOTHESIS

The following were the hypothesis devised to accomplish the objectives of the study.

1. H_1: The emotional intelligence of farmers was found to be low.
2. H_2: There is no significant association between the independent and dependent variable of the study
3. H_3: There is no significant change in rice yield before and after flood

Based on the analysis and the results obtained the following can be inferred

1. The emotional intelligence of farmers was found to be low

From table 4.12 it is apparent that the significant proportion of the farmers possessed medium level of emotional intelligence. Hence the hypothesis of the farmers exhibiting low emotional intelligence is falsified.

2. There is no significant association between the independent and dependent variable of the study

Table 4.14 represents the result obtained from the correlation analysis of emotional intelligence with independent variables. From the table it is comprehensible that three independent variables showed positive and significant correlation. Variables namely self confidence and problem solving ability were positively and significantly related at one percent level of significance while optimism was significant at five

percent level of significance. Subsequently there is critical relationship between the emotional intelligence and the independent variables. Thus the null hypothesis expressed above is rejected.

3. There is no significant change in rice yield before and after flood

It is evident from the results obtained that there was significant change in rice yield after flood which clearly indicates the hypothesis mentioned is rejected.
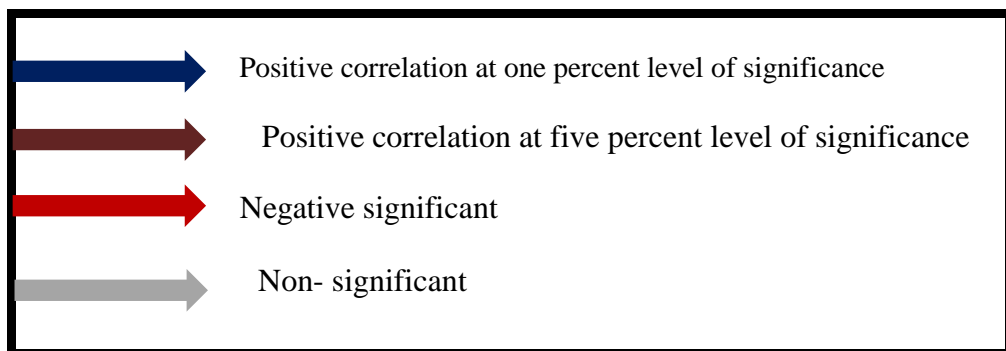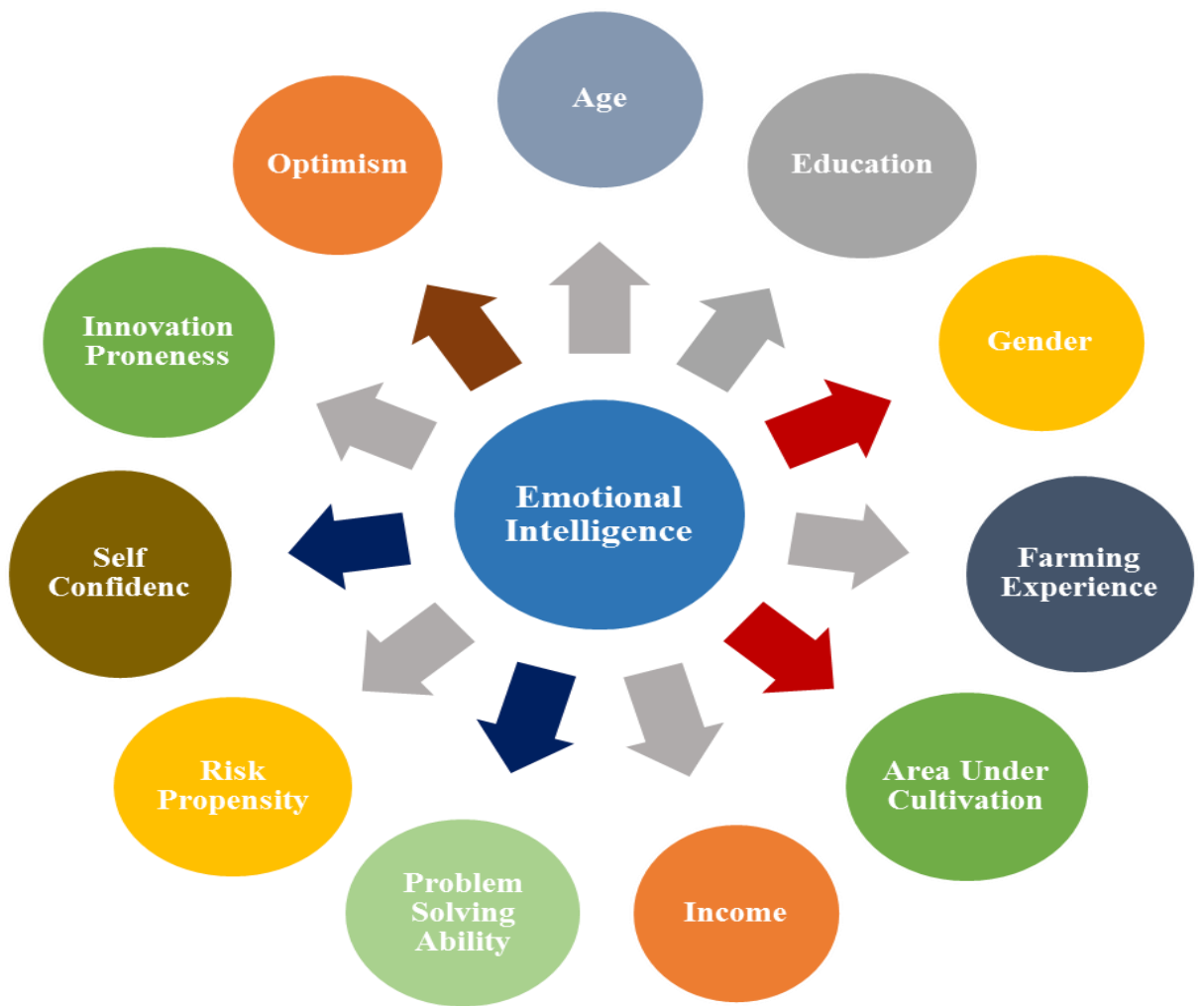
Plate 2 Empirical relationship between emotional intelligence and independent variables

SUMMARY

Renowned globally for its natural beauty, Kerala the Indian state in the southern peninsula is sandwiched between the Lakshadweep Sea and the mountain ranges of the Western Ghats. Ecologically strategic, the state harbours three Ramsar sites, wetlands of international importance. Given its proximity to the sea with a coastline of about 600 km, presence of numerous rivers, lakes, backwaters and estuaries and 14 per cent of its total area susceptible to landslides, Kerala is highly vulnerable to natural disasters.

Between June 1, 2018 and August 19, 2018, the state received heavy rainfall, more than three-fourths of the average annual rainfall, and 42 per cent above normal expected during this period. The heavy downpour soaked almost the entire state and the government was forced to release water from 35 dams while the intense rains continued. Simultaneously, more than 5,000 landslides of varying nature and intensity occurred all over the state. The result was catastrophic, affecting almost one in every six people in the state. The disasters impacted three-fourths of the Kerala villages and temporarily displaced almost 1.5 million people. Nearly five hundred people lost their lives and the total damage and losses were estimated to be worth USD 3.8 billion.

The prodigious disaster in Kerala's recent archive is no doubt the floods and landslides of 2018. The floods of August 2018 were so profound that most people now are unable to hark back that they constituted only the ultimate act in a sequence of disasters that hit Kerala from June 2018 onwards. Unseasonal heavy rains had kicked off in April 2018 and untimely floods were recorded in Kuttanad in June.

Kuttanad, a region spread across both Kottayam and Alappuzha districts has the lowest altitude in the country. The place lies several metres below sea level, which is a rare phenomenon and is considered as a Globally Important Agricultural Heritage System by the Food and Agriculture Organization (FAO). Known for its extensive paddy fields, Kuttanad is a major flood-prone area in Kerala.

The floods of 2018 battered the region extensively. Water from the first flood

of July 2018 had not dwindled completely when the second flood hit Kuttanad in August making the lives arduous across the region. Spoliation of the outer bunds in several areas due to heavy rain made the situation even more worse in Kuttanad. Hundreds of hectares of paddy fields got inundated and thousands in the region had to live in relief camps for several months. Motor pumps in the paddy fields that were supposed to draw off the water also got destroyed in the heavy flooding. There are certain pockets in Kuttanad like R-Block where human habitation is impossible anymore. People are still staying in temporary shelters on the bunds since the government and the residents are yet to reach a common ground on resettlement options. Kainakari, Pulinkunnu, Kavalam, Nedumudi, Chambakulam, Ramankary, Thakazhi, etc. were some of the worst-affected panchayats in the region.

Climate change is an intricate process where one change will feed into another, making the results incalculable. It is noteworthy straight forward admission that Kuttanad will never be the same again and that its people need to attune to the climate change that is to stay. Lessons learnt from the adversities are pivotal in evolving a more in toto response and nurturing a resilient society. Hence it is important to conduct socio-psychological studies related to flood management in order to devise appropriate strategy for preparedness and mitigation. The present study was structured with the following objectives.

1. **Assess the socio psychological constructs of rice farmers of Kuttanad after flood.**

2. **Explore and analyse the factors that influence flood as perceived by the farmers.**

3. **Delineate the strategies to mitigate the post flood situation as perceived by the farmers and officials.**

The study was conducted in the Kuttanad region of Alappuzha district. Chambakulam block and Veliyanad block were purposively selected as these were the

worst flood affected blocks with respect to rice cultivation in Kuttanad.

The respondent groups of the study comprises of 40 farmers each from Chambakulam block and Veliyanad block. From each of the blocks two most severely flood affected grama panchayats were chosen as the study area. The panchayats thus selected were Chambakulam, Nedumudi, Pulikunnu and   Ramankary. From each of these panchayats 20 farmers were selected, thus forming a total sample size of 80 farmers.

The second category of respondent group comprised of 30 officers from State Department of Agriculture, working in that area. Thus a total of 80 farmers and 30 officers were selected for the study.

Personal and psychological variables including age, education, gender, farming experience, income, area under cultivation, problem solving ability, self confidence, innovation proneness and optimism were the independent variables, while emotional intelligence was the dependent variable. The data collection was done using pre tested interview schedule. Variables were selected based on judges rating scores. Mean, range, percentile analysis, weighted average, correlation analysis, principal component analysis and t-test were the statistical tools used for analyzing and interpreting the data. The major findings of the study are given below:

- ❖ Majority of the farmers (68.75 per cent) were middle aged followed by old aged (17.5 per cent) and then young aged (13.75 per cent).

- ❖ Majority of the rice farmers (47.5 per cent) were educated up to college level followed by high school level (40 per cent) and professional degree level (12.5 per cent).

- ❖ Majority of the rice farmers were males (76 per cent) followed by females (24 per cent).

❖ Majority of the farmers were having medium level farming experience (64 per cent) followed by high (19 per cent) and low (17 per cent) level farming experience.

❖ More than half of the rice farmers (75 per cent) belonged to medium category of area under cultivation followed by low (15 per cent) and high (10 per cent) area under cultivation.

❖ More than half of the rice farmers (77 per cent) belonged to medium category of income followed by high (14 per cent) and low (9 per cent) level of income.

❖ more than half of the rice farmers (62 per cent) belonged to medium category of self confidence followed by low (20 per cent) and high (18 per cent) level of self confidence

❖ More than half of the rice farmers (63 per cent) belonged to medium category of problem solving ability followed by low (22 per cent) and high (15 per cent) level of problem solving ability.

❖ More than half of the rice farmers (54 per cent) belonged to medium category of risk propensity followed by low (27 per cent) and high (19 per cent) level of risk propensity.

❖ More than half of the rice farmers (60 per cent) belonged to medium category of innovation proneness followed by high (21 per cent) and low (19 per cent) level of innovation proneness.

❖ More than half of the rice farmers (60 per cent) belonged to medium category of optimism followed by high (26 per cent) and low (14 per cent) level of optimism.

❖ Majority of the farmers (63 per cent) belonged to the medium category of emotional intelligence followed by high (20 per cent) and low (17 per cent).

❖ Majority of the farmer's opined unusually high rainfall as the prime factor influencing flood.

❖ Majority of the farmers were self helping at the time of flood.

❖ Repairing damages, creating stronger bunds and draining out water from fields were the most important measures taken by farmers post flood.

❖ In the farmers perspective the most important strategy to mitigate the post flood situation is insuring their crops and exploring the possibility of creating a suitable storage reservoir.

❖ According to officials long term land use planning and regulation, exploring the possibilities of creating suitable storage reservoirs and establishing disaster management cells at flood prone areas were the most important strategy to mitigate the post flood situation.

❖ The variation in rice area in the years before and after flood was found to be non significant.

❖ There was significant change in rice yield before and after flood.

❖ Majority of the farmers (66.25%) improved their existing land and modified existing home (56.25%) also majority of the farmers (82.5%) incurred loss and debts.

❖ Correlation analysis of the dependent and independent variable had been undertaken to know the relationship between dependent and independent variables. It revealed that self confidence, problem solving ability and optimism were the major factors which affected the level of emotional intelligence of the farmers.

SUGGESTIONS FOR THE FUTURE LINE OF WORK

1. Since the study was restricted to four panchayats of Alappuzha disctrict which were purposively selected, related studies can be done in other blocks and districts of Kerala.

2. Future studies can be conducted to develop extension strategies for improving the emotional, psychological, and social well being of the farmers.

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ABSTRACT

The study titled 'Assessment of socio psychological constructs in post flood situation: The case of kuttanad rice farmers' was conducted during the year 2019-2020. The objectives of the study was to assess the socio psychological constructs of rice farmers of Kuttanad after flood, to explore and analyse the factors that influence flood as perceived by the farmers and to delineate the strategies to mitigate the post flood situation as perceived by the farmers and officials. The sample of the investigation comprised of 20 farmers each from Chambakulam, Nedumudi, Pulinkunnu and Ramankary representing the most flood affected panchayats in the alappuzha district and 30 agriculture officials.

On investigation of profile characters of the farmers it was found that majority of the farmers (68.75%) were middle aged and were dominated by males (76%); majority of the farmers had college level education (47.5%), with medium farming experience(64%); more than half of the farmers belonged to medium income level(77%); majority of the farmers had medium area under cultivation (75%); more than half of the farmers (62%) had medium level of self confidence; almost 63% of the farmers belonged to medium level of problem solving ability; majority of the farmers (60%) had moderate level of optimism; 60% of the farmers had medium level of innovation proneness; most of the farmers(54%) had moderate to high level of risk propensity.

The results on emotional intelligence of the farmers disclosed that more than half of the farmers (63%) belonged to the category of medium level of emotional intelligence. Correlation analysis revealed that optimism, innovation proneness and risk propensity of the farmers were significantly related at 5% level of significance, while self confidence and problem solving ability were significantly related at 1% level of significance with the emotional intelligence of farmers.

The study revealed that the major factor influencing flood as perceived by the farmers was unusually high rainfall. Self help, reaching out for mutual help and repairing damages were the major measures taken by farmers during and post flood respectively. Insuring the crops and exploring the possibilities of creating suitable

storage reservoirs were identified as the most important strategies to mitigate the post flood situation according to farmers. According to officials long term land use planning and regulation was the major strategy to mitigate the post flood situation. No significant change in rice area was observed during the years 2017-2019. However significant change in rice yield was observed prior and after flood. Majority of the farmers (66.25%) improved their existing land and modified existing home (56.25%). Also majority of the farmers (82.5%) incurred loss and debts. From the analysis and survey it can be interpreted that farmers of the Kuttanad region have an intermediate level of EI. Proper training and extension activities are essential to ensure the emotional, psychological, and social well being of the farmers.

APPENDIX 1

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE
Department of Agricultural Extension
Vellayani - 695 522
Thiruvananthapuram

Dr. B Seema
Professor and Head

Date: 01-11-2019

Sir/Madam,

Ms. Chippy Xavier. (Ad. No. 2018-11-060), the post graduate scholar in the Department of Agricultural Extension, College of Agriculture, Vellayani is undertaking a research study entitled "**Assessment of socio psychological constructs in post flood situation: The case of Kuttanad rice farmers**" as part of her research work. Variables supposed to have close association with the study have been identified after extensive review of literature.

Considering your vast experience and knowledge on the subject, I request you to kindly spare some of your valuable time for examining the variables critically as a judge to rate the relevancy of them. Kindly return the list duly filled at the earliest in the self-addressed stamped envelope enclosed with this letter.

Thanking you,

Yours faithfully
(Dr. B.Seema)

Assessment of socio psychological constructs in post flood situation: The case of Kuttanad rice farmers

Objectives

        To assess the socio psychological constructs of rice farmers of Kuttanad after flood. The study also envisages to explore and analyse the factors that influence flood as perceived by the farmers, and attempts to delineate the strategies to mitigate the post flood situation as perceived by the farmers and officials.

Personal, Social, Economic and Psychological variables taken for the study

Variables are given in bold cases and their respective meaning is explained for easy understanding of intended meaning. You may please rate the statement with a tick mark in the appropriate column against the statement with special reference to its importance to meet the objectives of the study.

S. No.	Variable	Operational definition	Relevancy rating (R - relevant)				
			Most R	More R	R	Less R	Least R
1.	**Age**	Operationalised as actual age of the farmer in completed years at the time of interview.					
2.	**Annual income**	Refers to the total earning of the farmer through farm entrepreneurship per year					
3.	**Education**	Defined as the level of formal education attained by the respondent.					
4.	**Decision making ability**	Operationally defined as the degree of weighing the available alternatives in terms of their desirability and their likelihoods and choosing the most appropriate one for achieving maximum profit on his farming.					

5.	**Social participation**	Refers to the content and nature of participation of farmer in various activities					
6.	**Dealing with failure**	Operationalised as the character of the farmer to deal with failure and being more intended on success					
7.	**Problem solving ability**	Operationalised as the ability of the farmer to identify the problem, find the solution, select the best one and apply it.					
8.	**Family size**	Refers to the number of family members in each farmer's household.					
9.	**Land holding**	Refers to the total land owned by the farmer					
10.	**Extension orientation**	Refers to the extent of contact of a farmer with different extension agencies and his /her participation in various extension activities					
11.	**Self reliance**	Refers to the extent to which a person relies on self for his future.					
12.	**Level of aspiration**	Defined as the future level of achievement in his job, which he is expecting based on the knowledge about the level of past experience					
13.	**Mass media exposure**	Refers to the degree to which the different mass media namely television, newspaper, magazines, bulletins, books and films					

		were utilised by the farmer for getting information					
14.	**Economic motivation**	Defined as the occupational excellence in terms of profit maximisation and relative value placed on economic ends by an entrepreneur.					
15.	**Scientific orientation**	Refers to the degree to which a farmer is oriented to the use of scientific methods in his cultivation					
16.	**Farming experience**	Total number of years a respondent had been engaged in farming					
17.	**Environme-ntal orientation**	Operationalised as degree to which a farmer has concern for his environment.					
18.	**Area under rice**	Operationalised as no: of standard acres possessed by farmer at the time of enquiry which is under rice cultivation					
19.	**Risk Orientation**	Operationalised as degree to which farmer is oriented towards encountering risk & uncertainity in adopting new ideas in farming					
20.	**Risk Preference**	Positive or negative effect or feelings towards risk held by farmers towards cultivation					
21.	**Self Confidence**	Extend of feelings about one's own ability and resource fullnesss to perform any activity which the respondents desires to					

		undertake					
22.	**Training**	No: of training which respondent had undergone					
23.	**Commercia-lisation**	Extend to which a farmer is intensing farming for commercial purpose					
24.	**Progressiveness**	Extend to which one is relatively early in venturing or putting the innovation into practice					
25.	**Land ownership pattern**	Ownership of land ,either owned by him or leased it					
26.	**Risk Perception**	Farmers subjective judgement on the factors that are influencing farming activity. It includes price fluctuation risk and yield fluctuation risk					
27.	**Orientation towards competition**	Degree to which a farmer is oriented to place himself in a competitive situation with respect to other farmers					
28.	**Farm Mechanisation**	Degree of automation in respondent field					
29.	**Level of Resilience**	Operationalised as capacity of the respondent to cope up with various risks and difficulties					
30.	**Risk Propensity**	Degree to which an entity is willing to take chances with respect to risk of loss					
31.	**Religiosity**	Term used to describe the extent to which religion influences societies and intersects with other areas of public life					

32.	**Flexibility**	Degree to which respondents manage unforeseen environmental situations					
33.	**Innovation Proneness**	Keenness of the respondent in accepting new ideas and seeking changes in farming technique and to introduce such changes into their farm operations when practical and feasible					
34.	**Optimism**	Operationalised as the hopefulness and confidence about the future or the success of something					
35.	**Others if any please specify**						

APPENDIX 2

QUESTIONNAIRE

Name   :   :

Panchayath   :

1. Age

2. Gender

3. Farming Experience

4. Area Under Cultivation

a.   Under rice

b.   Other enterprise

c.   % area under rice

5. Education

6. Income

a.   From agriculture

b.   Other sources

c.   Total Income

6. Emotional Intelligence

SL.NO	SELF AWARENESS	SA	A	UD	DA	SDA
1.	I realize immediately when I lose my temper					
2.	When I am being emotional I am aware of this					
3.	When I feel anxious I usually can account for the reasons					
4.	I know what makes me happy					
5.	I can tell if someone has upset or annoyed me					
SL.NO	MOTIVATING ONESELF	SA	A	UD	DA	SDA
1.	I am able to motivate myself to do difficult tasks					
2.	I never waste time					

SL.NO		SA	A	UD	DA	SDA
3.	I believe you should do the difficult things first					
4.	I can always motivate myself even when I feel low					
5.	Motivations has been the key to my success					
SL.NO	EMPATHY	SA	A	UD	DA	SDA
1.	I am always able to see things from the other persons view point					
2.	I am excellent at empathising with someone else's problem					
3.	I can tell if someone is not happy with me					
4.	Other individuals are not difficult just different					
5.	I can understand if I am being unreasonable					
SL.NO	SOCIAL SKILLS	SA	A	UD	D	SDA
1.	I am an excellent listener					
2.	I am good at adapting and mixing with a variety of people					
3.	I am good at reconciling differences with other people					
4.	People are the most interesting thing in life for me					
5.	I like to ask questions to find out what it is important to people					
SL.NO	MANAGING EMOTIONS	SA	A	UD	DA	SDA
1.	Difficult people do not annoy me					
2.	I can consciously alter my frame of mind or mood.					
3.	I do not let stressful situations or people affect me					
4.	I can suppress my emotions when I need to					
5.	Others can rarely tell what kind of mood i am in					

7. Self Confidence

SL.NO	STATEMENTS	SA	A	UD	DA	SD
1.	I have no fear in failing in everything I want to accomplish					
2.	I can face a difficult situation without worry					
3.	I am confident that I can accomdate to new situations					
4.	Several times I have given up the decision of doing a business because I thought of too little of my ability					
5.	I have enough faith in my ability					

		SA	A	UD	DA	SDA
6.	I feel insecure within myself					
7.	I am hesitant about starting a new venture					
8.	I frequently feel unworthy about myself					
9.	I am usually discouraged when the opinions of others differ from my own					
10.	I find hard to keep my mind on a task					

8. Problem solving Ability

Sl.No	STATEMENT	SA	A	UD	DA	SDA
1.	I am usually able to think an effective alternative to solve a problem					
2.	I am confident that I can solve a problem					
3.	I trust my ability to solve new and difficult problems					
4.	I make decision and I am happy with them later					
5.	I ask someone for advice and followed it					
6.	When confronted with a problem I collect all piece of information regarding the situation					
7.	I make judgements and later regret them					
8.	I am unsure whether I can handle the problem					

9. Risk propensity

SL.No	STATEMENT	SA	A	UD	DA	SDA
1	Safety first					
2	I do not take risk					
3	I prefer to avoid risk					
4	I take risk regularly					
5	I usually view risk as a challenge					
6	I really dislike not knowing what is going to happen					

10. Optimism

SL.No	STATEMENT	SA	A	UD	DA	SDA

	I will succeed as a farmer					
	Not even major set backs can make me give up my farming					
	My success as a farmer is certain					
	I always see positive side of everything					
	Whenever a situation arises negative thoughts comes to my mind					

11. Innovation Proneness

SL NO	STATEMENTS	SA	A	UD	DA	SDA
1.	You would feel restless unless you try out an innovative method which you have come across					
2.	You like to keep up to date information about the subjects of your interest					
3.	You are cautious about trying new practices					
4.	You would prefer to wait for others to try out new practices first					
5.	You opt for the traditional way of doing things than goin for newer methods					

12. Factors influencing flood as perceived by farmers (RANKING)

a.   Unusually high rainfall

b.   Overflowing of rivers

c.   Opening of dams

d.   Lack of vegetation

e.   Urbanisation

f.   Build up of sediments

g.   Modification of flood plain like clearing of vegetation

h. Climate change

i. Deforestation

j. Others

13. Measures taken by farmers during and post to mitigate flood

During Flood

SL.No	STATEMENTS	Fully	partially	Not At all
1	Self help –Did not wait for others to reach for help			
2	Reaching out for mutual help			
3	Moving/ Evacuating			
a	The elderly, children and animals			
b	The electrical goods			
c	Lighter valuables and cooking utensils			
d	Clothes and mattresses			
4	Relying on moral economy			
5	Utilizing communication technology			

Post flood

SL.No	STATEMENTS	F	P	Not
1	Draining out water			
2	Reaching out for mutual help			
3	Creating stronger bunds			
4	Repairing damages			
5	Sharing their concerns and seek help - counselling			
6	Economic diversification			
7	Optimal utilization of the existing resources			

SL. No	STATEMENTS		
8	Forming groups of affected victims-give them a venting out platform			
9	Formation of farmer groups			

14. Strategies to mitigate post flood situation according to Farmers & Officials

SL. No	STATEMENTS	VI (3)	I (2)	NI (1)
1	Flood plain zoning			
2	Afforestation			
3	Educational awareness programs related to floods			
4	Building regulations for new developments			
5	Short term monitoring, forecasting, and emergency response planning			
6	Long term land use planning and regulation			
7	Construction of structures to control or withstand flooding			
8	Understanding, documenting and popularization of traditional coping methods			
9	Insuring the crops			
10	Growing tolerant varieties			
11	Increasing the water holding capacity of soil			
12	Explore the possibilities of creating suitable storage reservoirs			
13	Popularisation of innovative approaches like sponge roads and house on stilts			
14	Establishing disaster management cells at flood prone areas			

15. Change in Rice area, Rice yield

1. Rice area

a.   2017   b. 2018   c. 2019

2. Rice yield

a. 2017   b. 2018   c. 2019

16. Material Changes

1.   Effect of Flood on farm changes

SL.No	STATEMENTS	YES (2)	NO (1)
1	Purchase of new lands		
2	Improved existing lands		
3	Leased in land for cultivation		
4	Leased out land for cultivation		
5	Kept land uncultivated		
6	Returned leased out land to the owner		
7	Purchased new implements		
8	Purchased new tractor		
9	Purchased/received relief additional livestock		

2. Effect of Flood on home changes

SL.No	STATEMENTS	YES (2)	NO (1)
1	Purchased new home/ Govt. provided new home		
2	Modified existing home		
3	Disintegration of joint family		

3. Other material changes

SL.No	STATEMENTS	YES (2)	NO (1)
1	Purchased new utensils		
2	Purchased household appliances		
3	Purchased Jewels		
4	Purchased new vehicles		
5	Purchased household items like Radio, TV, Phone		

17. Non material changes

1. Effect of Flood on social changes

SL.No	STATEMENTS	YES (2)	NO (1)
1	Better relations developed with extension workers		

2	Organizational participation increased		
3	Many farmers approached you for farm		
4	Emerged as a leader		
5	Became effective communicator		
6	Outside contact increased		
7	Subscribed for farm publications and general publications		

2. Effect of Flood on economic changes

SL.No	STATEMENTS	YES (2)	NO (1)
1	Repaid old loans		
2	Increased saving/deposit		
3	Invested money on other agriculture related enterprises		
4	Diversified the cultivation to		
5	Incurred loss and debts		

3. Effect of Flood on health, education and spiritual changes

SL.No	STATEMENTS	YES (2)	NO (1)
1	Provided higher education to children		
2	Had better health care		
3	Had better nutritional food		
4	Spent more for food / clothing		
5	Spent more for religious and other ceremonies		