AWARENESS AND PERCEPTION OF FARMERS TOWARDS SOIL HEALTH CARD SCHEME IN RAYALASEEMA REGION OF ANDHRA PRADESH

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M.Sc. (Ag.)

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(AGRICULTURAL EXTENSION)

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BY

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M.Sc. (Ag.)

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DECLARATION

I, **S.LOKESH BABU,** hereby declare that the thesis entitled **"AWARENESS AND PERCEPTION OF FARMERS TOWARDS SOIL HEALTH CARD SCHEME IN RAYALASEEMA REGION OF ANDHRA PRADESH"** submitted to the **Acharya N.G. Ranga Agricultural University** for the degree of **Doctor of Philosophy in Agriculture** is the result of original research work done by me. Part of the thesis has been published by me as S.Lokesh babu, T.Lakshmi, S.V.Prasad "awareness and perception of farmers towards soil health card scheme", "International journal of current microbiology and applied sciences "volume 8, number 06,2019:2342-2346.

Place : Tirupati
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CERTIFICATE

Mr**. S.LOKESH BABU** has satisfactorily prosecuted the course of research and that thesis entitled **"AWARENESS AND PERCEPTION OF FARMERS TOWARDS SOIL HEALTH CARD SCHEME IN RAYALASEEMA REGION OF ANDHRA PRADESH"** submitted is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that neither the thesis nor its part thereof has been previously submitted by him for a degree of any University.

Date:

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CERTIFICATE

This is to certify that the thesis entitled **"AWARENESS AND PERCEPTION OF FARMERS TOWARDS SOIL HEALTH CARD SCHEME IN RAYALASEEMA REGION OF ANDHRA PRADESH"** submitted in partial fulfillment of the requirements for the degree of **DOCTOR OF PHILOSOPHY IN AGRICULTURE** of the Acharya N. G. Ranga Agricultural University, Lam, Guntur is a record of bonafide research work carried out by **Mr. S.LOKESH BABU** under our guidance and supervision.

No part of the thesis has been submitted by the student for any other degree or diploma. The published part and all assistance and help received during the course of investigation have been duly acknowledged by the author of the thesis.

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(S.LOKESH BABU)

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LIST OF SYMBOLS AND ABBREVIATIONS

SHC	:	Soil Health Card
RKVY	:	Rashtriya Krishi Vikas Yojana
HYV	:	High Yielding Varieties
SAU	:	State Agricultural University
INM	:	Integrated Nutrient Management
RARS	:	Regional Agricultural Research Station
AMC	:	Agricultural Market Committee
NPMSHF	:	National Project on Management of Soil Health and Fertility
PMFBY	:	Pradhan Mantri Fasal Bima Yojana
ITDP	:	Integrated Tribal Development Programme
YHS	:	Yashaswini Health Scheme
CII	:	Cropping Intensity Index
MME	:	Mass Media Exposure
VLW	:	Village Level Worker
MMA	:	Macro Management of Agriculture
FIG	:	Farmer Interest Group
NDA	:	National Democratic Alliance
ICT	:	Information and Communication Technology
FYM	:	Farm Yard Manure
DAATTC	:	District Agricultural Advisory and Transfer of Technology Centre
ICAR	:	Indian Council of Agricultural Research
KVK	:	Krishi Vigyan Kendra

MO	:	Management Orientation
AM	:	Achievement Motivation
STL	:	Soil Testing Laboratory
ANGRAU	:	Acharya N.G.Ranga Agricultural University
SRI	:	System of Rice Intensification
EC	:	Electrical Conductivity
SPSS	:	Statistical Package for the Social Sciences
MLR	:	Multiple Linear Regression
%	:	Percentage
N	:	Number of respondents
i.e.	:	That is
Ha	:	Hectare
Kg/ha	:	Kilogram per hectare
Fig.	:	Figure
Viz.,	:	Namely
et. al.	:	and others
S.No.	:	Serial number
r	:	Correlation co-efficient
R^2	:	Co-efficient of Multiple Determination
NS	:	Non-Significant
<	:	Less than
>	:	Greater than
` ₹	:	Rupees
p^H	:	Potential of hydrogen

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ABSTRACT

The present study entitled “Awareness and Perception of farmers towards Soil Health Card scheme in Rayalaseema region of Andhra Pradesh”. The study intended to analyze the awareness and perception towards soil health card scheme with the objectives of analyzing awareness, perception, relationship between profile characteristics and awareness and perception, benefits, constraints and eliciting suggestions to overcome constraints in utilizing soil health cards.

Ex-post facto research design was adopted in the present investigation. Rayalaseema region of Andhra Pradesh state was selected purposively for the study. From Rayalaseema region Anantapuramu district was selected purposively based on the the per cent of achievement in distribution of soil health cards. Six mandals from Anantapuramu district were selected randomly by following lottery method of simple random sampling. Six mandals based on highest number of SHC holders viz., Raptadu, Kanekal, Tadipatri, Gudibanda, Dharmavaram, Gorantla were selected randomly by following lottery method of sampling. Two villages were selected from each of the 6 mandals by following simple random sampling thus making a total of 12 villages. From each village, 20 farmers who possessed soil health card were selected by following simple random sampling procedure, making a total of 240 SHC scheme farmers for the study.

Data were collected from the selected SHC holders by using interview schedule developed for the study during the months of October 2018 to December 2018 in Anantapuramu district. Interview schedule consisted of three parts. The first part consisted of primary information of the respondent i.e., respondent number, name, village and mandal. The second part consisted of profile characteristics of the respondent and third part consisted of the dependent variable i.e., awareness and perception towards soil health card. Farmers were also asked to elicit the benefits and problems they faced in utilizing the soil health cards and were asked to give their suggestions which they think will improve the situations. The data were collected and recorded in free and frank atmosphere where the interviewer and interviewee had a good rapport.

The findings with regard to the selected profile characteristics of the soil health card beneficiaries indicate that majority of the SHC beneficiaries were belonged to middle age, middle school education, nuclear family, medium farming experience, semi medium land holding medium annual income ,medium cropping intensity ,medium mass media exposure ,medium social participation ,medium extension contact ,medium scientific orientation, medium economic motivation, medium innovativeness, medium risk orientation, medium management orientation and medium achievement motivation.

In the present study majority (67.92%) of the SHC holders had possessed medium level of awareness about soil health card scheme and 79.58 percent medium level of perception about soil health card scheme.

In case of relationship between independent variables and awareness of farmers about soil health card scheme there was a positive and significant relationship of awareness about soil health card scheme with education, land holding , mass media exposure , social participation, extension contact, economic motivation, risk orientation and achievement motivation at one per cent level of probability where as cropping intensity ,scientific orientation, innovativeness and management orientation at five per cent level of probability. Age and annual income exhibited positive and non-significant relationship with awareness about soil health card scheme where as farming experience and family type exhibited negative and non-significant relationship with awareness about soil health card scheme.

In case of relationship between independent variables and perception of farmers towards soil health card scheme there was a positive and significant relationship of perception towards soil health card scheme with education, land holding , mass media exposure, social participation, extension contact, scientific orientation, economic motivation, risk orientation ,innovativeness, management orientation and achievement motivation at one per cent level of probability where as cropping intensity at five per cent level of probability. Age and annual income exhibited positive and non-significant relationship with perception of farmers towards soil health card scheme where as farming experience and family type exhibited negative and non-significant relationship with perception of farmers towards soil health card scheme.

The data related to benefits derived by utilizing soil health card by the SHC beneficiaries are as follows, the farmer can decide well which crops they should cultivate and which ones they should skip, SHC helps farmers to improve soil health and ultimately increase productivity, the farmer will always have updated data about their soil, the soil health card will help the farmers to get an idea on the crop-wise recommendations of nutrients and fertilizers required in each type of soil, reduces the over utilization of major nutrients (N,P,K) ,the government will also employ experts to help farmers in carrying out the corrective measures ,balanced application of fertilizers has increased ,soil health card portal enables SHC beneficiaries to get immediate data relating to their soil, the farmers are also given advice by the experts to improve the productivity of the crops and the necessary methods that have to be practiced in order to implement the changes and reduces the loss of fertilizers and soil pollution.

Majority of SHC beneficiaries reported that difficult to calculate fertilizer dose on the basis of nutrient status of soil was the major constraint in utilizing soil health card scheme, received soil health cards after crop harvest, time gap between soil samples taken and issuing cards is too high ,collection of soil sample was not done in

presence of farmers ,lack of technical advice on method and time of fertilizer application, recommended fertilizers not available in adequate quantity in local market ,soil testing labs are located far away ,high price of fertilizers ,doubt on the quality and reliability of the information provided in the SHC, lack of training, unable to operate internet (access to soil health card portal) and irregularity of extension services.

Majority of the farmers suggested that crop wise recommended dose of fertilizer should be given in the SHC ,soil sampling procedure should be done in presence of farmer ,SHC should be issued prior to crop season ,SHC should be issued prior to crop season, provide training for better understanding about content of soil health cards, farmer should be trained to take soil sample of his own soil ,soil testing laboratory should be established at taluka level with highly qualified staff ,government should provide subsidy on inputs used by farmers ,ensure availability of recommended fertilizers in the market, proper and timely agriculture extension services.

The findings of this study revealed that majority of the SHC beneficiaries were of middle age and had moderate education level, who have vital role in crop production technology base on application of soil health card and hence, such type of farmers should be approached for training in shaping the favourable perception and attitude towards soil health card programme. The findings of this study would facilitate in knowing the existing level of awareness and perception of farmers towards soil health card scheme which will serve as a guideline to planners and extension agencies to understand whether soil health card scheme is considered by the farmers as useful programme or not. It will help them in planning and implementing efforts to develop favourable disposition towards soil health card scheme. Hence there is more responsibility on shoulders of government to involve all the stakeholders of soil health card scheme on a single platform to make the scheme successful.

Chapter-1

INTRODUCTION

India is principally an agricultural country but still Indian farmers continue to be the poorest in the world. India has disparate climatic conditions, diversified soils which are rich in fertility and has immense potential to produce discrete agricultural products and become one among the top leading producer countries in agriculture. Though India has abundant natural resources as raw materials, India lags far behind in ensuring food security for its own citizens. This situation is a combined repercussion of various factors, such as lack in use of advanced scientific methods in agriculture, dearth of modern machinery to the farmers, lack of electricity in villages, lack of consciousness among farming community and lack of proper financial support. Tonnes of food grains are being wasted as spoilage in the godowns due to inefficiency in storage and maintenance. Farmers across the country depend more on the practices learnt by their ancestors and take various decisions based on illusion. Majority of farmers are uneducated and they believed that anything for improving soil fertility must have a direct response and the more they add it, the better things should become. So same notion they followed when it comes to the concept of fertilizer utilization. Indeed presently farmers are unaware of overuse of fertilizer and they keep on adding fertilizers in a view to get good production, but heating and complexation end up burning the roots.

Agriculture in India has encountered considerable transformation over decades. Changesin agrarian structure, technological interventions, cropping pattern, enterprise mix and marketing system were the consequences of the above said transformation. Amid earlystages of agricultural advancement, much concernwas placed on enhancingproduction through adoption of High Yielding Varieties (HYV's)parallely with usage of chemical fertilizers and pesticides. This had driven to rigorous usage of land and agricultural inputs

largely in the regions enriched with irrigation facilities. The more use of HYV's necessitated the more application of chemical fertilizers. The wave in usage of chemical fertilizers in India has spectacularly grown since the advent of green revolution in late 1960s. With the enhancement in production of agricultural produce since green revolution period, India's position has bowed from the state of net importer of agricultural products to exporter of certain agricultural commodities like rice, wheat and sugar. Even at farm household level also, the green revolution had helped to improve the livelihood pattern, nutrition and education of children. Conversely, the technology has been associated with some harmful aspects as well (Elumalai, 2016). In fact green revolution has proved victorious in irrigated areas, on other handarid and semi arid regions and crops grown in respective arid and semi arid regions were left out of the process and hence had created regional disparity in rural income (Krishnaji, 1975, Vaidyanathan 1988 and Rao 1996). In addition to above quoted things green revolution technology has also tainted traditionally followed multiple cropping system to mono-cropping, for example cultivation of only rice in some parts of south India. This practice has put the land and other resources under severe strain resulting in depletion of soil nutrients, decline in water table, build up of pest and diseases, and micro-nutrient deficiency (Murgai *et al*., (2001) and Pingali and Shah,(2001).

Agriculture occupies most important role in Indian economy and agricultural development is the prime aspect in India which has to feed billions of people, at least three times a day. Enhancing production of food grains is dire need of hour to feed the ever increasing human population and to ensure their nutritional security as well. India's food grain production has witnessedincredible changes and registered an over a five-fold increase, to around 283.37 million tonnes in 2018-19 since independence (*www.pib.nic.in*). More than half of work forces in the country depend on agriculture as source of livelihood directly or indirectly. During 1950s, series of famines and diminishing agricultural growth in India sparked government

to commence upon many development strategies in direction of improving agriculture growth. For achieving this massive task novel technologies were disseminated to farmers. This agricultural approachconcentrated on usage of critical inputs like high yielding varieties, fertilizers, pesticides and machinery. With this strategy, the use of fertilizers for increasing yields entered into picture of Indian agriculture. Additional experiences also showed that increased use of fertilizers in a proper proportion increases agricultural productivity and production. Thus, the use of chemical fertilizers has become anessentialpart of the Indian agriculture forimproving the yield.

Coming to the aspect of global fertilizer consumption, the consumption of the three main fertilizer nutrients viz., nitrogen, phosphorus and potassium is estimated to reach 199 million tonnes by 2022 which is greater by 1.8 per cent over 2015 consumption levels. Consistent with past trends, global demand is forecasted to grow quicker for potassium (1.8% per annum) than for phosphorus (1.4% per annum) and nitrogen (1.0% per annum) as a consequence of steady improvements in nitrogen management practices and a lot of balanced fertilization in some regions. Over subsequent five years, the global capacity of the fertilizers production, intermediates and raw materials assembling is additionally expected to extend (*World fertilizer trends and outlook to 2022*). In India the annual consumption of fertilizers, in nutrient terms (N, P and K), has increased from 0.07 MT in 1951 - 52 to more than 25.95 MT in 2016 -17 and per hectare consumption has increased from less than 1 Kg in 1951 -52 to the level of 130.8 Kg now (*www.indiastat.com*). India is the leading consumer of fertilizers in the world subsequent to China, consuming about 259.49 lakh tonnes of fertilizers (*Agriculture statistics at a glance 2017*). It accounted for 15.3 per cent of the world's Nitrogen (N) consumption, 19 per cent of Phosphatic (P) and 14.4 per cent of Potassic (K) nutrients in 2017. The use of fertilizers is affectedby a number of factors like irrigation, high yielding variety seeds, size of the farm and credit obtained. Increased area under high yielding varieties led to increased food

grainproduction. The high yielding varieties respond well to the use of chemical fertilizers. The major nutrients which ought to be added to the soil in the form of fertilizers are Nitrogen, Phosphorus and Potassium. Micro nutrients such as calcium, magnesium, manganese and boronwould even be required in few cases. The current level of nitrogen, potassium and phosphorus seems to be not fully balanced.

In India, intensive agriculture has resulted in remarkable growth in food grain production powered by improved variety of seeds, farm mechanization, assured irrigation, application of fertilizers and plant protectants. But there are issues about the haphazard use of chemical fertilizers by the farmers with a view to increase the crop yield which has led to deterioration of soil structure, wastage of nutrients, and destruction of soil micro-organisms and scorching of plants in the extreme cases. Several factors contribute to excessive use of fertilizers, few among them were intensive cultivation of crops, differential pricing of fertilizers and subsidy. Besides, due to lack of awareness among the farmers about balanced use of fertilizers, there are wide unfold issues related to the indiscriminate use of chemical fertilizers, mismanagement of surface water and over exploitation of ground water.

Soil is a living medium that acts as a natural source of nutrients for plant growth. The four major components of soils are rocks, mineral, organic matter, water and air which vary in proportions and together form a system for plant growth. Soil surveys are made for natural resource management and as a part of fertilizer use and administration soil testing is being conducted. Continued diminutionof natural resources in intensive agriculture to attain goals of food sufficiency stood as one of the major reasons for the decrepit factor productivity and stagnation in food grain production in the country. The vigor of our soils has been impaired due to emergenceof multinutrient deficiencies and falling of organic carbon levels frequently. Currentlysoils are operating on anoff-putting nutrient balance of about 10 million tonnes per

annum whichrestrictsexpression of other nutrients obviously leading to lower overall fertilizer-use efficiency and crop productivity. The ill informed farming practices and haphazard use of agro chemicals have depleted our soil and made our soils infertile.

There is a huge responsibility on shoulders of government for promoting balanced use of fertilizers in favor of better absorption of nutrients from the applied fertilizers and increasing productivity of crops. It is essential to adopt recommended doses of fertilizer as per the State Agricultural Universities (SAU) norms and soil health card. Site specific nutrient management involving soil test based application of fertilizers is vital to enhance fertilizer use efficiency.Different types of fertilizers are required to be used in acidic/ alkaline soils. Fertigation involves the use of water soluble fertilizers through drip and sprinkler irrigation and is expected to give better use efficiency for water and fertilizers. Hence, it is on hour to promote use of required sources of plant available forms of nutrients in combination with use of soil amendments in acidic/ alkaline soils to enhance soil nutrient availability.

In India, in general, fertilizer recommendations are followed for N, P and K which rarely match soil fertility need and often ignoring secondary and micro nutrients, in various cropping systems followed by small and marginal farmers. Inthe view of the above facts, Indian governmenthas taken specific measures to promote Integrated Nutrient Management (INM), alongside with bio-fertilizers and locally available organic manures based on soil testing to maintain soil health and crop productivity. In such scenario it becomes imperative to have report on soil testing to increase fertilizer use efficiency or use appropriate fertilizers for specific to soils and crops.Results in soil testing report can throw light on the health of soils and can build a way to recommend dose of fertilizers required to their soils. In view of the critical role played by soil testing in ensuring balanced and efficient use of fertilizers the incumbent NDA regime has laid emphasis on the soil health card

scheme.Soil health card scheme was launched for the first time in uniform manner by central government on February 2015 to provide soil health card to each and every farmer across the country.

Soil health is the continued ability of the soil to function as a very important living systemwithin the ecosystem to sustain the productivity and promote plant growth. Soil health accentuates the integration of biological with chemical and physical measures of soil quality that affect farmers' profits, risks, and the environment.

A soil health card is a printed card that contains information on status of soil health indicators like plant nutrients available in farmer’s field and provides recommendation on the dosage of different fertilizers for the major crops grown in farmers fieldsbased on the soil test results. The soil health card presently portray the status of 12 essential parameters viz., available nitrogen, phosphorus and potassium (macro nutrients), available sulphur(secondary nutrient), available zinc, iron, copper, manganese and boron (micronutrients) and physical parameters like pH , EC, and organic carbon. Acharya and Srivastava (2017) stated the benefit of soil health card scheme as the adoption of soil health card based fertilizer recommendation is anticipated to cut back fertilizer use within the country by reducing the fertilizer consumption within the areas where soil fertility is build up and increasing its use within the areas wherever it is needed. This would guarantee an increased productivity on sustainable basis and also trim down the financial burden on government towards import of fertilizers and fertilizer raw material. They also disclosed about the possible obstacles before the scheme as to provide soil health cards to the farmers of India at an interval of three years about 4.67 crore soil samples need to be analyzed each year (assuming that one representative soil sample is collected from each of the 14 crore farmer’s holding over a period of three years) which will be a devastating task with the available infrastructure of soil testing laboratories in the country. However, toaccomplish the dream, government, private functionaries, private

stakeholders in agriculture and students are working dynamically in mission mode for soil sample collection and analysis in order to achieve this national goal.

The soil health cardhelps in studying and reviewing the health of soil or to a certain extent we can say a complete evaluation of the quality of soil right from its functional characteristics to water and nutrients content and other biological properties. These soil health cards are useful to farmers as they provide a well monitored report of their soil health. Monitoring of farm fields by expertsregularly helps farmers to cultivate crops and use fertilizers in coherence with concept of sustainability and profitability. Regular monitoring of farm fields will help the farmers to get a long-term soil health record and accordingly can study and evaluate the results of different soil management practices. The soil health card helps the farmers to get an idea on the crop-wise recommendations of nutrients and fertilizers required in each type of soil. This can help in enhancing the crop yield. The card shall also be accompanied by advisory on curative measures a farmer should take for enhancing soil health and better yield. Theadvantage of the soil health card is thatit would provide an appraisal about use of major fertilizers and making him aware of the missing nutrients and those which could be added for a balanced soil.

The then Union agriculture and farmer's welfare minister Shri. Radha Mohan Singh in July 2015 said that the aim of soil health card scheme is to provide information about the soil health to 120 million farm holdings in the country. To state a true statement, this is a timely intervention as aggressive farming coupled with absence of any concrete step to bring new lands under cultivation has already affected yields and disadvantaged farmlands of valuable nutrients. Experts also talk about the importance of genetic food cultivation calling for lot more variety in the land. The Agriculture ministry also emphasizesexpansion of more and more pulses and green vegetables as they can bring inherent resilience in the land. According to renowned expert

and the ‘father of Green Revolution’, M S Swaminathan, there is need to opt for wide range of crops cultivation. The awareness of soil health conditions would only make these operations easier and more result oriented. The studies of soil across the states also show that there is need to promote alternate crops like pulses, sunflower, bajra, or fodder and vegetables. Thus we can say that the soil health card mechanism definitely aims to help herald some indispensable revolutionary changes and constructive effect in country’s agricultural scene. There are actually many path-breaking initiatives associated with the soil health card scheme. Under this scheme the government can help farmers adopt crop diversification. Farmers would be able to understand the fertility factor of the land better and can be engrossed towards cultivation of newer crops. This would assistin lesseningof risk in farming and also reduces the cost of overall cultivation process. In order to improve quality of soil and ultimately for better nutrient values and higher yields, experts say while at present, general fertilizer recommendations are followed by farmers for primary nutrients, the secondary and micro nutrients are often overlooked. “We have often come across deficiency of nutrients like Sulphur, Zinc and Boron. This has turned out to be a restricting factor in increasing food productivity. The soil health card scheme will address the above said problems. (*www.pib.nic.in*). Soilhealth card mobile application was launched by Union Minister of Agriculture and Farmers Welfare Shri Radha Mohan Singh on the occasion of World Soil Day – 5th December 2017 in Jhajjar, Haryana. The soil health card app will benefit field-level workers by automatically capturing GIS coordinates while registering sample details at the time of sample collection in the field and point out the location from where the sample has been collected. Shri Radha Mohan Singh said that soil health card is prepared in 14 local languages and dispersed to the farmers. He said that farmers be supposed to use nutrients on their farms as per the recommendations in the card. This will trim down the cost of production and augment the production and income of the farmers.

The agriculture minister also informed that, distribution of fertilizers on the basis of soil health card recommendation has commenced in 16 districts as a pilot scheme. It is appealingthing that, on the occasion of World Soil Day programs are being organized at the state level to generate awareness about soil health. To promote soil health card scheme, various initiatives are being organized by state governments and ICAR, its institutions and Krishi Vigyan Kendras. With the startof the scheme in February 2015 till May 2019, 8.93 crore cards have been issued (*www.soilhealth.dac.gov.in*). This is a flagship programme of government of India in field of agriculture. To facilitate quick soil sample testing and distribution of soil health cards, the soil test infrastructure has been upgraded, 9263 soil testing labs have been permitted to states. In addition, 1562 village level soil testing projects have been permitted to generate employment for rural youth (*www.pib.nic.in*). Among all the states in India, Andhra Pradesh has taken the lead in distribution of the SHCs to farmers. In order to make the scheme more flourishing, the government of India jointly with the agriculture department has launched a soil health card agriculture portal where in farmers need to register at the web portal ***www.soilhealth.dac.gov.in*** along with the details of the soil samples and test lab reports. The fundamental objective behind the initiationof the web portal is to generate a single national database on soil health which assists in research and planning for both farmers and soil experts.

1.1 Soil health card scheme in Andhra Pradesh

In Andhra Pradesh, soil sampling and soil testing programme has been organized in a systematic manner to evaluate the fertility status, to identify the soil related problems (Salinity/ Sodicity), to reclaim the problematic soils, to implement soil test results for soil fertility management as per the requirement of crop and to improve fertility and to apply fertilizer based on soil test data. In Andhra Pradesh, the soil testing programme is carried out by a network of 91 soil testing laboratories comprising of 2 Regional soil testing

labs, 26 District soil testing labs, 5 Mobile soil testing labs and 58 Mini soil testing labs at Agricultural Market Committee level (Table 1.1).

Table 1.1 Infrastructure for soil testing in Andhra Pradesh

S.No.	Type of Soil Testing Lab	No.	Facility
1.	Regional soil testing labs	2	Macro & Micro nutrient & water analysis
2.	District soil testing labs	26	Macro & Micro nutrient and water analysis
3.	Mobile labs	5	Macro nutrients analysis
4.	AMC level labs	58	Macro nutrients analysis
	Total	**91**	

(*www.apagrisnet.gov.in*)

1.2 Statement of the problem

Soil health is not a new concept. Greek and Roman philosophers were aware of the importance of soil health to agricultural success over 2000 years ago, and reflected this awareness in their dissertations on farm management. As the science of agriculture developed, plant nutrients were identified as essential components of soil health, at least with respect to sustaining biological productivity. This resulted in anarchetype of plant nutrition and soil management that relied heavily on the use of artificial fertilizers and intensive tillage. Increasing concern over agriculture's impact on the environment has created renewed interest in soil health. Efforts to define soil health in the context of multiple soil functions began in 1977 (Warkentin and Fletcher, 1977), and were followed by more formalized definitions (Larson and Pierce, 1991; Karlen *et. al.*1997), selection of indicators (Doran and Parkin, 1994) and specific strategies to enhance soil health (Doran *et. al.* 1996). Soil fertility is largely regulated by the application of compost and manure, but in recent years a decline in soil fertility has been reported (Shrestha *et. al.* 2000).

At present nutrient management based on soil health test has evolved as critical issue in wake of increasing agricultural production and productivity worldwide. Also studies revealed that intensively cultivated lands became deficient in primary, secondary and micronutrients over passage of time. Considering the importance or soil testing, soil testing programme was started in India in the year 1955-56 with the setting up of 16 soil testing laboratories under "Determination of Soil fertility and Fertilizer use" programme. Total nutrient content varies from soil to soil, and available forms of nutrients for plants are chemically determined in soil testing laboratories. The progression of setting-up of soil testing laboratories has continued with financial support from Government of India, year after year. The soil testing facility is provided by State Governments to the farmers free of cost or with some nominal fee. With about 12 crore farm holdings in the country, soil analyzing capacity of 4 crore samples annually is required to enable analysis of each holding once in three years. This requires animmense expansion of soil testing programme in the states. Thus government took up some initiatives like, a centrally sponsored scheme “National Project on Management of Soil Health and Fertility (NPMSHF)” and was launched in 2008-09. In addition, states were availing substantial resources for soil testing programme under Rashtriya Krishi Vikas Yojana (RKVY) and Macro Management of Agriculture (MMA) which includes the most recently launched soil health card scheme to cover all over India.An amount of Rs 568 crores was allocated by the government for the scheme. In 2016 Union budget of India, Rs 100 crores has been allocated to states for making soil health cards and settingup soil testing laboratories *(www.soilhealth.dac.gov.in*).

A soil health card givesa comprehensive picture of soil health condition of soil. This card facilitates the farmers, extension personnel, researcher and decision makers to assess and to improve the soil health based on their personal experience and field knowledge to enhance the production by utilization of soil test based fertilizer application.Soil health to be

evaluated periodically to ensure the application of nutrients based on the information pertaining to that are already exist in the soil. Regular soil testing practice will help the farmers and related functionaries to observe the trends in soil health in long term, in turn to estimate theimpact of different oil management practices, response of fertilizer application and selection of crops eventually result in competency in deciding the factors influencing crop production within its capabilities and limitations of a field. The main culprit is soil deterioration, which makes soil worthless for irrigation. The main reason for soil deterioration accounts to indiscriminate use of chemical fertilizers, marginal utilization of organic matter and non-replenishment of depleted micro and secondary nutrients in the soil. Over the period of time there is deterioration in soil fertility and nutrient deficiencies which ultimately results in making farming futile. For example, green revolution appealed use of chemical fertilizers for increasing crop production which are unsuitable for farming. However, thoughtless use of fertilizers led the soil in many regions worthless for farming. This is mainly because of imprudent distortion of the ideal N: P: K (Nitrogen, Phosphorous and Potassium) proportion (4:2:1).

There is no doubt that soil health card scheme would provokefarmers about the scientific usage of fertilizersbut the diffusion of the technology into farming community makes the difference. However, the diffusion process of any technology used to face a lot of hurdles before it reaches adoption phase from the awareness phase for greater part of the besieged beneficiaries. To surmount overdiminishing output which is due to decrease in soil fertility, farmers should improve their production techniques by following scientific recommendations in farming. The decision to apply new agricultural technologies relies on farmer’s perception which is a key determinant in influencing adoption (Adesina and Baiduforson, 1995; Negatu and Parikh, 1999). Technology adoption is also influenced by perceived profitability, costs of the technology and eloquence at which the new knowledge and information is communicated in a recipient population (Boahene *et. al.*

1999). Farmer's perception's regarding compatibility of sustainable practices with their farming systems have emerged as the best predictor of adoption of such practices (Alonge and Martin, 1995). Since perception refers to an individual's current appraisal of an object or program, assessing farmer's perception is an important means to evaluate their knowledge level on a particular issue (Hikson and Keith, 2000). People base their perception on precedent experience and knowledge thus if a person has limited knowledge and experience then he is incapable to perceive it in accurate manner. Many efforts were put forth by the central and state government to evaluate the soil health status of farmer's fields by introducing soil health card scheme (SHC), but how far farmers are aware, how farmers perceive about the soil health card and how efficiently they use the information given in the soil health card makes the difference.

Keeping the above quoted points in mind the present study entitled Awareness and perception of farmers towards soil health card scheme in Rayalaseema region of Andhra Pradesh was conducted with the following specific objectives.

1.3 Objectives of the study

1. To study profile characteristics of Soil health card scheme farmers.
2. To measure the awareness of farmers about Soil health card scheme.
3. To assess the perception of farmers towards Soil health card scheme.
4. To find out the relationship between profile characteristics with awareness and perception of farmers.
5. To document the benefits derived from the Soil health card scheme by the farmers.
6. To elicit the problems as perceived by the farmers regarding Soil health card scheme and suggestions to overcome them.

1.4 Scope of the study

The Soil health card provides information to improve soil health related aspects and working knowledge to maximize the production by cautious use of organic and inorganic fertilizers. Central and state government had made a remarkable effort for improving soil health by introducing soil health card scheme. This exploration is of great significance and necessary in making information base for better understanding of the factors responsible for the extent of awareness and perception towards soil health card for soil protection and conjointly the course of action to be undertaken within the future. The study also helpsin understanding the transformation in fertilizer use behavior of farmers as a result of the programme in the study area. Also, this study will put forward several implications to the academicians, farmers, planners, administrators, scientists and change agents to heighten the use and application of soil health card for sustainable agriculture production by delimiting imprudent and haphazard use of chemical fertilizer in agriculture to maintain the potential to meet the needs and aspiration of future generations which ultimately aims towards ways and means for living in harmony with nature.

The results will throw light to the pros and cons of the programme like whether the scheme could bring the expectedchange in farmer's adoption behavior of nutrient management practices or not. If yes, which factors motivate adoption behavior and if not what are the lacunas in the implementation of scheme also teaches lesson to improve or modify the approach to make the scheme more effective. The present study will also allow us to assess whether the government's step will help the farmers to change their knowledge and perception regarding soil health card and its importance to sustain soil health. Therefore, the study will assist the scientists, policy makers, administrators, researchers and other implementing agencies, to think on the existing situations and future situations regarding the soil health card scheme, indiscriminate use of fertilizers, soil health and may

serve as a feedback to make suitable policy interventions in implementation of the scheme.

1.5 Limitations of the study

Although, all possible efforts were made to make the study more meaningful and precise, but due to scantiness of time, money and other facilities with the investigator, as the study was undertaken as a student research project, certain limitations which were felt in the studies are as follows

1. The study has the limitation of time, financial resources, conveyance and other physical facilities at the disposal of investigator.
2. The present study wastaken up as a single student's research hence the study was conducted in only one district *i.e.* Anantapuramu district of Andhra Pradesh.
3. This study was limited to Anantapuramu district of Andhra Pradesh, the results of the study can therefore be applicable to that areas where similar conditions exist.
4. Since data were based on expressed opinions of respondents, there exist some personal biases.
5. Although the study had taken all the precautions, the chances of bias could not be completely eliminated. Yet, sincere and thoughtful attention was paid to make this study as objective, definite and systematic one to the extent possible.

1.6 Layout of the thesis

Chapter I: 'INTRODUCTION' gave a brief account of need and importance of the study, specific objectives, the scope as well as limitations of the study.

Chapter II: 'REVIEW OF LITERATURE', dealt with past studies, related to the present study.

Chapter III: Devoted for describing the ‘MATERIAL AND METHODS’ of the study which includes statistical tools used for analysis.

Chapter IV: Dealt with ‘RESULTS AND DISCUSSION’ of the study.

Chapter V: Dealt with ‘SUMMARY AND CONCLUSIONS’ consisting implications of the findings and suggestions for future research.

The literature cited was appended at the end.

Chapter II

REVIEW OF LITERATURE

A comprehensive literature has become an essential part of any investigation, as it not only gives an idea about the work done in the past and helps to identify the gaps in the research findings. The review of the past research will be a forerunner of future research.

It was observed that a very few studies are there on soil health cards. Therefore, not much literature pertinent to soil health cards was available. Hence an effort was made to review the related literature, which were found to be meaningful, and having direct or indirect bearing on the study. A brief account of the review available is presented below under the following headings.

2.1 Profile characteristics of Soil health card scheme farmers.

2.2 Awareness of farmers about Soil health card scheme.

2.3 Perception of farmers towards Soil health card scheme.

2.4 Relationship between profile characteristics with awareness and perception of farmers.

2.5 Benefits derived from the Soil health card scheme by the farmers.

2.6 Problems as perceived by the farmers regarding Soil health card scheme and suggestions to overcome them.

2.1 PROFILE CHARACTERISTICS OF SOIL HEALTH CARD SCHEME FARMERS

2.1.1 Age

Patel (2013) in his study revealed that majority (58.00%) of soil health card holders belonged to middle age group followed by (25.34%) old age and (16.66%) young age group.

Gour *et. al.* (2015) revealed that majority (72.00%) of the tribal livestock owners belonged to middle age group followed by (14.66%) old age group and (13.34%) middle age group.

Hanglem *et. al.* (2015) observed that nearly half (44.16%) of the farmers belonged to middle age group followed by (30.00%) old age and (25.84%) young age group.

Kesharam *et. al*. (2015) observed that more than half (56.00%) of the paddy growers belonged to middle age group followed by (29.33%) young age and (14.67%) old age group.

Charel (2016) revealed that majority (65.83%) of soil health card holders belonged to middle age group followed by (17.50%) young age, (16.67%) old age group.

Dalvi and Pandya (2016) revealed that majority (59.00%) of maize contract farmers belonged to middle age group followed by (28.00%) old age and (13.00%) young age.

Mukati (2016) concluded that majority (70.94%) of soil health card holders belonged to middle age group followed by (16.24%) old age and (12.82%) young age.

Pandya and Timbadia (2016) revealed that majority (82.00%) of the soil health card users belonged to young age group followed by middle age group (18.00%) and none old age farmer.

Patel *et. al.* (2017) revealed that preponderance (56.00%) of respondents belonged to middle age group followed by old age (38.00%) and young age (06.00%) group.

Chakrawarty (2018) in his study revealed that nearly half of (45.83%) of soil health card holders belonged to middle age group followed by (40.00%) young and (14.17%) old age group.

Jaiswal and Singh (2018) in their study revealed that nearly half (45.00%) of soil health card holders belonged to middle age group, followed by (30.00%) old age and (25.00%) young age group.

Lamkane (2018) in his study revealed that majority (57.50%) of soil health card holders belonged to middle age group followed by (23.33%) young age and (19.17%) old age group.

Rathor (2018) in his study found that majority (54.16 %) of soil health card holders were of middle age group followed by young (23.34 %) and old (22.50 %) age group.

2.1.2. Education

Patel (2013) in his study disclosed that more than two-fifth (43.34 %) of the soil health card holders had secondary level of education followed by (23.34 %) higher secondary, (19.33%) primary,(11.33 %) illiterate and (02.66 %) graduation level of education.

Gour *et. al*. (2015) observed that majority (35.33%) of tribal livestock owners were illiterate followed by primary school (30.00%). middle school (24.00%) and high school level (10.67%) respectively. None of the respondent had graduate level of education.

Hanglem *et. al.* (2015) observed that majority (52.09%) of the respondents had primary to middle education followed by (42.91%) above tenth and (05.00%) below primary education respectively.

Kesharam *et. al.* (2015) observed that more than two-fifth (42.00 %) of the paddy growers had primary level of education followed by (30.00 %) secondary level, (18.00%) illiterate, (08.00%) higher secondary level ,(02.00%) graduation and none had postgraduate and above level of education.

Charel (2016) revealed that majority (59.17%) of soil health card holders had secondary level of education, followed by college and above level (21.66%) and primary level of education (19.17%) respectively.

Dalvi and Pandya (2016) revealed that majority (32.00%) of contract farmers had education up to middle school followed by functionally literate (23.00%), college/post graduated (16.00%), primary school (15.00%) and high school (14.00%) level of education respectively.

Mukati (2016) concluded that majority (27.35%) of soil health card holders had education up to middle school followed by high school education (21.37%), primary education (19.66%), able to read and write (18.80%), higher secondary (7.70%), illiterate (4.27%) and a negligible percentage of respondents (0.85%) had education upto graduation or more respectively.

Pandya and Timbadia (2016) revealed that majority (42.00%) of the soil health card users had secondary level of education followed by higher secondary (28.00%), graduation (18.00%), primary education (6.00%) and illiterate (6.00%) respectively.

Patel *et. al.* (2017) concluded that majority (42.00%) of respondents had secondary education, followed by primary school (34.00%), graduate (14.00%), illiterate (06.00%) and higher secondary education (04.00%) respectively.

Chakrawarty (2018) revealed that majority (59.17%) of soybean growers with SHC possessed medium level of education followed by (20.83%) low and (20.00%) high level of education.

Jaiswal and Singh (2018) in their study revealed that 14.17 per cent of SHC holders were illiterate followed by 7.50 per cent can read and write, 6.67 per cent were upto primary school, 19.17 per cent were up to middle school, 24.16% were high school and intermediate and 28.33% were having graduate and above levels of education.

Lamkane (2018) concluded that nearly less than one third (27.50%) of SHC holders possessed higher education followed by (24.17%) graduate, (22.50%) secondary education,(12.50%) post graduate,(08.33%) primary education and (5.00%) illiterate.

Rathor (2018) reported that (27.50%) of soil health card users had education up to middle school followed by high school education (21.66%), primary education (19.17%), able to read and write(19.16%), higher secondary (7.50%), illiterate (4.17%) and negligible (0.84%) had education up to graduation or more.

2.1.3. Family type

Rai and Rai (2012) revealed that 76.00 per cent of the farmer's belonged to nuclear family system followed by 24.00 per cent of the farmer's belonged to joint family system.

Ranjan (2013) revealed from their study that majority (69.00%) of respondents belonged to joint family and (30.00%) belonged to nuclear family.

Vishwanatha *et. al.* (2014) indicated that majority 62.85 per cent rural youth were from nuclear family followed by 37.15 per cent of rural youth were from joint family.

Gour *et. al.* (2015) observed that majority (87.33%) of the tribal livestock owners farmers belonged to joint family and only (12.67%) belonged to nuclear family.

Dalvi and Pandya (2016) concluded that majority (57.00%) of maize contract farmers belonged to joint family and (43.00%) farmers belonged to nuclear family.

Laxman (2016) in his study concluded that majority (57.50%) of respondents belonged to nuclear family and (42.50%) belonged to joint family.

Naik and Deshmukh (2016) revealed that majority (68.33%) of respondents belonged to nuclear type of family and (31.67%) belonged to joint type of family.

Panda and Singh (2016) identified that majority (83.33%) of respondents belonged to nuclear family and (16.67%) belonged to joint family.

Jaiswal and Singh (2018) in their study revealed that majority (56.67%) of SHC holders were found to be in the joint family and (43.33%) were found to be in the nuclear family.

Kumar *et. al.* (2019) concluded from their study that majority (73.00%) of the farmers belonged to nuclear/single family and (27%) belonged to joint family.

2.1.4. Farming experience

Kesharam *et. al.* (2015) observed that nearly half of the respondents (46.66 %) had very low (upto 10 years) farming experience, followed by (40.00 %) medium experience (11-20 years) and high (13.34%) experience (above 20 years).

Charel (2016) revealed that majority (70.83%) of soil health card holders had medium level of farming experience, followed by high farming experience (21.67%) and low level (7.50%) of farming experience respectively.

Mukati (2016) revealed that majority (58.12%) of soil health card holders were having medium level of farming experience, followed by high farming experience (24.79%) and low level (17.09%) of farming experience respectively.

Patel *et. al.* (2017) revealed that majority (65.00%) of respondents had high farming experience (> 20 years), followed by medium (28.00%) farming experience (11-20 years) and low (07.00%) farming experience (1-10 years) respectively.

Ansari *et. al.* (2018) revealed that majority (85.83%) of respondents had low farming experience followed by, (12.5%) high and (1.67%) medium farming experience levels.

Jaiswal and Singh (2018) in their study revealed that majority (65.83%) of SHC holders were having an experience of 5-10 years followed by (17.50%) having less than 5 years of experience whereas (16.67 %) were having an experience even more than 10 years.

Rathor (2018) reported that 59.17 per cent of SHC users had medium level of farming experience followed by 24.17 per cent and 16.66 per cent had high and low level of farming experience, respectively.

Santhi and Sangeetha (2018) reported that majority (44.00%) of Pradhan Mantri Fasal Bima Yojana (PMFBY) beneficiaries had farming experience of 5-8 years followed by (37.33%) 8-10 years and (18.67%) had farming experience of above 10 years.

2.1.5. Land holding

Patel (2013) in his study revealed that 32.67 per cent of the soil health card holder had small size of land, followed by 32.00 per cent 22.00 per cent and 13.33 per cent of them had medium size, marginal size, and large size of land holding respectively.

Gour *et. al.* (2015) observed that majority (64.67%) of the tribal livestock farmers had small size land, followed by landless (22.00%), marginal land (13.33%) and none had medium and large sized land holding.

Hanglem *et. al.* (2015) observed that nearly half (42.50%) of respondents had medium land holding, followed by (37.50%) small and semi medium and (20.00%) marginal land holding respectively.

Kesharam *et. al.* (2015) revealed that nearly two-fifth (40.66 %) of the paddy growers had medium size of land holding, followed by (34.67%) with small size of holding and (16.67%) with marginal size of land holding and (08.00%) had large size of land holding.

Charel (2016) revealed that nearly half (46.67%) of soil health card holders had medium size of land holding, followed by small size holding (31.67%) and (21.66%) large size of land holding.

Dalvi and Pandya (2016) concluded that majority (54.00%) of the maize contract farmers had small size of land holding, followed by semi medium land holding (24.00%) and (22.00%) marginal land holding.

Mukati (2016) revealed that majority (70.09%) of soil health card holders had medium size of land holding, followed by (29.06%) had large size and only (0.85%) were having small size of land holding.

Pandya and Timbadia (2016) concluded that majority (72.00%) of soil health card users had marginal size of land followed by small size (26.00%), medium size (02.00%) and none had large size of land.

Patel *et. al.* (2017) revealed that majority (45.00%) of respondents had small size of land holding, followed by marginal land holding (42.00%) and (13.00%) large size of land holding.

Bunkar (2018) in his study concluded that 54.16 per cent of SHC users had small land holding followed by 18.34 per cent and 27.50 per cent had marginal and large size land holding respectively.

Chakrawarty (2018) in his study revealed that majority (41.67%) of soybean growers with SHC had large size land holding followed by (37.50%) medium size and (20.83%) small size land holding.

Jaiswal and Singh (2018) in their study revealed that nearly half (43.33%) of the SHC holders had medium size of land holding followed by (35.83%) small and (20.83%) had large size of holding.

Lamkane (2018) revealed that major (42.50%) proportion of SHC holders had medium size land holding followed by (36.67%) small, (10.83%) large and (10.00%) marginal land holding.

Rathor (2018) reported from his study that 66.66 per cent of SHC holders had medium size of land holding, followed by 29.17 per cent, and 4.17 per cent had large and small size of land holding respectively.

2.1.6. Annual income

Gour *et. al.* (2015) observed that majority (75.33%) of respondents had medium income level followed by (14.00%) low income level and (10.67%) had high income level.

Kesharam *et. al.* (2015) revealed that less than one-third of the paddy growers (30.00 %) had annual income ranging from Rupees 2,00,001 to 3,00,000, followed by (26.00%) ranging from Rupees 1,00,001 to 2,00,000, (20.00%) ranging from Rupees 3, 00,001 to 4, 00,000, (12.67%) upto

Rupees1.00,000 and (11.33%) had annual income greater than Rupees 4,00,000.

Charel (2016) revealed that half (50.00%) of soil health card holders had high annual income followed by low (25.83%) and (24.17%) medium annual income.

Dalvi and Pandya (2016) concluded that majority (51.00%) of the contract farmers had annual income of up to Rupees 50,000 followed by (21.00%) above Rupees 200,000 and (20.00%) had income level of Rupees 50,001 to Rupees 100,000.

Mukati (2016) revealed that majority (77.78%) of soil health card holders had medium level of annual income, followed by (11.96%) high income and (10.26%) had low income.

Pandya and Timbadia (2016) revealed that 78.00 per cent of respondents had annual income up to Rupees 50000 followed by 14.00 per cent between Rupees 51,001 to Rupees 1, 00,000 and 08.00 per cent above Rupees 2, 00,000.

Patel *et. al.* (2017) revealed that majority (70.00%) of respondents had annual income of Rupees 50,001 to Rupees 1, 00,000 followed by (27.00%) up to Rupees 50,000 and (03.00%) had annual income greater than Rupees 1, 00,000.

Bunkar (2018) in his study revealed that majority (55.00%) of SHC holders were from middle income group followed by (16.67%) low-income group and (28.33%) high income group.

Chakrawarty (2018) revealed that majority (46.67%) of soybean growers with SHC possessed high level of income followed by (37.50%) medium and (15.83%) low level.

Jaiswal and Singh (2018) in their study revealed that, (53.33%) of soil health card holders had monthly income more than Rupees15, 001 followed by (39.17%) ranging from Rupees 10,001to Rupees 15, 000 and (7.50%) had income less than Rupees 10,000.

Lamkane (2018) concluded that majority (84.16%) of SHC holders had medium annual income followed by (10.00%) low and (5.83%) high annual income.

Rathor (2018) revealed that 77.50 per cent of SHC holders had medium level of annual income, followed by 11.66 per cent and 10.84 per cent had high and low level of annual income respectively.

2.1.7. Cropping intensity

Aher (2000) concluded that the cropping intensity on the small, medium and large size farms of rainfed region was 120.51, 101.70 and 102.69 per cent, while that of the farms of the irrigated region was 113.04, 108.21 and 110.82 per cent, respectively.

Kanavi (2000) reported that 58.00 per cent of sugarcane growers were under low category of cropping intensity and 42.00 per cent of farmers under high category.

Nagaraj (2002) reported that 90.00 per cent of sugarcane growers fell under low category of cropping intensity and 10.00 per cent were found in high category.

Nirban (2004) reported that about 43.00 per cent of the Konkan farmers were in medium category (104.00 to 192.00 per cent) of cropping intensity, followed by 29.00 per cent and 28.00 per cent in low (up to 103.00 per cent) and high (193.00 per cent and above) categories, respectively.

Malathesh *et. al.* (2009) in their study revealed that majority (41.66 %) of farmers had high cropping intensity followed by (30.00%) medium and (28.33 %) low cropping intensity.

Jyoti (2012) in her study on Farm mechanization expectations of cotton growers reported that majority (88.75%) of the cotton growers belonged to high cropping intensity category, only 11.25 per cent of the cotton growers belonged to low cropping intensity category.

Archana (2013) in her study revealed that, 83.33 per cent of the seed growers had low cropping intensity and 16.67 per cent of the seed growers had high cropping intensity.

Babu (2014) indicated in his study that majority (53.34%) of the respondents had medium level of cropping intensity followed by high (30.83%) and low (15.83%) levels of cropping intensity.

Madhukar (2015) identified that that a majority (65.00%) of the respondents had medium level of cropping intensity (138.00 to 232.00%) followed by (18.34%) low level (up to 137.00 %) and (16.66 %) high level (233.00 % and above) of cropping intensity.

Prajapati *et. al.* (2016) revealed that (55.00%) of the farmers had medium level of cropping intensity followed by (26.67%) low and (18.33%) high level of cropping intensity.

Pawar *et. al.* (2019) revealed that majority (83.75%) of the respondents had medium cropping intensity followed by (16.25%) high and none of them had low cropping intensity cropping intensity.

2.1.8. Mass media exposure

Yavanapriya (2010) reported that 46.70 per cent of the farm women belonged to medium mass media participation category followed by 27.50 per cent and 25.80 per cent of the respondents had low and high mass media participation respectively.

Devendrappa *et. al.* (2011) revealed that 75.00 per cent of respondents regularly listened to radio, whereas, only 42.4 per cent and 38.4 per cent regularly read newspapers and viewed television respectively. 24.80 per cent respondents read agricultural magazines.

Nataraju (2012) revealed that 45 per cent of the dairy farm women had high level of mass media participation followed by 33.34 and 21.66 per cent had medium and low level of mass media participation respectively.

Patel (2013) revealed that that more than half (54.00 %) of the soil health card holders had medium level of mass media exposure, followed by (24.67%) low, (10.66%) high, (08.67%) very high and (02.00%) very low level.

Kesharam *et. al.* (2015) concluded that slightly more than half (52.67%) of paddy growers had medium level of mass media exposure, followed by low (24.66%), high (19.34%), and very high level (02.03%) of mass media exposure respectively.

Charel (2016) revealed that majority (60.83%) of soil health card holders had medium level of mass media exposure, followed by low level (27.50%) and high level (11.67%) of mass media exposure respectively.

Mukati (2016) revealed that majority (78.63%) of soil health card holders were having medium level of mass media exposure followed by low level (14.53%) and high (6.84%) level of mass media exposure, respectively.

Pandya and Timbadia (2016) revealed that slightly less than half (40.00%) of soil health card users had low level of mass media exposure, followed by medium (32.00%), high (16.00%), very high (06.00%) and very low (06.00%) respectively.

Rajashekar *et. al.*(2017) revealed that majority (54.20%) of the respondents had low mass media exposure followed by medium (41.60%) and high (4.20%) mass media exposure.

Jaiswal and Singh (2018) in their study revealed that that 77.50 per cent of SHC holders were having medium mass media exposure followed by 15.00 per cent low and 7.50 per cent high level of mass media exposure respectively.

Rathor (2018) reported that 62.50 per cent of SHC users had medium level of mass media exposure followed by 20.84 per cent and 16.66 per cent had high and low mass media exposure, respectively.

Shehrawat *et. al.* (2018) concluded from their study that 96.60 per cent of SHC holders viewed television followed by 94.40 per cent read newspaper,

51.10 per cent read magazines, 47.80 per cent listen radio, and 27.80 per cent used internet for getting information.

Singh *et. al.* (2018) revealed from their study that 11.50 per cent of the respondents always listen to a radio programme followed by 26.00 per cent sometimes listen to a radio programme and 62.50 per cent had never listened. More than half of the respondents (60.00%) watch TV programme always followed by 33.50 per cent watch TV programme sometimes and 06.50 per cent had never watched a TV programme. About 36.50 per cent of the respondents always read a newspaper followed by 45.50 per cent sometimes read a newspaper and 18.00 per cent had never read a newspaper. About 11.00 per cent of the respondents read magazine always followed by 31.50 per cent read magazine sometime and 57.50 per cent had never read a magazine. Only 03.50 per cent of the respondents watch educational films always followed by 18.00 per cent watch educational films sometimes and 78.50 per cent had never viewed educational films.

Kumar *et. al.*(2019) in their study identified that nearly half (45.83%) of respondents had high level of mass media exposure followed by 29.16% ,25.00% had medium and low level of mass media exposure respectively.

2.1.9. Social participation

Deshmukh *et. al.* (2007) in their study "Knowledge and Adoption of Agricultural Technologies in Marathwada region" revealed that 45.13 per cent of the respondents had medium social participation followed by high (38.88 per cent) and low (15.97 per cent) level.

Patel (2013) deduced from his study that more than half of respondents (56.66%) had membership in more than one organization followed by 23.34 per cent, 12.00 per cent and 08.00 per cent had membership in one organization and no membership and membership along with position holding in the organization respectively.

Kesharam *et. al.* (2015) revealed that majority (63.33 %) of the paddy growers had membership in one organization, followed by (28.67%) had no-

membership in any organization, (5.33%) membership in more than one organization and (02.67%) membership along with position.

Charel (2016) revealed that majority (47.50%) of soil health card holders had membership in one organization, followed by (23.33%) had membership in more than one organization, (17.50%) had no membership in any organization and only (11.67%) of the soil health card holders had membership along with position in organization.

Mukati (2016) revealed that majority (76.92%) of soil health card holders had medium level of social participation followed by high level (23.08%) and none had low social participation.

Pandya and Timbadia (2016) revealed that majority (76.00%) of the soil health card users had no membership in any organization followed by membership in one organization (14.00%), membership in more than one organization (08.00%) and membership along with position holding in the organization(02.00%) respectively.

Patel *et. al.* (2017) revealed that majority (61.00%) of respondents had no participation followed by (26.00%) participation in one organization, (12.00%) participation in two organizations and (1.00%) participation in more than two organizations.

Jaiswal and Singh (2018) in their study revealed that majority (75.84%) of soil health card holders had medium social participation followed by (23.33%) high and (0.83 %) low levels.

Lamkane (2018) revealed that majority (64.16%) of SHC holders had medium social participation followed by high (20.00%) and (15.84%) low levels.

Rathor (2018) reported that 37.50 per cent of SHC holders had medium level of social participation, followed by 33.33 per cent and 29.17 per cent of the soil health card holders had high and low social participation respectively.

2.1.10. Extension contact

Deshmukh *et. al.* (2007) revealed that majority (79.51 %) of respondents had medium extension contact followed by (13.88%) high and (6.59%) low level extension contact.

Sharnagat (2008) indicated that majority (86.67%) of respondent beneficiaries had moderate extension contact with extension agencies for seeking information followed by 8.00% and 5.33% per cent of respondent beneficiaries had high and low extension contact respectively.

Thore (2008) revealed that majority (75.50%) of respondents had medium level of extension contact followed by (13.34%) low and (10.86%) high level of extension contact.

Patel (2013) concluded from his study that exactly three fifth (60.00 %) of the farmers had low level of extension contact, followed by 18.67 per cent and 11.33 per cent of them had medium and high level of extension contact respectively. Only 10.00 per cent of them had very low level of extension contact.

Kesharam *et. al.* (2015) revealed that more than two-fifth (41.33 %) of the paddy growers had medium level of extension contact followed by (32.67%) low level, (23.33%) very low level and (02.67%) high level of extension contact.

Mukati (2016) revealed that majority (82.90%) of the soil health card holders had medium level of extension contact followed by high level (10.26%) and low (6.84%) level of extension contact.

Pandya and Timbadia (2016) revealed that slightly less than half (46.00%) of soil health card users had low level of extension contact followed by medium level (20.00%), high (16.00%), low (12.00%) and very high (06.00%) level of extension contact.

Jaiswal and Singh (2018) in their study revealed that majority (81.67%) of SHC holders had medium level of extension contact followed by (10.83%) high and (7.50%) low levels.

Lamkane (2018) in his study revealed that majority (78.33%) of SHC holders had medium level of extension contact followed by (11.67%) high and (10.00%) low levels.

Rathor (2018) revealed that that majority (50.00%) of the soil health card holders had medium level of extension contact followed by high (33.34%) and low (16.66%) level of extension contact.

2.1.11. Scientific orientation

Khan *et. al.* (2007) revealed that majority (60.00%) of the respondents had low level of scientific orientation while 24 per cent had medium and only 16 per cent had high scientific orientation.

Narbaria (2013) mentioned that majority (97.62%) of the respondents had high level of scientific orientation followed by 1.59 per cent of them had medium level scientific orientation and only 0.79 per cent of respondents had low level of scientific orientation.

Patel (2013) revealed that majority (89.34%) of the farmers had medium level of scientific orientation, followed by 06.66 per cent low and 02.00 per cent each had very low and high level of scientific orientation respectively. While none of the respondents were found under the categories of very high scientific orientation.

Thatchinamoorthy and Selvin (2014) found that more than 85 per cent of SRI farmers possessed medium level of scientific orientation followed by 10 and around 6 per cent who had high and low level of scientific orientation respectively.

Kesharam *et. al.* (2015) revealed that more than three- fifth (62.00%) of paddy growers had medium level of scientific orientation followed by high level (20.00%), low level (16.00%) and very high level (2.00%) of scientific orientation, respectively. None of the paddy growers belonged to very low level of scientific orientation.

Hanglem *et. al.* (2015) observed that majority (51.66%) of respondents had medium level of scientific orientation followed by low level (36.66%) and high level (11.68%) of scientific orientation.

Charel (2016) revealed that majority (70.00%) of soil health card users had medium level of scientific orientation, followed by low level (17.50%) and high level (12.50%) of scientific orientation.

Dalvi and Pandya (2016) revealed that majority (80.00%) of maize contract farmers had moderate level of scientific orientation, followed by lower level (14.00%) and higher level (06.00%) of scientific orientation.

Mukati (2016) revealed that majority (81.20%) of soil health card holders were having medium level of scientific orientation, followed by low (12.82%) and high (5.98%) level of scientific orientation.

Pandya and Timbadia (2016) revealed that majority (30.00%) of soil health card users had medium level of scientific orientation, followed by high (28.00%), low (22.00%), very high (14.00%) and very low (06.00%) of scientific orientation, respectively.

Narbaria (2017) revealed that majority (78.00%) of the respondents had medium level of scientific orientation followed by (13.33%) high and (9.00%) low level.

Jaiswal and Singh (2018) in their study revealed that majority (80.00%) of SHC holders had medium scientific orientation followed by high (13.33%) and low (6.67%) level of scientific orientation.

Lamkane (2018) in his study revealed that majority (73.34%) of SHC holders had medium level of scientific orientation followed by (14.16%) high and (12.50%) low levels.

Rathor (2018) reported that 78.33 per cent of SHC users had medium level of scientific orientation followed by 13.34 per cent and 8.33 per cent had low and high level of scientific orientation respectively.

2.1.12. Economic motivation

Khan *et. al.* (2007) mentioned that 40 per cent of the total had high level of economic motivation, 36 per cent had medium and 24 per cent had low level of economic motivation.

Dhruw (2008) found that 79.16 per cent respondents had medium level of economic motivation, while 11.68 per cent and 9.16 per cent respondents had high and low level of economic motivation respectively.

Devarani and Bandhyopadhyay (2012) revealed that the majority of the farmers had low economic motivation. Male farmers (22.37%) having high economic motivation were more than the farmwomen (5.13%). In the low economic motivation category the percentage of farm-women (14.10%) was higher than the male farmers (5.26%).

Patel (2013) revealed that majority (73.34 %) of the SHC holders had medium level of economic motivation followed by 16.67 per cent, 04.00 per cent 03.33 per cent and 02.66 per cent of the respondents had low, high, very low and very high level of economic motivation respectively.

Thatchinamoorthy and Selvin (2014) found that the majority of the SRI farmers (87.50%) had medium to high level of economic motivation behavior and the remaining 12.50 per cent of SRI farmers had low level of economic motivation behavior.

Kesharam *et. al.* (2015) revealed that, slightly more than half (52.00 %) of the paddy growers had medium degree of economic motivation, followed by high (44.00%), very high (02.67%) and low degree (01.33%) of economic motivation respectively. No paddy growers found place in the category of very low level of economic motivation.

Dalvi and Pandya (2016) revealed that majority (70.00%) of maize contract farmers had moderate level of economic motivation, followed by lower level (20.00%) and higher level (10.00%) of economic motivation respectively.

Pandya and Timbadia (2016) revealed that majority (86.00%) of the soil health card users had medium level of economic motivation followed by low (12.00%), high (02.00%) level of economic motivation while there are no any respondent with very low or very high level of economic motivation.

Narbaria (2017) mentioned that majority (66.67%) of the respondents had medium level of economic motivation followed by (22.00%) low level and (11.33%) high level.

Sadashive *et. al.* (2017) revealed that majority (45.83%) of dairy farmers had high economic motivation followed by medium (32.50 %) and low (21.67%) level of economic motivation.

Chakrawarty (2018) deduced from his study that majority (48.00%) of soybean growers with SHC had medium level of economic motivation followed by (27.00%) high and (25.00%) low levels.

Pawar *et. al.* (2019) indicated that majority (57.50%) of respondent had medium level of economic motivation followed by low level (26.25%) and high level (16.25%) of economic motivation.

2.1.13. Innovativeness

Bhoi (2008) observed that majority (91.67%) of the demonstration beneficiary castor growers had medium to high and non demonstration beneficiary castor growers (80.00%) had low to medium level of innovativeness.

Dhaneshwar (2008) observed that more than three-fifth (62.50%) of the beneficiary and (61.25%) non beneficiary farmers had medium innovativeness, followed by (23.75%) beneficiary and (15.00%) non beneficiary with high innovativeness and (13.75%) and (23.75%) had low innovativeness respectively.

Patel (2013) in his study revealed that great majority (85.33 %) of the respondents had medium level of innovativeness followed by 08.00 per cent, 04.00 per cent and 02.00 per cent of the respondents had low, very low and

high level of innovativeness, respectively. While only 00.67 per cent of the respondents had very high level of innovativeness.

Charel (2016) revealed that majority (50.83%) of soil health card holders had medium level of innovativeness, followed by lower level (29.17%) and higher level (20.00%) of innovativeness respectively.

Pandya and Timbadia (2016) revealed that majority (72.00%) of the soil health card users had high level of innovativeness followed by medium level (28.00%) and none of the farmer belonged to very low, low, or very high level of innovativeness.

Rajashekar *et. al.* (2017) revealed that majority (55.00%) of the respondents had medium innovativeness followed by high (40.00%) and low (5.00%) innovativeness.

Jaiswal and Singh (2018) in their study revealed that majority (76.67%) of SHC holders had medium level of innovativeness followed by (13.33%) high and (10.00%) low level of innovativeness.

Lamkane (2018) revealed that majority (70.00%) of SHC holders had medium level of innovativeness followed by (20.00%) low and (10.00%) high levels.

Rathor (2018) found that 76.66 per cent of SHC users had medium level of innovativeness, followed by 13.34 per cent and 10.00 per cent had high and low level of innovativeness respectively.

2.1.14. Risk orientation

Arathy (2011) reported that majority 61.67 per cent of the respondents had medium risk orientation followed by high (32.50%) and low (5.83%) risk orientation.

Thiyagarajan (2011) found that 43.30 per cent of the SRI farmers had high level of risk orientation, followed by 42.50 per cent with medium and 14.20 per cent with low level of risk orientation.

Venkataswarrao *et. al.* (2012) reported that majority (47.00%) of Farmers Field School respondents has high risk orientation well whereas non Farmers Field School respondents (60.00%) had medium risk orientation.

Babu (2014) revealed that majority (67.50%) of the Paddy farmers had medium level of risk orientation followed by low (15.8%) and high (16.70%) levels of risk orientation.

Thatchinamoorthy and Selvin (2014) found that 55 per cent of the SRI farmers had medium level of risk orientation behavior, followed by 27.5 per cent of the SRI farmers with high level of risk orientation behavior and the rest 17.5 per cent of the SRI farmers had low level of risk orientation behavior.

Kesharam *et. al.* (2015) revealed that, majority (70.67%) of the paddy growers had medium risk orientation followed by high level (20.00%), low level (8.00%) and very low level (1.33%) of risk orientation. None belonged to category of very high risk orientation.

Charel (2016) revealed that majority (80.00%) of soil health card users had medium level of risk orientation followed by low level (15.83%) and high level (4.17%) of risk orientation.

Rajashekar *et. al.* (2017) revealed that majority (65.00%) of the respondents had medium risk orientation followed by high (27.50%) and low (11.70%) risk orientation.

Chakrawarty (2018) concluded from his study that major (40.83%) proportion of soybean growers with SHC had high level of risk orientation followed by (35.84%) medium and (23.33%) low levels.

Krishnamurthy *et. al.* (2018) revealed that more than half (57.22 %) of the respondents had low risk orientation followed by 23.33 per cent and 19.44 per cent of respondents belonged to high and medium risk orientation categories respectively.

2.1.15. Management orientation

Nagesha (2005) revealed that majority (66.7%) of the respondents belonged to medium category of management orientation, followed by 19.28 per cent of respondents having low level management orientation and 14.22 per cent of respondents having high level management orientation.

Nagesh (2006) found that majority (62.50%) of the respondents had medium management orientation, followed by 21.66 and 15.84 per cent of the respondents having high and low management orientation, respectively.

Vidhyadhari (2007) reported that majority (80.00%) of the respondents had medium level of management orientation followed by high (12.50%) and low (7.50%) level of management orientation respectively.

Taufiq *et. al.* (2011) in their study on Entrepreneurial characteristics of agripreneurs under the scheme of Agriclinics & Agri-business Centres reported that majority of the respondents (60.83%) had medium level of management orientation followed by 21.67 per cent under high level and 17.50 per cent under low level of management orientation.

Naidu (2012) revealed that majority of sugarcane farmers had medium management orientation (56.11%) followed by low (22.78%) and high (21.11%) management orientation respectively.

Sreeram (2013) identified that majority (77.50%) of the respondents had medium level of management orientation followed by low (12.50%) and high (10.00%) levels of management orientation respectively.

Shivacharan (2014) in his study reported that most (39.17%) of the respondents had medium management orientation followed by low (34.17%), high (12.50%), very high (8.33%) and very low (5.83%) management orientation.

Sadashive *et. al.* (2017) revealed that less than half (45.50%) of dairy farmers had low management orientation followed by medium (38.33%) and high (19.17%) had low management orientation.

Shreekant and Jahagirdar (2017) indicated that 48.33 per cent of the respondents had medium management orientation followed by 30 and 21.67 per cent high and low management orientation respectively.

Stephency and Vengatesan (2018) reported that more than fifty per cent of the respondents (51.67 per cent) had medium level of management orientation followed by 29.16 per cent with high level of management orientation and 19.17 per cent with low level of management orientation.

Pawar *et. al.* (2019) indicated that majority (67.50%) of respondents had medium level of management orientation followed by low (18.75%) and high (13.75%) level of management orientation.

2.1.16. Achievement motivation

Neelaveni (2005) revealed that 45.55 per cent of the respondents had medium achievement motivation, while 28.90 per cent with high and 25.55 per cent of them had low achievement motivation.

Dhanasree (2007) showed that majority (53.33%) of self help group leaders were classified under medium category of achievement motivation followed by high (24.44%) and low (22.23%) levels.

Chidananda (2008) reported that majority (64.16%) of the respondent farmers have medium achievement motivation followed by 21.67 per cent in high and 14.17 per cent in low achievement motivation respectively.

Beegam (2008) revealed that majority (73.33%) of the respondents had medium achievement motivation followed by high (10.83%) and low (15.84%) achievement motivation.

Chithra (2011) observed that nearly one-half of the beneficiaries of the programme had medium level (48.35%) of achievement motivation followed by 21.75 per cent and 30.00 per cent of the beneficiaries with low and high level of achievement motivation respectively.

Naidu (2012) revealed that 65.00 per cent of the sugarcane farmers had medium achievement motivation followed by high (19.44%) and low (15.56%) achievement motivation.

Mukati (2016) revealed that majority (81.20%) of soil health card holders were having medium level of achievement motivation, followed by low (11.97%) and high (6.83%) level of achievement motivation.

Shreekant and Jahagirdar (2017) indicated that 52.5 per cent of the respondents had medium achievement motivation followed by 38.33 and 9.17per cent low and high achievement motivation respectively.

Jaiswal and Singh (2018) in their study revealed that majority (80.00%) of SHC holders had medium level of achievement motivation followed by low (12.50%) and low (7.50 %) level of achievement motivation.

Stephency and Vengatesan (2018) reported that half of the respondents (50.00 %) had medium level of achievement motivation followed by 26.67 per cent and 23.33 per cent high and low levels of achievement motivation respectively.

Rathor (2018) indicated that 79.16 per cent of SHC users had medium level of achievement motivation, followed by 12.50 per cent and 8.34 per cent had low and high level of achievement motivation respectively.

2.2 AWARENESS OF FARMERS ABOUT SOIL HEALTH CARD SCHEME

Patel (2005) revealed that majority of the respondent 68.00 per cent were having medium level of knowledge, where as equal number 16.00 per cent of the respondents had low and high level of knowledge about Integrated Tribal Development Programme (ITDP).

Yadav *et. al.* (2006) found that the majority of the farmers (82.00 %) had knowledge about soil testing practices. Only (18.00%) respondents had no knowledge of soil testing practices. The knowledge about soil testing practices had been found satisfactory.

Bhatt *et. al.* (2009) revealed that all the beneficiaries were aware about various aspects of soil health card like major nutrients (N, P & K), soil pH and Soil EC, while 74.00 per cent were aware about irrigation water analysis and only 20.00 per cent were aware about analysis of Sulphur.

Patel (2013) reported that the majority (86.67 %) of the respondents had medium level of knowledge regarding application of soil health card programme, followed by 08.00 per cent, 03.33 per cent and 01.33 per cent of them had low, very low and high level of knowledge regarding application of soil health card, respectively.

Mohapatra and Kameswari (2014) while studying the Knowledge of farmers about soil health management found that maximum number of the farmers (76.66%) had medium level of knowledge regarding acidic soil management, followed by INM (62.22%) and soil testing technology (57.78 %).

Mukati (2016) revealed that 81.19 per cent of soil health card holders were aware about SHC and 18.81per cent were unaware about SHC.

Patel *et. al.* (2017) in their study concluded that 37 per cent of SHC beneficiaries had high level of knowledge regarding benefits of soil testing followed by 18 per cent 16 per cent, 15 per cent, and 14 per cent had low ,medium, very high and very low level of knowledge respectively.

Reddy (2017) found that at the national level 82.2 per cent of the sample farmers were aware of SHC. Awareness levels were quite good in South, West, Central and Eastern zones, with about 80 per cent to 90 per cent awareness. North east has the lowest awareness of 31.8 per cent followed by north 78.4 per cent.

Bunkar (2018) in his study revealed that majority 66.66 per cent of SHC holders had medium level of awareness, followed by 15.00 per cent and 18.34 per cent had low and high level of awareness about the scheme respectively.

Archana and Balasubramanian (2019) revealed that 74.17 per cent of the farmers in Tamil Nadu had awareness about the scheme. Only 25.83 per cent of the farmers were not aware about the scheme.

2.3. PERCEPTION OF FARMERS TOWARDS SOIL HEALTH CARD SCHEME

Kadam *et. al.* (2012) reported that majority (53.85 %) of the respondents had moderately perceived their role followed by 39.42 per cent and 6.73 per cent of the respondents had good and poor level of perception about their role respectively.

Patel (2013) reported that slightly less than three fourth (71.33%) of SHC holders had neutral attitude for soil health card followed by 19.33,4.66,3.33 and 1.34 per cent respondents had unfavourable attitude, highly unfavourable attitude, favourable, and most favourable attitude towards soil health card programme, respectively.

Sonawane *et. al.* (2015) observed that majority (59.16%) of the crop insurance beneficiaries had low level of perception towards Crop Insurance Scheme followed by 30.84 per cent and 10.00 per cent of the crop insurance beneficiaries had medium level of perception and high level of perception respectively.

Kumari (2016) revealed that that majority (54.17%) of the respondents had medium level of perception followed by low (25.00%) and high (20.83%) level of perception on climate variability.

Laxman (2016) indicated that more than half (58.75%) of the respondents had moderate level of perception followed by 20.63 per cent and 20.62 per cent had poor and good level of perception respectively.

Charel *et. al.* (2018) in their study revealed that that majority (70.83 %) of the SHC holders had moderate level of perception about soil health card followed by 15.00 per cent and 14.17 per cent possessed good and poor level of perception about soil health card, respectively.

Jaiswal and Singh (2018) in their study identified that majority (82.50%) of SHC holders had moderate level of perception followed by (12.50%) poor and (5.00%) good level.

Shehrawat *et. al.* (2018) in their study revealed that equal number of farmers (56.67%) had opinion that SHC provides the dose of organic manure' and 'an idea of fertilizer's usage pattern' followed by 'information about crop grown suited to soil type' (54.44%). More than half of farmers (53.33%) had opinion that 'it helps to increase the organic matter in soil', 'timely management of fertilizers' and 'improve the quality of produce', and it helps in selection of crop (Kharif& Rabi) with (52.22 %) of farmers. Further, it was found that half of farmers (50.00%) had opinion that 'it helps to maintain soil structure & texture', 'provide the dose of farmyard manure (FYM)/ compost' and 'provides the dose of lime and gypsum'.

Mukati *et. al.* (2018) deduced from their study that majority (83.76%) of soil health card holders had favorable attitude towards soil health card followed by less favorable (11.97%), and (4.27%) had most favorable attitude.

Rathor (2018) indicated from his study that maximum number of soil health card holders (83.66%) had favorable attitude regarding soil health card followed by less favorable (11.97%), and (4.27%) most favorable attitude towards soil health card.

2.4. RELATIONSHIP BETWEEN PROFILE CHARACTERISTICS OF THE FARMERS WITH AWARENESS AND PERCEPTION ABOUT SOIL HEALTH CARD SCHEME

2.4.1 Relationship between profile characteristics of the farmers with awareness

2.4.1.1 Age and awareness

Chand (2012) indicated that age of tribal farm women had significant relationship with awareness in improved cattle management practices.

Dohare (2014) revealed that age of respondents had positive and significant relationship with their awareness regarding post harvest management practices of tomato cultivation.

Dineshbhai (2015) concluded that age of respondents had negative and significant relationship with awareness of organic farming practices.

Radhika (2016) identified that age of respondents had significant relationship with their awareness towards Farm T.V. programmes.

Ankit (2018) delineated that age of respondents had no significant relationship with awareness towards management practices of over-exploitation of ground water.

Bunkar (2018) found that age of soil health card holders had positive and significant relationship with their awareness about soil health card scheme.

Minz (2018) identified that age of respondents had no significant relationship with their awareness about weather information sources.

Parmar (2018) revealed that age of respondents had positive and significant relationship with their awareness of integrated farming system.

Santhi and Sangeetha (2018) depicted that age of respondents had no significant relationship with their awareness on PMFBY Scheme.

2.4.1.2 Education and awareness

Rawat (2010) revealed that education of cotton growers had significant relationship their awareness about indigenous technical knowledge in cotton production.

Chand (2012) indicated that education of tribal farm women had significant relationship with awareness in improved cattle management practices.

Dohare (2014) revealed that education of respondents had positive and significant relationship with their awareness regarding post harvest management practices of tomato cultivation.

Dineshbhai (2015) concluded that education of respondents had significant relationship with awareness of organic farming practices.

Radhika (2016) identified that education of respondents had significant relationship with their awareness towards Farm T.V. programmes.

Ankit (2018) delineated that education of respondents had positive and significant relationship with awareness towards management practices of over-exploitation of ground water.

Bunkar (2018) found that education of soil health card holders had positive and significant relationship with their awareness about soil health card scheme.

Minz (2018) identified that education of respondents had positive and significant relationship with their awareness about weather information sources.

Parmar (2018) revealed that education of respondents had positive and significant relationship with their awareness of integrated farming system.

Santhi and Sangeetha (2018) depicted that education of respondents had significant relationship with their awareness on PMFBY Scheme.

2.4.1.3 Family type and awareness

Vaidya and Trivedi (2006) revealed that family type had no significant relationship with awareness regarding agricultural pollution.

Chandranna *et. al.* (2009) delineated that family type of respondents had negative and no significant association with awareness about IPM practices in ground nut.

Dayalal (2010) revealed that family type of respondents had no significant association with awareness about organic farming.

Pavitra (2013) revealed that family type had no significant relationship with awareness about Yashaswini Health Scheme (YHS).

Amitendu and Mazumder (2014) reported that family type of livestock farmers had no significant relationship with awareness of deworming of pig.

Nayak (2017) revealed that family type had no significant relationship with awareness about crop insurance scheme.

Ray (2017) revealed that family type of respondents had no significant relationship with awareness about genetically modified crops.

Sundhesha *et. al.* (2018) revealed that family type of farm women had significant relationship with awareness of drudgery reducing tools and equipment.

2.4.1.4 Farming experience and awareness

Dayalal (2010) revealed that farming experience of respondents had positive and significant association with awareness about organic farming.

Younus (2013) revealed that farming experience of respondents had positive and significant relationship with awareness of integrated farming system.

Pavitra (2013) revealed that farming experience had positive and significant relationship with awareness about Yashaswini Health Scheme (YHS).

Ranjan (2013) delineated that farming experience of respondents had negative and no significant association with awareness of farm mechanization.

Prakashrao (2016) revealed that farming experience of respondents had negative and significant relationship with awareness of broad bed furrow technology in Soybean crop.

Ray (2017) revealed that farming experience of respondents had negative and no significant relationship with awareness about genetically modified crops.

Babu et. al. (2018) revealed that farming experience of respondents had positive and significant relationship with awareness on effect of pesticides on human health.

Naik *et. al.* (2018) revealed that farming experience of respondents had no significant association with awareness on organic red gram cultivation.

Ankit (2018) delineated that farming experience of respondents had no significant relationship with awareness towards management practices of over-exploitation of ground water.

Naik *et. al.* (2018) revealed that farming experience of respondents had positive and significant association with awareness on organic red gram cultivation.

Parmar (2018) revealed that farming experience of respondents had positive and significant relationship with their awareness of integrated farming system.

2.4.1.5 Land holding and awareness

Chand (2012) indicated that land holding of tribal farm women had significant relationship with awareness in improved cattle management practices.

Pavitra (2013) revealed that annual income had no significant relationship with awareness about Yashaswini Health Scheme (YHS).

Dohare (2014) revealed that land holding of respondents had positive and significant relationship with their awareness regarding post harvest management practices of tomato cultivation.

Dineshbhai (2015) concluded that land holding of respondents had no significant relationship with awareness of organic farming practices.

Radhika (2016) identified that land holding of respondents had significant relationship with their awareness towards Farm T.V. programmes.

Ankit (2018) delineated that land holding of respondents had positive and significant relationship with awareness towards management practices of over-exploitation of ground water.

Babu et. al. (2018) revealed that land holding of respondents had no significant relationship with awareness on effect of pesticides on human health.

Bunkar (2018) found that land holding of soil health card holders had positive and significant relationship with their awareness about soil health card scheme.

Parmar (2018) revealed that land holding of respondents had positive and significant relationship with their awareness of integrated farming system.

Sundhesha *et. al.* (2018) revealed that land holding of farm women had significant relationship with awareness of drudgery reducing tools and equipment.

2.4.1.6 Annual income and awareness

Rawat (2010) revealed that annual income of cotton growers had significant relationship their awareness about indigenous technical knowledge in cotton production.

Pavitra (2013) revealed that annual income had no significant relationship with awareness about Yashaswini Health Scheme (YHS).

Younus (2013) revealed that annual income of respondents had no significant relationship with awareness of integrated farming system.

Radhika (2016) identified that annual income of respondents had no significant relationship with their awareness towards Farm T.V. programmes.

Ankit (2018) delineated that annual income of respondents had no significant relationship with awareness towards management practices of over-exploitation of ground water.

Bunkar (2018) found that annual income of soil health card holders had positive and significant relationship with their awareness about soil health card scheme.

Minz (2018) identified that annual income of respondents had no significant relationship with their awareness about weather information sources.

Parmar (2018) revealed that annual income of respondents had positive and significant relationship with their awareness of integrated farming system.

Santhi and Sangeetha (2018) depicted that annual income of respondents had significant relationship with their awareness on PMFBY Scheme.

Sundhesha *et. al.* (2018) revealed that annual income of farm women had significant relationship with awareness of drudgery reducing tools and equipment.

2.4.1.7 Cropping intensity and awareness

Dayalal (2010) revealed that cropping intensity of respondents had no significant association with awareness about organic farming.

Markana *et. al.* (2016) identified that cropping intensity had no significant association with knowledge about recommended practices of kharif groundnut.

Prakashrao (2016) revealed that cropping intensity of respondents had positive and significant relationship with awareness of broad bed furrow technology in Soybean crop.

2.4.1.8 Mass media exposure and awareness

Rawat (2010) revealed that mass media exposure of cotton growers had significant relationship their awareness about indigenous technical knowledge in cotton production.

Pavitra (2013) revealed that mass media exposure had positive and significant relationship with awareness about Yashaswini Health Scheme (YHS).

Amitendu and Mazumder (2014) reported that mass media exposure of livestock farmers had no significant relationship with awareness of deworming of pig.

Dohare (2014) revealed that mass media exposure of respondents had positive and significant relationship with their awareness regarding post harvest management practices of tomato cultivation.

Dineshbhai (2015) concluded that mass media exposure of respondents had significant relationship with awareness of organic farming practices.

Babu *et. al.* (2018) revealed that mass media exposure of respondents had positive and significant relationship with awareness on effect of pesticides on human health.

Ankit (2018) delineated that mass media exposure of respondents had no significant relationship with awareness towards management practices of over-exploitation of ground water.

Minz (2018) identified that mass media exposure of respondents had significant relationship with their awareness about weather information sources.

Parmar (2018) revealed that mass media exposure of respondents had no significant relationship with their awareness of integrated farming system.

Sundhesha *et. al.* (2018) revealed that mass media exposure of farm women had significant relationship with awareness of drudgery reducing tools and equipment.

2.4.1.9 Social participation and awareness

Vaidya and Trivedi (2006) revealed that social participation had no significant relationship with awareness regarding agricultural pollution.

Rawat (2010) revealed that social participation of cotton growers had significant relationship their awareness about indigenous technical knowledge in cotton production.

Chand (2012) indicated that social participation of tribal farm women had significant relationship with awareness in improved cattle management practices.

Chaudhary (2013) identified that social participation of respondents had no significant relationship with awareness regarding agricultural pollution.

Amitendu and Mazumder (2014) reported that social participation of livestock farmers had no significant relationship with awareness of deworming of pig.

Dohare (2014) revealed that social participation of respondents had positive and significant relationship with their awareness regarding post harvest management practices of tomato cultivation.

Dineshbhai (2015) concluded that social participation of respondents had negative and no significant relationship with awareness of organic farming practices.

Babu *et. al*. (2018) revealed that social participation of respondents had positive and significant relationship with awareness on effect of pesticides on human health.

Bunkar (2018) found that social participation of soil health card holders had positive and significant relationship with their awareness about soil health card scheme.

Minz (2018) identified that social participation of respondents had no significant relationship with their awareness about weather information sources.

2.4.1.10 Extension contact and awareness

Vaidya and Trivedi (2006) revealed that extension contact had significant relationship with awareness regarding agricultural pollution.

Chaudhary (2013) identified that extension contact of respondents had significant relationship with awareness regarding agricultural pollution.

Ranjan (2013) delineated that extension contact of respondents had positive and significant association with awareness of farm mechanization.

Younus (2013) revealed that extension contact of respondents had positive and significant relationship with awareness of integrated farming system.

Prakashrao (2016) revealed that extension contact of respondents had no significant relationship with awareness of broad bed furrow technology in Soybean crop.

Ankit (2018) delineated that extension contact of respondents had positive and significant relationship with awareness towards management practices of over-exploitation of ground water.

Bunkar (2018) found that extension contact of soil health card holders had positive and significant relationship with their awareness about soil health card scheme.

Minz (2018) identified that extension contact of respondents had no significant relationship with their awareness about weather information sources.

Parmar (2018) revealed that extension contact of respondents had positive and significant relationship with their awareness of integrated farming system.

Sundhesha *et. al.* (2018) revealed that extension contact of farm women had significant relationship with awareness of drudgery reducing tools and equipment.

2.4.1.11 Scientific orientation and awareness

Sangwan (2006) revealed that scientific orientation of respondents had positive and significant association with awareness of medicinal plants.

Vaidya and Trivedi (2006) revealed that scientific orientation had significant relationship with awareness regarding agricultural pollution.

Pruthvi (2011) revealed that scientific orientation of respondents had positive and significant association with awareness about Bt cotton.

Chaudhary (2013) identified that scientific orientation of respondents had significant relationship with awareness regarding agricultural pollution.

Ranjan (2013) delineated that scientific orientation of respondents had positive and significant association with awareness of farm mechanization.

Dineshbhai (2015) concluded that scientific orientation of respondents had no significant relationship with awareness of organic farming practices.

Prakashrao (2016) revealed that scientific orientation of respondents had positive and significant relationship with awareness of broad bed furrow technology in Soybean crop.

Raghuvansi *et. al.* (2017) revealed that scientific orientation of respondents had significant relationship with awareness about climate change.

Babu *et. al.* (2018) revealed that scientific orientation of respondents had positive and significant relationship with awareness on effect of pesticides on human health.

2.4.1.12 Economic motivation and awareness

Dayalal (2010) revealed that economic motivation of respondents had positive and significant association with awareness about organic farming.

Bandode (2012) delineated that economic motivation of respondents had positive and significant relationship with awareness regarding post harvest management practices in maize cultivation.

Chand (2012) indicated that economic motivation of tribal farm women had significant relationship with awareness in improved cattle management practices.

Chaudhary (2013) identified that economic motivation of respondents had significant relationship with awareness regarding agricultural pollution.

Amitendu and Mazumder (2014) reported that economic motivation of livestock farmers had no significant relationship with awareness of deworming of pig.

Dohare (2014) revealed that economic motivation of respondents had positive and significant relationship with their awareness regarding post harvest management practices of tomato cultivation.

Prakashrao (2016) revealed that economic motivation of respondents had no significant relationship with awareness of broad bed furrow technology in Soybean crop.

Ray (2017) revealed that economic motivation of respondents had no significant relationship with awareness about genetically modified crops.

Babu *et. al.* (2018) revealed that economic motivation of respondents had positive and significant relationship with awareness on effect of pesticides on human health.

2.4.1.13 Innovativeness and awareness

Rawat (2010) revealed that innovativeness of cotton growers had significant relationship their awareness about indigenous technical knowledge in cotton production.

Pruthvi (2011) revealed that innovativeness of respondents had positive and significant association with awareness about Bt cotton.

Bandode (2012) delineated that innovativeness of respondents had positive and significant relationship with awareness regarding post harvest management practices in maize cultivation.

Chand (2012) indicated that innovativeness of tribal farm women had significant relationship with awareness in improved cattle management practices.

Amitendu and Mazumder (2014) reported that innovativeness of livestock farmers had no significant relationship with awareness of deworming of pig.

Dohare (2014) revealed that innovativeness of respondents had no significant relationship with their awareness regarding post harvest management practices of tomato cultivation.

Dineshbhai (2015) concluded that innovativeness of respondents had no significant relationship with awareness of organic farming practices.

Prakashrao (2016) revealed that innovativeness of respondents had positive and significant relationship with awareness of broad bed furrow technology in Soybean crop.

Ray (2017) revealed that innovativeness of respondents had no significant relationship with awareness about genetically modified crops.

Babu *et. al.* (2018) revealed that innovativeness of respondents had positive and significant relationship with awareness on effect of pesticides on human health.

Minz (2018) identified that innovativeness of respondents had significant relationship with their awareness about weather information sources.

2.4.1.14 Risk orientation and awareness

Sangwan (2006) revealed that risk orientation of respondents had positive and significant association with awareness of medicinal plants.

Dayalal (2010) revealed that risk orientation of respondents had positive and significant association with awareness about organic farming.

Pruthvi (2011) revealed that risk orientation of respondents had positive and significant association with awareness about Bt cotton.

Ranjan (2013) delineated that risk orientation of respondents had positive and significant association with awareness of farm mechanization.

Amitendu and Mazumder (2014) reported that risk orientation of livestock farmers had negative and no significant relationship with awareness of deworming of pig.

Raghuvansi *et. al.* (2017) revealed that risk orientation of respondents had significant relationship with awareness about climate change.

Ray (2017) revealed that risk orientation of respondents had positive and significant relationship with awareness about genetically modified crops.

Babu *et. al.* (2018) revealed that risk orientation of respondents had positive and significant relationship with awareness on effect of pesticides on human health.

Melkeri and Mazhar (2018) delineated that risk orientation of farmers had positive and significant association with knowledge of transplanting method of pigeon pea cultivation.

2.4.1.15 Management orientation and awareness

Chandranna *et. al.* (2009) delineated that management orientation of respondents had no significant association with awareness about IPM practices in ground nut.

Dayalal (2010) revealed that management orientation of respondents had positive and significant association with awareness about organic farming.

Pruthvi (2011) revealed that management orientation of respondents had positive and significant association with awareness about Bt cotton.

Chand (2012) indicated that management orientation of tribal farm women had no significant relationship with awareness in improved cattle management practices.

Ranjan (2013) delineated that management orientation of respondents had positive and significant association with awareness of farm mechanization.

Ray (2017) revealed that management orientation of respondents had no significant relationship with awareness about genetically modified crops.

Raghuvansi *et. al.* (2017) revealed that management orientation of respondents had significant relationship with awareness about climate change.

2.4.1.16 Achievement motivation and awareness

Dayalal (2010) revealed that achievement motivation of respondents had no significant association with awareness about organic farming.

Chaudhary (2013) identified that achievement motivation of respondents had significant relationship with awareness regarding agricultural pollution.

Ranjan (2013) delineated that achievement motivation of respondents had positive and significant association with awareness of farm mechanization.

Raghuvansi *et. al.* (2017) revealed that achievement motivation of respondents had significant relationship with awareness about climate change.

2.4.2 Relationship between profile characteristics of the farmers and perception towards soil health card scheme.

2.4.2.1 Age and perception

Badhe (2012) found that age of the farmers had negative but highly significant correlation with their perception regarding environmental risk in use of pesticides.

Chand (2012) stated that age had negative and non- significant correlation with perception of the farmers toward technical capability of the public extension personnel.

Jain *et. al.* (2014) concluded that age was positively and significantly correlated with perception of tribal farmers about viewing of krishi dharshan programme.

Dilipsinh (2015) revealed that age of respondents had no significant relationship with their perception towards low cost greenhouse technology.

Nagaraj (2015) revealed that age of respondents had no significant relationship with perception level of paddy growers towards improved production technologies.

Patidar and Patidar (2015) found that age of respondents had positive and significant relation with perception towards organic farming.

Dharmendra (2016) revealed that age of respondents had no significant relationship with their perception about SRI technology.

Kumari (2016) reported that age of respondents had no significant correlation with the perception of the farmers towards climate variability.

Maravi (2017) revealed that age of farmers had significant relationship with perception of chickpea growers for climate change.

Charel *et. al.* (2018) stated that age of SHC holders had negative and non significant correlation with perception of the farmers towards soil health card scheme.

Mukati *et. al.* (2018) identified that age of SHC beneficiaries had positive and non-significant correlation with perception of the farmers towards soil health card scheme.

Parmar (2018) reported that age of respondents had positive and significant relationship with their perception about integrated farming system.

Shinde (2018) revealed that age of PMFBY beneficiaries had negative and no significant relationship with perception of farmers regarding PMFBY.

2.4.2.2 Education and perception

Hingonekar (2011) reported that education was positively and significantly correlated with role perception of the FIG members.

Badhe (2012) found that education had positive and highly significant correlation with their perception regarding environmental risk in use of pesticides.

Kadam *et. al.* (2012) reported that the education was positively and significantly correlated with role perception of the respondents.

Dilipsinh (2015) revealed that education of respondents had significant relationship with their perception towards low cost greenhouse technology.

Kesharam *et. al.* (2015) found that education had positive and highly significant correlation with perception level of paddy growers in relation to environmental hazards cause through injudicious use of chemicals in paddy cultivation.

Nagaraj (2015) revealed that education of respondents had positive and significant relationship with perception level of paddy growers towards improved production technologies.

Patidar and Patidar (2015) found that education of respondents had positive and significant relation with perception towards organic farming.

Dharmendra (2016) revealed that education of respondents had significant relationship with their perception about SRI technology.

Kumari (2016) reported that education of respondents had positive and significant correlation with the perception of the farmers towards climate variability.

Maravi (2017) revealed that education of farmers had significant relationship with perception of chickpea growers for climate change.

Charel *et. al.* (2018) stated that education of SHC holders had positive and significant correlation with perception of the farmers towards soil health card scheme.

Dhakad (2018) revealed that education had positive and significant relationship with perception about sustainability of natural resource management.

Mukati *et. al.* (2018) stated that education level of SHC beneficiaries had positive and significant correlation with perception of the farmers towards soil health card scheme.

Parmar (2018) reported that education of respondents had positive and significant relationship with their perception about integrated farming system.

Shinde (2018) revealed that education of PMFBY beneficiaries had negative and no significant relationship with perception of farmers regarding PMFBY.

2.4.2.3 Family type and perception

Raghuprasad *et. al.* (2012) revealed that family type had no significant relationship with perception/attitude of farmers towards ICT tools in farm communication.

Laxman (2016) found that family type of respondents had no significant relation with their perception regarding climate change.

Shireesha *et. al.* (2016) revealed that family type had no significant relationship with attitude of youth towards farming.

2.4.2.4 Farming experience and perception

Badhe (2012) found that experience in farming of respondents had negative but highly significant correlation with their perception regarding environmental risk in use of pesticides.

Chand (2012) found that experience in farming of the respondents had negative and non- significant correlation with perception of the farmer toward technical capability of the public extension personnel.

Shiroya (2014) stated that experience in farming had positive and non significant correlation with perception of farm women about dairy occupation.

Dilipsinh (2015) revealed that farming experience of respondents had no significant relationship with their perception towards low cost greenhouse technology.

Nagaraj (2015) revealed that farming experience of respondents had no significant relationship with perception level of paddy growers towards improved production technologies.

Dharmendra (2016) revealed that farming experience of respondents had significant relationship with their perception about SRI technology.

Kumari (2016) reported that farming experience of respondents had positive and significant correlation with the perception of the farmers towards climate variability.

Charel *et. al.* (2018) stated that farming experience of SHC holders had negative and non- significant correlation with perception of the farmers towards soil health card scheme.

Mukati *et. al.* (2018) stated that farming experience of SHC beneficiaries had negative and non-significant correlation with perception of the farmers towards soil health card scheme.

Parmar (2018) reported that farming experience of respondents had positive and significant relationship with their perception about integrated farming system.

Rathor (2018) found that farming experience of SHC beneficiaries had positive and no significant relation with perception of the farmers towards soil health card scheme.

Shinde (2018) revealed that farming experience of PMFBY beneficiaries had negative and no significant relationship with perception of farmers regarding PMFBY.

2.4.2.5 Land holding and perception

Hingonekar (2011) reported that land holding was positively and significantly correlated with role perception of FIG members.

Badhe (2012) found that land holding had positive and non significant correlation with farmer's perception regarding environmental risk in use of pesticides.

Shiroya (2014) stated that size of land holding had positive and non significant correlation with perception of farm women about dairy occupation.

Dilipsinh (2015) revealed that land holding of respondents had significant relationship with their perception towards low cost greenhouse technology.

Nagaraj (2015) revealed that land holding of respondents had no significant relationship with perception level of paddy growers towards improved production technologies.

Patidar and Patidar (2015) found that land holding of respondents had positive and significant relation with perception towards organic farming.

Dharmendra (2016) revealed that land holding of respondents had significant relationship with their perception about SRI technology.

Kumari (2016) reported that land holding of respondents had positive and significant correlation with the perception of the farmers towards climate variability.

Maravi (2017) revealed that land holding of farmers had no significant relationship with perception of chickpea growers for climate change.

Parmar (2018) reported that land holding of respondents had positive and significant relationship with their perception about integrated farming system.

Rathor (2018) found that land holding of SHC beneficiaries had positive and significant correlation with perception of the farmers towards soil health card scheme.

2.4.2.6 Annual income and perception

Badhe (2012) found that annual income of the farmers had positive and highly significant correlation with their perception regarding environmental risk in use of pesticides.

Chand (2012) found that annual income had positive and highly significant correlation with perception of the farmer toward technical capability of the public extension personnel.

Jain *et. al.* (2014) concluded that annual income was positively and significantly correlated with perception of tribal farmers about viewing of krishi dharshan programme.

Dilipsinh (2015) revealed that annual income of respondents had significant relationship with their perception towards low cost greenhouse technology.

Keshram *et. al.* (2015) stated that annual income had negative and non-significant correlation with perception level of paddy growers in relation

to environmental hazards cause through injudicious use of chemicals in paddy cultivation.

Nagaraj (2015) revealed that annual income of respondents had significant relationship with perception level of paddy growers towards improved production technologies.

Dharmendra (2016) revealed that annual income of respondents had significant relationship with their perception about SRI technology.

Kumari (2016) reported that annual income of respondents had no significant correlation with the perception of the farmers towards climate variability.

Maravi (2017) revealed that annual income of farmers had significant relationship with perception of chickpea growers for climate change.

Rathor (2018) found that annual income of SHC beneficiaries had positive and significant correlation with perception of the farmers towards soil health card scheme.

Shinde (2018) revealed that annual income of PMFBY beneficiaries had negative and no significant relationship with perception of farmers regarding PMFBY.

2.4.2.7 Cropping intensity and perception

Rokonuzzaman *et. al.* (2006) inferred that crop intensity of farmers was positively correlated with their perception of sustainable agriculture.

Saiva (2012) delineated that there was positive and significant association between groundnut crop intensity and perception.

2.4.2.8 Mass media exposure and perception

Dilipsinh (2015) revealed that mass media exposure of respondents had no significant relationship with their perception towards low cost greenhouse technology.

Nagaraj (2015) revealed that mass media exposure of respondents had significant relationship with perception level of paddy growers towards improved production technologies.

Joshi (2016) found that mass media exposure of respondents had positive and significant relationship with perception of respondents about climate change.

Kumari (2016) reported that mass media exposure of respondents had positive and significant correlation with the perception of the farmers towards climate variability.

Raaj and Jahanara (2017) reported that mass media exposure had positive and significant relationship with perception of farmers towards soil health card scheme.

Ansari *et. al.* (2018) reported that mass media exposure had positive and significant relationship with perception of farmers about climate change.

Mukati *et. al.* (2018) revealed that mass media exposure of SHC beneficiaries had positive and significant relationship with perception of beneficiaries towards soil health card scheme.

Parmar (2018) reported that mass media exposure of respondents had positive and significant relationship with their perception about integrated farming system.

Prasad and Chandrashekar (2018) revealed that mass media exposure had positive and significant relationship with perception of farmers towards integrated farming system.

Rathor (2018) found that mass media exposure of SHC beneficiaries had positive and significant correlation with perception of the farmers towards soil health card scheme.

Shinde (2018) revealed that mass media exposure of PMFBY beneficiaries had no significant relationship with perception of farmers regarding Pradhan Mantri Fasal Bhima Yojana (PMFBY).

Ahuja *et. al.* (2019) found that mass media exposure had negative and significant relationship with perceived training needs of dairy farmers about animal management practices.

2.4.2.9 Social participation and perception

Dilipsinh (2015) revealed that social participation of respondents had significant relationship with their perception towards low cost greenhouse technology.

Dharmendra (2016) revealed that social participation of respondents had no significant relationship with their perception about SRI technology.

Kumari (2016) reported that social participation of respondents had positive and significant correlation with the perception of the farmers towards climate variability.

Maravi (2017) revealed that social participation of farmers had no significant relationship with perception of chickpea growers for climate change.

Raaj and Jahanara (2017) reported that social participation had positive and no significant relationship with perception of farmers towards soil health card scheme.

Kurmi (2018) revealed that social participation had no significant relationship with perception regarding Pradhan Mantri Fasal Bhima Yojana (PMFBY).

Mukati *et. al.* (2018) revealed that social participation of SHC beneficiaries had negative and no significant relationship with perception of beneficiaries towards soil health card scheme.

Prasad and Chandrashekar (2018) revealed that social participation had positive and no significant relationship with perception of farmers towards integrated farming system.

Dhakad (2018) revealed that social participation had no significant relationship with perception about sustainability of natural resource management.

Rathor (2018) found that social participation of SHC beneficiaries had negative and no significant correlation with perception of the farmers towards soil health card scheme.

Ahuja *et. al.* (2019) found that social participation had negative and significant relationship with perceived training needs of dairy farmers about animal management practices.

2.4.2.10 Extension contact and perception

Kumari (2016) reported that extension contact of respondents had no significant correlation with the perception of the farmers towards climate variability.

Shireesha *et. al.* (2016) revealed that extension contact had no significant relationship with attitude of youth towards farming.

Maravi (2017) revealed that extension contact of farmers had significant relationship with perception of chickpea growers for climate change.

Raaj and Jahanara (2017) reported that extension contact had positive and significant relationship with perception of farmers towards soil health card scheme.

Kurmi (2018) revealed that extension contact had positive and significant relationship with perception regarding Pradhan Mantri Fasal Bima Yojana (PMFBY).

Mukati *et. al.* (2018) revealed that extension contact of SHC beneficiaries had positive and significant relationship with perception of beneficiaries towards soil health card scheme.

Parmar (2018) reported that extension contact of respondents had positive and significant relationship with their perception about integrated farming system.

Prasad and Chandrashekar (2018) revealed that extension contact had positive and significant relationship with perception of farmers towards integrated farming system.

Rathor (2018) found that extension contact of SHC beneficiaries had positive and significant correlation with perception of the farmers towards soil health card scheme.

Ahuja *et. al.* (2019) found that extension contact had negative and significant relationship with perceived training needs of dairy farmers about animal management practices.

2.4.2.11 Scientific orientation and perception

Kadam *et. al.* (2012) reported that scientific orientation was positively correlated with role perception of the respondents.

Dilipsinh (2015) revealed that scientific orientation of respondents had significant relationship with their perception towards low cost greenhouse technology.

Nagaraj (2015) revealed that scientific orientation of respondents had no significant relationship with perception level of paddy growers towards improved production technologies.

Joshi (2016) found that scientific orientation of respondents had no significant relationship with perception of respondents about climate change.

Maravi (2017) revealed that scientific orientation of farmers had no significant relationship with perception of chickpea growers for climate change.

Ansari *et. al.* (2018) reported that scientific orientation had no significant relationship with perception of farmers about climate change.

Charel *et. al.* (2018) found that scientific orientation had positive and significant relationship with perception of farmers towards soil health card scheme.

Mukati *et. al.* (2018) revealed that scientific orientation of SHC beneficiaries had positive and significant relationship with perception of beneficiaries towards soil health card scheme.

Rathor (2018) found that scientific orientation of SHC beneficiaries had positive and significant correlation with perception of the farmers towards soil health card scheme.

Shinde (2018) revealed that scientific orientation of PMFBY beneficiaries had negative and no significant relationship with perception of farmers regarding Pradhan Mantri Fasal Bhima Yojana (PMFBY).

Ahuja *et. al.* (2019) found that scientific orientation had negative and significant relationship with perceived training needs of dairy farmers about animal management practices.

2.4.2.12 Economic motivation and perception

Kumar *et. al.* (2008) found that economic motivation had positive and significant relationship with perceptions of farmers on quality of Groundnut.

Raghuprasad *et. al.* (2012) revealed that economic motivation had positive and significant relationship with perception/attitude of farmers towards ICT tools in farm communication.

Dilipsinh (2015) revealed that economic motivation of respondents had significant relationship with their perception towards low cost greenhouse technology.

Dharmendra (2016) revealed that economic motivation of respondents had significant relationship with their perception about SRI technology.

Joshi (2016) found that economic motivation of respondents had no significant relationship with perception of respondents about climate change.

Sathish *et. al.* (2016) revealed that economic motivation had positive and significant relationship with perception of service quality of extension services provided by public extension organizations.

Maravi (2017) revealed that economic motivation of farmers had significant relationship with perception of chickpea growers for climate change.

Ansari *et. al.* (2018) reported that economic motivation had no significant relationship with perception of farmers about climate change.

Dhakad (2018) revealed that economic motivation had positive and significant relationship with perception about sustainability of natural resource management.

Prasad and Chandrashekar (2018) revealed that economic motivation had positive and significant relationship with perception of farmers towards integrated farming system.

Shinde (2018) revealed that economic motivation of PMFBY beneficiaries had negative and significant relationship with perception of farmers regarding Pradhan Mantri Fasal Bhima Yojana (PMFBY).

Ahuja *et. al.* (2019) found that economic motivation had negative and significant relationship with perceived training needs of dairy farmers about animal management practices.

2.4.2.13 Innovativeness and perception

Kumar *et. al.* (2008) found that innovativeness had positive and significant relationship with perceptions of farmers on quality of Groundnut.

Hingonekar (2011) reported that innovativeness was positively and significantly correlated with role perception of the FIG members.

Kadam *et. al.* (2012) reported that innovativeness was positively correlated with role perception of the respondents.

Nagaraj (2015) revealed that innovativeness of respondents had significant relationship with perception level of paddy growers towards improved production technologies.

Shireesha *et. al.* (2016) revealed that innovativeness had positive and significant relationship with attitude of youth towards farming.

Raaj and Jahanara (2017) reported that innovativeness had positive and significant relationship with perception of farmers towards soil health card scheme.

Charel *et. al.* (2018) found that innovativeness had positive and no significant relationship with perception of farmers towards soil health card scheme.

Mukati *et. al.* (2018) revealed that innovativeness of SHC beneficiaries had positive and significant relationship with perception of beneficiaries towards soil health card scheme.

Rathor (2018) found that innovativeness of SHC beneficiaries had positive and significant correlation with perception of the farmers towards soil health card scheme.

Shinde (2018) revealed that innovativeness of PMFBY beneficiaries had negative and significant relationship with perception of farmers regarding PMFBY.

2.4.2.14 Risk orientation and perception

Raghuprasad *et. al.* (2012) revealed that risk orientation had positive and significant relationship with perception/attitude of farmers towards ICT tools in farm communication.

Dilipsinh (2015) revealed that risk orientation of respondents had significant relationship with their perception towards low cost greenhouse technology.

Nagaraj (2015) revealed that risk orientation of respondents had no significant relationship with perception level of paddy growers towards improved production technologies.

Dharmendra (2016) revealed that risk orientation of respondents had significant relationship with their perception about SRI technology.

Sathish *et. al.* (2016) revealed that risk orientation had positive and significant relationship with perception of service quality of extension services provided by public extension organizations.

Shireesha *et. al.* (2016) revealed that risk orientation had positive and significant relationship with attitude of youth towards farming.

Maravi (2017) revealed that risk orientation of farmers had significant relationship with perception of chickpea growers for climate change.

Charel *et. al.* (2018) found that risk orientation had negative and no significant relationship with perception of farmers towards soil health card scheme.

Kurmi (2018) revealed that risk orientation had positive and significant relationship with perception regarding Pradhan Mantri Fasal Bima Yojana (PMFBY).

Shinde (2018) revealed that risk orientation of PMFBY beneficiaries had negative and no significant relationship with perception of farmers regarding Pradhan Mantri Fasal Bhima Yojana (PMFBY).

2.4.2.15 Management orientation and perception

Kumar *et. al.* (2008) found that market orientation had positive and significant relationship with perception of farmers on quality of Groundnut.

Singh and Tyagi (2014) found that market orientation had no significant relationship with perception of farmers towards sustainability in chilli production.

Dilipsinh (2015) revealed that management orientation of respondents had significant relationship with their perception towards low cost greenhouse technology.

Shireesha *et. al.* (2016) revealed that management orientation had positive and significant relationship with attitude of youth towards farming.

Maravi (2017) revealed that market orientation of farmers had significant relationship with perception of chickpea growers for climate change.

Parmar (2018) reported that market orientation of respondents had positive and significant relationship with their perception about integrated farming system.

Ahuja *et. al.* (2019) found that market orientation had negative and significant relationship with perceived training needs of dairy farmers about animal management practices.

2.4.2.16 Achievement motivation and perception

Nagaraj (2015) revealed that achievement motivation of respondents had significant relationship with perception level of paddy growers towards improved production technologies.

Dharmendra (2016) revealed that achievement motivation of respondents had significant relationship with their perception about SRI technology.

Kumari (2016) reported that achievement motivation of respondents had significant correlation with the perception of the farmers towards climate variability.

Shireesha *et. al.* (2016) revealed that achievement motivation had positive and significant relationship with attitude of youth towards farming.

Mukati *et. al.* (2018) revealed that achievement motivation of SHC beneficiaries had positive and significant relationship with perception of beneficiaries towards soil health card scheme.

Rathor (2018) found that achievement motivation of SHC beneficiaries had negative and no significant correlation with perception of beneficiaries towards soil health card scheme.

Shinde (2018) revealed that achievement motivation of Pradhan Mantri Fasal Bhima Yojana (PMFBY) beneficiaries had significant relationship with perception of farmers regarding Pradhan Mantri Fasal Bhima Yojana (PMFBY).

2.5 BENEFITS DERIVED BY FARMERS THROUGH SOIL HEALTH CARD SCHEME

Pavitra (2013) in her study revealed that the direct benefits perceived from the Yashaswini Health Scheme by the farmers are as follows, (28.00%) of the respondents received the benefit of getting their eye operation done under the scheme. Quarter per cent of the respondents (25.83%) benefitted by getting surgeries done for different ailments related to stomach, gall bladder, bone and kidney.

Shehrawat *et. al.* (2018) in their study revealed that (61.33%) of farmers were found aware about the SHC and (56.34%) were found aware that SHC studies soil, (57.34%) were found aware that it is a Govt. of India's scheme, helped to reduce the input cost (53.67%), give soil nutrient status' (57.34%) and it contain the soil type information (56.34%). Farmers were also found aware that SHC contain the cropping pattern information and it contains crop sequence information with 47.00 per cent and 47.34 per cent, respectively. The results vividly explains that (56.67%) of farmers were aware that 'SHC tells about fertilizers dosages', 'it helps the farmers to use the chemical fertilizers' (56.00 %) and the farmers had awareness that 'SHC helps to maintain the soil fertility with (53.66 %) and 'increases productivity of crops' with (53.00 %). More than half (53.67%) of farmers expressed their awareness that 'SHC encourage judicious application of fertilizers and equal numbers of farmers (54.34%) were found that it helps to diagnose soil-related constraints and identifies the requirement of different nutrients.

2.6 PROBLEMS AS PERCEIVED BY THE FARMERS REGARDING SOIL HEALTH CARD SCHEME AND SUGGESTIONS TO OVERCOME THEM

2.6.1 Problems faced by farmers

Badole and Patio (2011) stated that major constrains faced by the staff working in soil testing laboratory were; lack of knowledge about recommended varieties in particular soil type (72.50 %) followed by lack of proper guidance about new analytical process (62.70 %), lack of knowledge and information about soil testing (56.70 %), insufficient information about new agricultural technology specially soil testing and fertilizer recommendation (52.90 %), how to take soil sample and preparation for analysis (52.90 %), lack of knowledge about suitability of soil for crop grown (51.00 %), lack of knowledge about recommended fertilizer dose (47.10 %) and very little or not having knowledge about micronutrients (35.30 %).

Patel and Chauhan (2011) reported that over whelming majority (91.00 %) of the farmers had expressed difficulty in identifying micronutrient deficiency due to unavailability of micronutrient status of soil. Further majority (88.00 %) of the respondents had expressed difficulty in calculating fertilizer dose on the basis of nutrient status of soil. Majority (84.00 %) of the respondents had expressed that Soil Health Cards were issued after harvesting of crops, (82.00%) had expressed that time taken between soil sampling and issuing cards to the farmers was too high, (65.00%) had expressed problem of unavailability of internet facility at village level and (23.00%) of them had expressed that collection of soil sample was not done in presence of farmers.

Patel (2013) found that major constrains faced by the SHC holders were: unavailability of micronutrient status of soil ranked first (78.00 %) followed by difficulty in calculating fertilizer dose on the basis of nutrient status of soil (77.33 %), unable to operate internet (76.66 %), received SHCs after crop harvest (74.66 %), time gap between soil samples taken and issuing

cards is too high (74.00 %), unavailability of internet facility (73.33 %) and collection of soil sample was not done in presence of farmers (64.00 %).

Mukati (2016) revealed that large majority of the soil health card holders faced the problem while making the soil health card (76.92 %) followed by difficulty in calculating fertilizer dose on the basis of nutrient status of soil (64.10 %). The respondents also responded that the task of collection of soil sample was not done in presence of farmers (55.56 %), time gap between soil sample taken and issuing cards was too high (51.28 %), received soil health cards after crop harvest (40.17 %), inability to understand all the information give in the card (25.64 %), no subsidy on inputs required by the government for improving the soil quality (20.51%), and irregularity of extension services (17.09 %), which may restrict them to clear their doubts at the time of need.

Lamkane (2018) reported that unavailability of micronutrient status of soil ranked first with mean score (76.67%) followed by difficulty in calculating fertilizer dose on the basis of nutrient status of soil (75.00%), unable to operate internet (73.34%), received soil health cards after crop harvest (68.34%), time gap between soil samples taken and issuing cards is too high (65.84%), unavailability of internet facility (62.50%), collection of soil sample was not done in presence of farmers (54.67%) were major constraints faced by the farmers in application of soil health card programme.

Shinde (2018) reported that majority of the respondents (67.50%) reported unavailable of surveyor at the time of crop loss followed by lack of communication with other (64.16%), Problem of improper reporting in case of losses (62.50%), employee do not talk directly to the farmers (60.83%), delay in payment of insurance claims (58.33%), insufficient coordination and linkage between banks and farmers and unavailability of source for getting details of the scheme (57.50%) as major constraints in availing benefits of the PMFBY scheme.

2.6.2 Suggestions elicited by farmers

Patel (2013) in his study reported that, major suggestions given by the farmers to overcome the constraints associated with acceptance of soil health card programme were crop wise recommended dose of fertilizer should be given (74.66 %) followed by availability of micronutrient status should be displayed (74.00 %), SHC should be issued prior to crop season (73.33%), Farmer should be trained to take soil sample of its own soil (72.66 %) soil testing laboratory should be established at taluka level with highly qualified supporting staff (71.33%), internet facility should be provided at village level (70.00 %) and soil sampling procedure should be done in presence of farmer (66.66 %).

Maheriya *et. al.* (2015) in their study reported that, great majority of the farmers suggested that remunerative market prices of paddy should be provided to the farmers (91.67 %), farmers should be protected by crop insurance scheme in case of failure of season (87.50 %), minimum support price of paddy should be declared well in advance by the Government (83.33 %), extension system should be streamlined to disseminate farm technology (73.33 %), proper technical guidance should be given to the farmers as and when they needs (68.33 %), training on new cultivation technology should be imparted to the farmer (65.00%), farm information centers should be established at village level (62.50%), farm consultancy services should be made available to the farmers at village level (58.33%), required farm inputs should be made available at village level (56.66 %), timely supply of canal water (54.16 %) and electricity should be supplied regularly (50.00 %).

Chakrawarty (2018) in his study “Impact and Awareness of soil health card on Soybean production technology in Ujjain block of Ujjain District (M.P.)” reported that majority (64.17%) of SHC beneficiaries suggested availability of micronutrients status should be in soil health card followed by (58.33%) timely information should be provided, (57.50%) calculation for fertilizer dose application through SHC should be made easy,

(56.67%) proper irrigation facilities should be made available, (55.00%) timely visits by extension personnel and specialist should be carrying on for guidance, (53.33%) the agricultural inputs should be given at low price, (45.83%) cost of micronutrient analysis should be reduced, (43.33%) labour should be available at the time of weeding, (36.67%) proper transportation and marketing facilities should be made available and (33.33%) availability of post harvesting unit.

Dubey (2018) in his study "Impact assessment of Soil Health Card Scheme on income and nutrient management practices in major crops among the farmers of Raisen district in Madhya Pradesh" reported that majority (25.00%) of SHC beneficiaries suggested that RAEO/Gramsevak should come before sowing to interpretate the content/recommendation of SHC followed by SHC should be given personally to the farmers and should made available on time (21.00%) ,training should be given on proper method of collecting soil sample (19.00%) and minor (3.00%) of them suggested that method of fertilizer application should be given in SHC.

Lakmane (2018) in his study "Attitude of farmers towards recommendation of soil health card "elicited suggestions given by farmers to overcome constraints in adopting soil health card as follows, availability of micronutrient status should be displayed (73.34%), crop wise recommended dose of fertilizer should be given (71.66%), SHC should be issued prior to crop season (68.34%), Farmer should be trained to take soil sample of its own soil (66.67%), internet facility should be provided at village level (63.34%), soil sampling procedure should be done in presence of farmer (60.00%), soil testing laboratory should be established at taluka level with highly qualified supporting staff (16.67%).

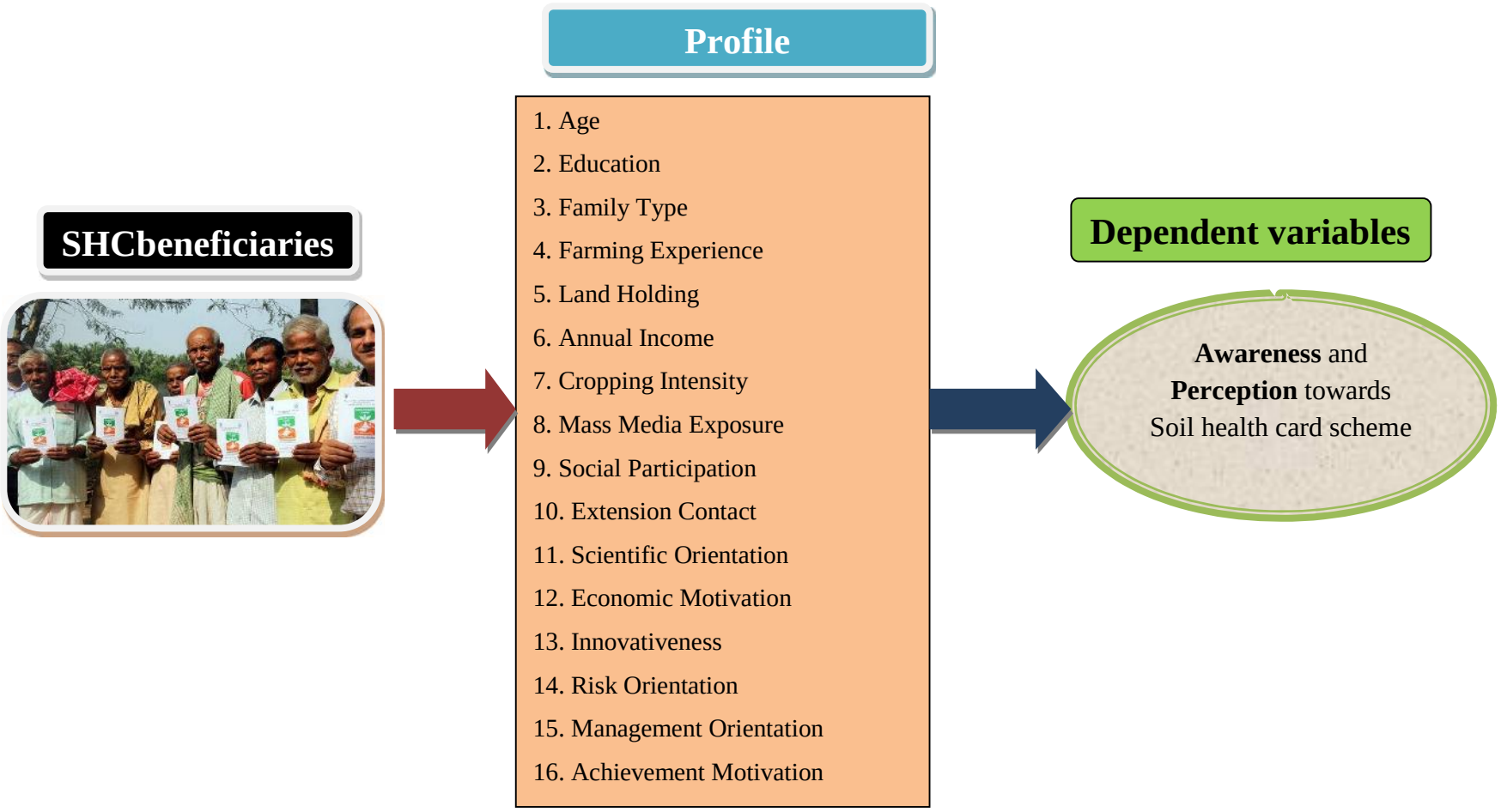

Figure 2.1 Conceptual model of the study

Chapter - III

MATERIAL AND METHODS

This chapter deals with research design, sampling procedure, variables and their measurement, tools of data collection, statistical tests used and analytical procedures followed to interpret the data of the present study. The details of the methodology followed in the present investigation are presented under the following heads.

3.1 Research design

3.2 Sampling procedure

3.3 Variables and their empirical measurements

3.4 Benefits derived by farmers through soil health card scheme

3.5 Problems and suggestions elicited by the farmers

3.6 Collection of data

3.7 Preparation of report

3.8 Statistical tools used

3.1 RESEARCH DESIGN

The design of research is the most important and critical aspect of research methodology. In a broad sense, research design is the process of planning and carrying out research.

Ex-post-facto research design was followed for carrying out the study. *Ex-post-facto* research design is systematic empirical enquiry in which the independent variables are not directly manipulated because they have already occurred or they are inherently not manipulable. Further, stated that an *ex-post-facto* study devised to deduce theories, identify behaviour phenomenon and explore condition under which a phenomenon occurs. Keeping in view,

the type of variables under consideration, size of respondents and phenomenon to be studied, the *ex-post-facto* research design was selected as an appropriate research design.

3.2 SAMPLING PROCEDURE

Sampling procedure followed for the investigation is given below

3.2.1 Locale of the Study

Rayalaseema region of Andhra Pradesh state was selected purposively for the study as the researcher hails from the same area and is familiar with local language and culture. Hence, building up rapport with the respondents would become easier and the results are useful for the state. (Figure 3.1)

3.2.2 Selection of the District

The study was conducted in Anantapuramu district of Rayalaseema region. This district was selected purposively based on the percentage of achievement in distribution of soil health cards. (Figure 3.2)

3.2.3 Selection of Mandals

Six mandals with highest number of soil health card holders from Anantapuramu district were selected randomly for present study namely Raptadu, Kanekal, Tadipatri, Gudibanda, Dharmavaram, and Gorantla (Figure 3.3)

3.2.4 Selection of Villages

Two villages were selected from each of the 6 mandals by following simple random sampling thus making a total of 12 villages. The list of villages selected was given in the Table 3.1 and Figure 3.4

3.2.5 Selection of Respondents

From each village, 20 farmers possessing soil health cards were selected by following simple random sampling procedure, thus making a total of 240 respondents for the study.

Table 3.1 Selection of district, mandals, villages and respondents

State	Region	District	Mandals	Villages	Respondents
Andhra Pradesh	Rayalaseema	Anantapuramu	Raptadu	Bommaparthy	20
				Hampapuram	20
			Kanekal	Kanekal	20
				Ganigera	20
			Tadipatri	Peddapolamada	20
				Alur	20
			Gudibanda	Muthukuru	20
				Morubagal	20
			Dharmavaram	Kunuthuru	20
				Chigicherla	20
			Gorantla	Gowrivaripalle	20
				Vanavolu	20
Total	**1**	**1**	**6**	**12**	**240**

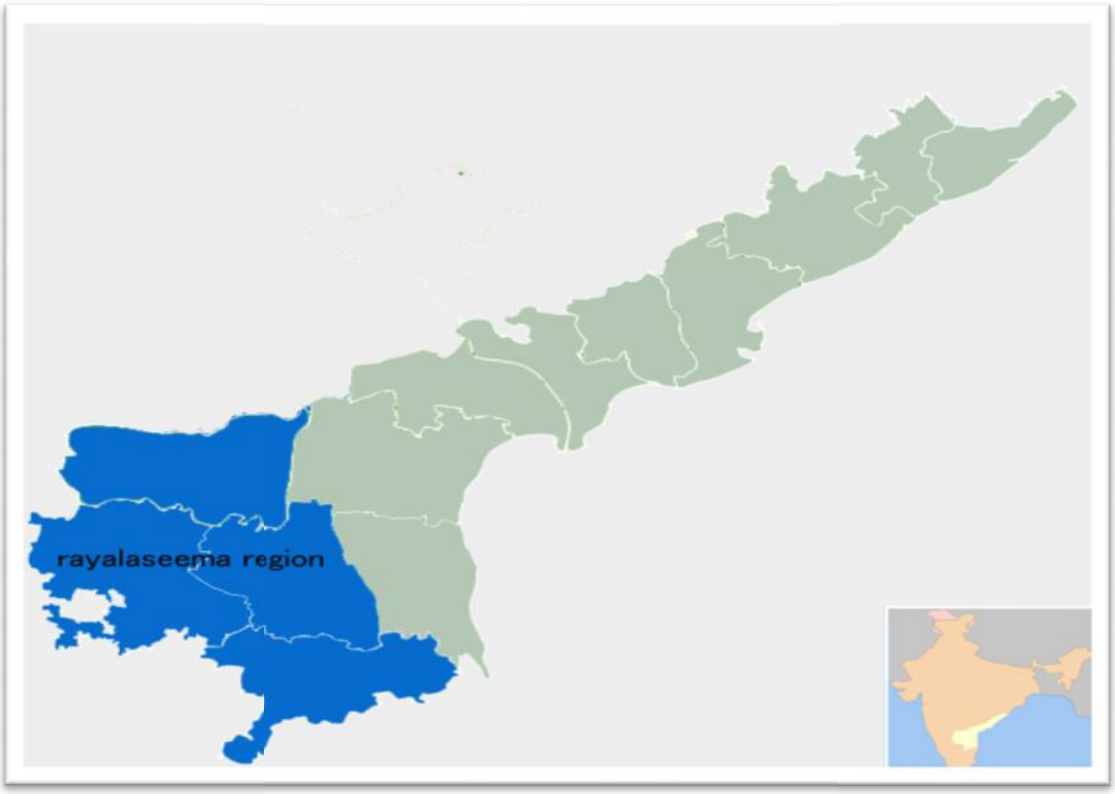

Figure 3.1 Map of Andhra Pradesh depicting Rayalaseema region

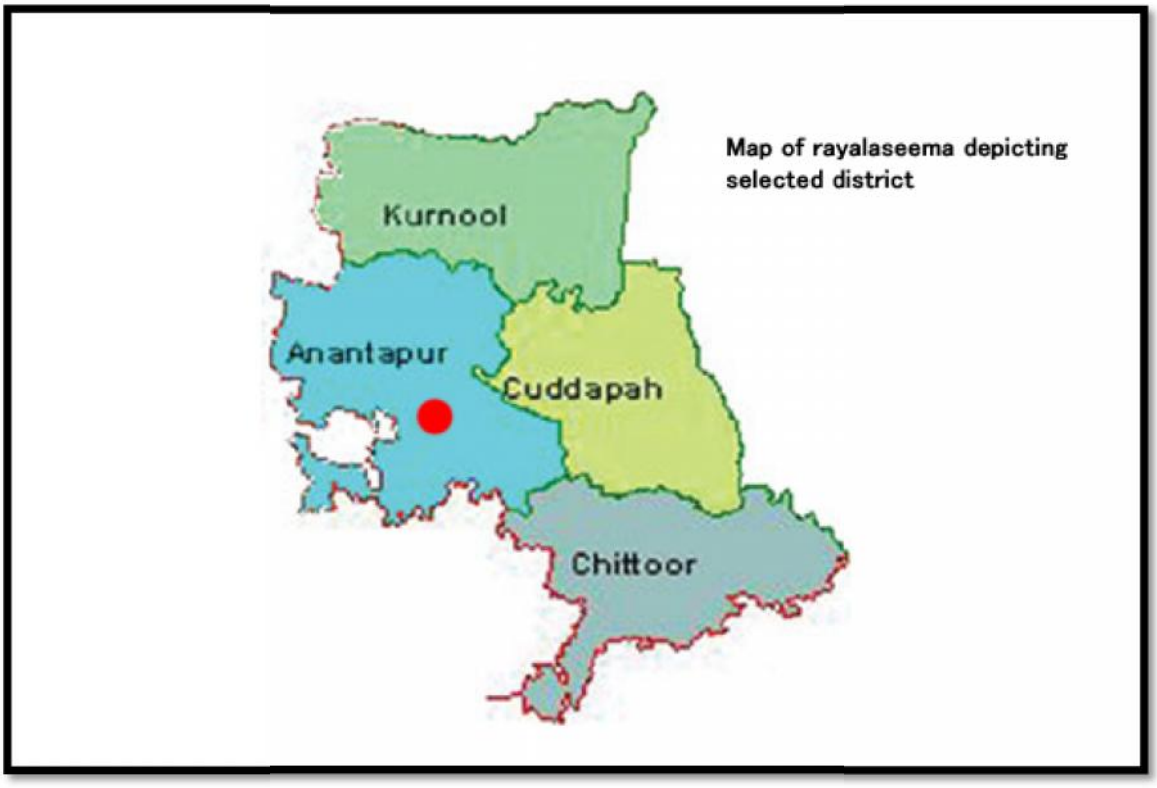

Figure 3.2 Map of Rayalaseema region of Andhra Pradesh depicting Anantapuramu district.

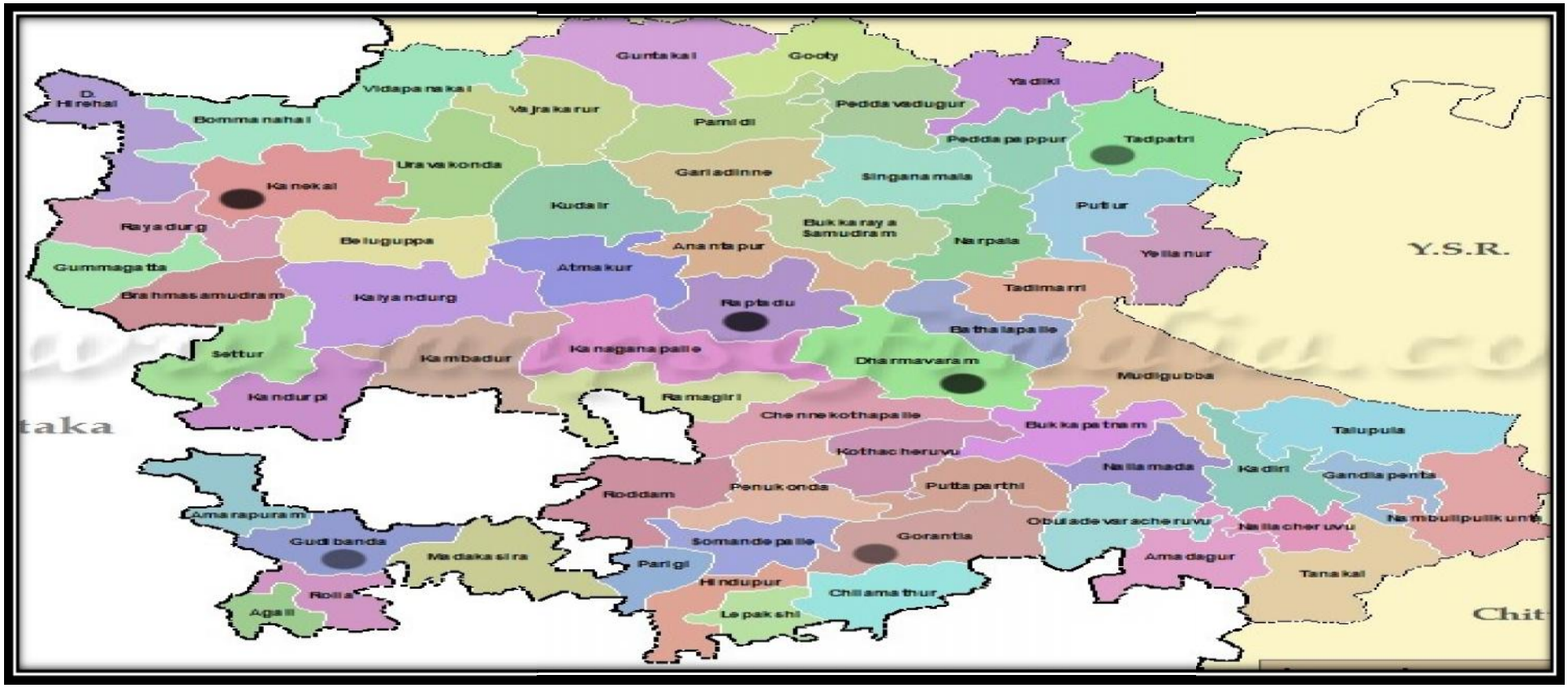

Figure3.3. Map of Anantapuramu depicting selected mandals.

3.3 Variables and their Empirical measurement

Relevant variables were indentified in consultation with experts and also based on review of relevant literature. Table 3.2 shows the variables selected for the study.

Table 3.2 Variables and their empirical measurement

S.No	Variables	Empirical Measurement
A.	**Dependent variables**	
1.	Awareness about soil health card scheme	Schedule developed for the study
2.	Perception towards soil health card scheme	Schedule developed for the study
B.	**Independent variables**	
1	Age	Chronological age of the respondent
2	Education	Schedule developed for the study
3	Family type	Schedule developed for the study
4	Farming experience	Schedule developed for the study
5	Land holding	Schedule developed for the study
6	Annual income	Schedule developed for the study
7	Cropping intensity	Schedule developed for the study
8	Mass media exposure	Schedule developed for the study
9	Social participation	Scale developed by Nirban (2004) with suitable modifications
10	Extension contact	Scale developed by Sawant (1999) with suitable modifications
11	Scientific orientation	Scale developed by Supe (2007) with suitable modifications
12	Economic motivation	Scale developed by Supe (2007) with suitable modifications
13	Innovativeness	Scale developed by Nandapurkar (1980) with suitable modifications
14	Risk orientation	Scale developed by Supe (2007) with suitable modifications
15	Management orientation	Scale developed by Samanta (1977) with suitable modifications
16	Achievement motivation	Scale developed by Rani(1985) with suitable modifications

3.3.1 DEPENDENT VARIABLES

3.3.1.1 Awareness of farmers about soil health card scheme

Awareness is the ability to directly know and perceive, to feel or to be conscious of events, objects, thoughts, emotions or sensory pattern. An important dimension of the study was to know the awareness of the farmers about soil health card scheme.

For the present study it was operationalized as awareness level of respondents about usefulness of soil health card scheme. For measuring this variable, the respondents were asked whether they were aware about soil health card and its benefits. Accordingly, responses were recorded as yes and no with scores of 1 and 0, respectively.

The respondents were grouped into three categories on the basis of mean and standard deviation as shown in the table below.

S.No.	Level of awareness	Categories
1	Low awareness	Below (mean – SD)
2	Medium awareness	Between (mean ± S.D.)
3	High awareness	Above (mean + SD)

3.3.1.2 Perception of farmers towards soil health card scheme

According to new Webster's dictionary, the term perception means apprehension with mind or senses an immediate or initiative recognition as of moral or aesthetic quality. It can also be defined as an active process of becoming aware or getting meaningful understanding about situation. Perception about soil health card scheme by respondents was the centre point in the study. The perception inspires an individual to behave in expected form and carry out the work effectively. Total 32 statements were administered on the sample farmers and asked to express their reaction in terms of their agreement or disagreement with each item by selecting any one of three response categories viz., Agree, Undecided and Disagree. The scores

given for the statements were 3, 2 and 1 for Agree, Undecided and Disagree responses, respectively.

Response	Agree	Undecided	Disagree
For positive statement	3	2	1
For negative statement	1	2	3

The respondents were grouped into three categories on the basis of mean and standard deviation as shown in the table below.

S.No.	Level of perception	Categories
1	Poor perception	Below (mean – SD)
2	Moderate perception	Between (mean ± S.D.)
3	Good perception	Above (mean + SD)

3.3.2 INDEPENDENT VARIABLES

3.3.2.1 Age (X_1)

It refers to the chronological age of the respondents in completed years at the time of investigation. The respondents were asked to indicate their age in completed years as on the date of data collection. The farmers were grouped into three categories based on age.

S.No.	Category	Age (years)
1	Young	Below 35 years
2	Middle	35-55 years
3	Old	Above 56 years

3.3.2.2 Education (X_2)

It was operationally defined as the educational level attained by the individual respondent at the time of investigation. It was a measure in number of years of schooling completed by a respondent. The following score was given to each category.

S.No.	Education levels	Score
1	Illiterate	0
2	Primary School (I to IVth stds**)**	1
3	Middle School (V to VIIth stds**)**	2
4	High School (VIII to Xth stds)	3
5	Higher Secondary School (XI to XIIth stds)	4
6	Graduate	5
7	Post Graduate	6

3.3.2.3 Family type (X_3)

Type of family referred as, whether the respondents belonged to nuclear family or joint family.

A score of 1 for nuclear family and 2 for joint family was assigned for purpose of analysis. The respondents were categorized as under.

S.No.	Category	Score
1	Nuclear family	1
2	Joint family	2

3.3.2.4 Farming experience (X_4)

Farming experience was operationalised as the number of years a farmer completed in farming. A weight of '1' score was given to each completed year to compute the farming experience of each farmer.

The respondents were grouped into three categories based on the farming experience scores duly following the usual procedure by adopting mean and standard deviation.

S.No.	Category	Score
1.	Low farming experience	Below (mean- S.D.)
2.	Medium farming experience	Between (mean ±S.D.)
3.	High farming experience	Above (mean + S.D.)

3.3.2.5 Land holding (X_5)

The land holding was operationally defined as the number of hectares of land possessed by the respondents. The following categories were formed with respect of size of holding of respondents for analysis. The standard classification as per All India Report on Number and Area of Operational Holdings was followed (Agriculture Census Division, 2014.)

S.No.	Category	Area of land (ha)
1.	Marginal	Below 1.00 Hectare
2.	Small	1.01 to 2.00 Hectare
3.	Semi- medium	2.01 to 4.00 Hectare
4.	Medium	4.01 to 10.00 Hectare
5.	Large	10.01 Hectare and above

3.3.2.6 Annual income (X_6)

It was operationalised as the actual income received by the respondent's family from agriculture, animal husbandry and off-farm employment. For every one thousand rupees of income a score of 'one' was given.

Based on the total scores obtained the respondents were classified into three categories based on the mean and standard deviation as follows;

S.No.	Category	Score
1.	Low income	Below (mean- S.D)
2.	Medium income	Between (mean ±S.D)
3.	High income	Above (mean + S.D)

3.3.2.7 Cropping intensity (X_7)

It was operationalised as the proportion of total annual cropped area to the size of operational holdings expressed in percentage.

The farmer is asked to indicate single cropped, double cropped and triple cropped area of land cultivated by him. This variable is empirically measured by computing cropping intensity index as follows

$$\text{Cropping intensity index (CII)} = \frac{\text{Gross (total) cropped area in one year}}{\text{Size of land holding}} \times 100$$

Based on the total scores obtained the respondents were classified into three categories based on the mean and standard deviation as follows;

S.No	Category	Score
1.	Low cropping intensity	Below (mean- S.D)
2.	Medium cropping intensity	Between (mean ±S.D)
3.	High cropping intensity	Above (mean+S.D)

3.3.2.8 Mass media exposure (X_8)

It was operationalised as the degree to which the farmers utilized the different mass media sources. The degree of mass media exposure of the respondents was measured with the help of a schedule developed for the study. The individuals were scored based on the number of mass media exposed and also the extent of exposure. The schedule consisted of 10 statements. The extent of exposure was measured with a score of 2 for regularly, 1 for occasionally and 0 for never.

Frequency of use	Regularly	Occasionally	Never
Score	2	1	0

The total score of each respondent was arrived by adding all the scores. The respondents were grouped into three categories based on mean and standard deviation.

S.No.	Category	Score
1.	Low mass media exposure	Below (mean- S.D.)
2.	Medium mass media exposure	Between (mean ± S.D.)
3.	High mass media exposure	Above (mean + S.D.)

3.3.2.9 Social participation (X_9)

Social participation refers to the degree of involvement of the respondent in formal and informal organizations, simply as a member or an office bearer. Social participation of the respondent can be calculated on the basis of the nature of participation and the number of organizations he or she participates.

Social participation is empirically measured with the help of procedure followed by Nirban (2004) with slight modifications. A score of '1' is assigned to an individual when he is a 'member' of an organization; a score of '2' for the respondent who is the office bearer of an organization. Further a score of '2' for 'regular' participation, while '1' and '0'for 'occasional' and 'never' participation respectively.

A. Membership position		**B. Extent of participation**	
Item	**Score**	**Item**	**Score**
a. Office bearer	2	a. Regularly	2
b. Member	1	b. Occasionally	1
c. Non member	0	c. Never	0

Thus the cumulative score is obtained for each respondent and finally they were grouped into three categories considering the mean and standard deviation as follows

S. No.	Category	Score
1.	Low social participation	Below (mean- S.D.)
2.	Medium social participation	Between (mean ± S.D.)
3.	High social participation	Above (mean + S.D.)

3.3.2.10 Extension contact (X_{10})

It was operationalised as the degree to which the farmers had maintained contact and the frequency of contacts with extension personnel.

The degree of extension contact of the respondents was measured with the help of a procedure developed by Sawant (1999) with slight modifications

for the study. The extent of contact was measured with a score of ’2’ for ‘regularly’, ‘1’ for ‘occasionally’ and ‘0’ for ‘never’.

Frequency of contact	Regularly	Occasionally	Never
Score	2	1	0

The scale consisted of 10 statements. The total score of each respondent was arrived by adding the scores obtained. The respondents were grouped into three categories based on mean and standard deviation.

S.No.	Category	Score
1.	Low extension contact	Below (mean- S.D.)
2.	Medium extension contact	Between (mean ± S.D.)
3.	High extension contact	Above (mean + S.D.)

3.3.2.11 Scientific orientation (X_{11})

Scientific orientation was operationalised as the degree to which the respondents were oriented towards the use of scientific methods in farming and decision making.

It was measured with the help of scale developed by Supe (2007) which consisted of six statements. Out of six statements in the scale, the sixth statement alone was negative. The responses for each statement were rated on a five-point continuum ranging from strongly agree, agree, undecided, disagree and strongly disagree by following the scoring procedure of 5,4,3, 2 and 1 respectively for positive statements and 1,2,3, 4 and 5 respectively for negative statements.

Response	SA	A	UD	D	SD
Positive statements	5	4	3	2	1
Negative statement	1	2	3	4	5

The respondents were classified into three categories based on the mean and standard deviation as follows.

S.No.	Category	Score
1.	Low scientific orientation	Below (mean- S.D.)
2.	Medium scientific orientation	Between (mean ± S.D)
3.	High scientific orientation	Above (mean + S.D.)

3.3.2.12 Economic motivation (X_{12})

It was operationalised as the extent to which an individual was oriented towards achieving the maximum returns such as maximization of farm profits.

It was measured with the help of scale developed by Supe (2007) which consisted of six statements. Out of six statements in the scale, the sixth statement alone was negative. The responses for each statement were rated on a five-point continuum ranging from strongly agree, agree, undecided, disagree and strongly disagree by following the scoring procedure of 5,4,3, 2 and 1 respectively for positive statements and 1,2,3, 4 and 5 respectively for negative statements.

Response	SA	A	UD	D	SD
For positive statements	5	4	3	2	1
For negative statements	1	2	3	4	5

The respondents were classified into three categories based on the mean and standard deviation as follows.

S.No.	Category	Score
1.	Low economic motivation	Below (mean- S.D.)
2.	Medium economic motivation	Between (mean ± S.D.)
3.	High economic motivation	Above (mean + S.D.)

3.3.2.13 Innovativeness (X_{13})

Innovativeness is the degree to which an individual adopts new ideas or technology relatively earlier than others in his social system.

The scale developed by Nandapurkar (1980) was used with suitable modifications in the present study for measuring the innovativeness of the farmers. The scale consisted of seven statements of which four were positive and three were negative. These statements were rated on a three point scale viz., Yes, Undecided and No with scores 3, 2 and 1 respectively for positive statements and 1, 2 and 3 respectively for negative statements.

Response	Yes	UD	No
For positive statements	3	2	1
For negative statement	1	2	3

Based on mean and standard deviation the farmers were divided into three categories as shown below.

S.No.	Category	Score
1.	Low innovativeness	Below (mean- S.D.)
2.	Medium innovativeness	Between (mean ± S.D.)
3.	High innovativeness	Above (mean + S.D.)

3.3.2.14 Risk orientation (X_{14})

It was operationalised as the degree to which farmer is oriented towards risk and uncertainty and have courage to face the problem in farming.

It was measured with the help of risk orientation scale developed by Supe (2007). This scale consisted of six items, of which first four items were positive and rest two were negative. The responses for each statement were rated on a five-point continuum ranging from strongly agree, agree, undecided, disagree and strongly disagree by following the scoring procedure of 5,4,3, 2 and 1 respectively for positive statements and 1,2,3, 4 and 5 respectively for negative statements.

Response	SA	A	UD	D	SD
For positive statements	5	4	3	2	1
For negative statement	1	2	3	4	5

The respondents were classified into three categories based on the mean and standard deviation as follows.

S.No.	Category	Score
1.	Low risk orientation	Below (mean- S.D.)
2.	Medium risk orientation	Between (mean ± S.D.)
3.	High risk orientation	Above (mean + S.D.)

3.3.2.15 Management orientation (X_{15})

It was operationalised as the degree to which a farmer is oriented towards scientific farm management comprising planning, production and marketing function of the farm.

It was measured with the help of risk orientation scale developed by Samanta (1977). This scale consisted of eighteen statements each for planning, production and marketing orientation. Each item is provided with four point response continuum .The positive statements were given a score of four for 'strongly agree', three for 'agree', two for 'disagree', and one for 'strongly disagree', response and vice versa in case of negative statements.

Response	SA	A	DA	SDA
For positive statements	4	3	2	1
For negative statements	1	2	3	4

Based on the total scores obtained by the respondents, they can be grouped into three categories taking mean and standard deviation.

S.No.	Category	Score
1.	Low management orientation	Below (mean- S.D.)
2.	Medium management orientation	Between (mean ± S.D.)
3.	High management orientation	Above (mean + S.D.)

3.3.2.16 Achievement motivation (X_{16})

It was operationalised as the desire for excellence to attain a sense of personal accomplishment.

It was measured with the help of procedure adopted by Rani (1985) with slight modifications. The scale consisted of 6 positive statements. The response continuum was Agree, Undecided and Disagree with a weightage of, 3, 2 and 1 respectively. The scoring of respondents was done by summing up response weightage for each statement. Based on the total scores obtained by the respondents on achievement motivation they were grouped into three categories taking mean and standard deviation as points of discrimination as follows.

S.No.	Category	Score
1.	Low achievement motivation	Below (mean- S.D.)
2.	Medium achievement motivation	Between (mean ± S.D.)
3.	High achievement motivation	Above (mean + S.D.)

3.4 BENEFITS BY SOIL HEALTH CARD SCHEME AS ELICITED BY FARMERS

Benefits derived from soil health card can be operationally defined as an advantage or profit that is gained by utilization of soil health card. The respondents were asked to express the benefits derived by utilizing soil health card. Frequencies and percentages were calculated and ranking was given in the order of magnitude.

3.5 PROBLEMS AND SUGGESTIONS ELICITED BY THE FARMERS IN UTILIZATION OF SOIL HEALTH CARD SCHEME

3.5.1 Problems elicited by the farmers in utilization of soil health card

Constraints elicited by the farmers were operationally defined as unsatisfactory situations in utilization of soil health card as perceived by the farmers. The respondents were asked to express the constraints faced by them in utilization of soil health card and the constraints as stated by them were recorded. Frequencies and percentages were calculated and ranking was given in the order of magnitude.

3.5.2 Suggestions elicited by the farmers to overcome the constraints in utilizing soil health card

Suggestions elicited by the farmers were operationally defined as the solutions given by them for the improvement of their adaptive capacity. The respondents were requested to give their suggestions in order to enhance their adaptive capacity. Frequencies and percentages were calculated and ranking was given in the order of magnitude.

3.6 COLLECTION OF DATA

3.6.1 Sources of data collection

3.6.1.1 Primary data

Data were collected from the selected respondents by using interview schedule developed for the study during the months of October 2018 to December 2018 in Anantapuramu district. The interview schedule was developed in consultation with the advisory committee, experts in the field of agricultural extension, Department of Agronomy and Department of Statistics and Computer Applications of S.V. Agricultural College, Tirupathi and scientists of Regional Agricultural Research Station (RARS), Tirupathi. The interview schedule was pre-tested with the respondents (40 members) outside the study area, where similar conditions prevailed. Based on the experience gained in the pre-testing, the interview schedule was suitably modified wherever necessary.

The finalized interview schedule used for the study is provided in Appendix A. Interview schedule consisted of three parts. The first part consisted of primary information of the respondent i.e., respondent number, name, mandal and village. The second part consisted of profile characteristics of the respondent and third part consisted of the dependent variables i.e., awareness and perception towards soil health card. Farmers were also asked to elicit the benefits, problems they faced in utilizing the soil health cards and were asked to give their suggestions which they think will improve the

situations. The data were collected and recorded in free and frank atmosphere where the interviewer and interviewee had a good rapport. The final schedule was enclosed at the end (appendix-A).

3.6.1.2 Secondary data

The needed secondary data were collected from the various Government offices like Department of Farmers Welfare and Agriculture Development, Tehsil office, mandal office, magazines and publications.

3.6.2 Instrument of data collection

3.6.2.1 Construction of interview schedule

In order to study perception of farmers towards soil health card scheme, list of 40 items related to soil health card scheme were developed after consulting various scientists ,experts in disciplines of soil science and agronomy and by referring different literature, books and journals.

3.6.2.2 Analysis of items

After a preliminary selection and editing of items, the items were subjected to judgement by 20 scientists (experts in agronomy and soil science) from RARS (Regional Agricultural Research Station), Tirupati, S.V. Agricultural College, Tirupathi and DAATTC and KVK, Kalikiri. The scientists were requested to go through the items and indicate their significance on a three point continuum as ‘Highly relevant’, ‘Relevant’ and ‘Least relevant’ with corresponding scores of 3, 2 and 1, respectively.

Continuum	**Highly relevant**	**Relevant**	**Least relevant**
Score	3	2	1

After tabulating the responses of all the 20 scientists, weighted mean for all the items put together was calculated along with the means of each item to arrive at final relevant score of the each individual item. The individual item mean is compared with weighted mean. The item whose mean is more than 2 was considered as relevant and less than 2 was considered as

irrelevant. Finally 32 statements were chosen to measure perception of farmers towards soil health card scheme and the same was enclosed in the end.

3.6.2.3 Validity

In the present investigation, validity of the schedule was examined for its content validity. Content validity is the representativeness or sampling adequacy of content, substance, matter and topics of a measuring instrument (American Psychological Association, 1966). In developing schedule, the experts as judges were the agriculture specialists from Agricultural colleges, research stations and KVKs of State Agriculture Universities. They were asked to judge the sampling adequacy of the contents. Thus, the judgment of the judge was taken into account before using the final schedule.

3.6.2.4 Reliability

A reliable scale produces similar results on repeated observations when applied to the same sample under similar conditions. The reliability of a test is its ability to yield consistent results from one set of measures to another; it is the extent to which the obtained test scores are free from such internal defects and errors of measurement inherent in the items and their standardization. The method used for estimating the reliability of the test was ‘test-retest’ method. In this the items were given to the same individuals at different point of time i.e. on a gap of ten days. Thereafter, the resulting scores at different points of time were correlated. The calculated value of reliability was found to be 0.78 indicating high reliability of the tool.

3.6.2.5 Interview schedule

The interview schedule was designed for collecting the relevant information of selected variable. Schedule prepared consists of different types of questions related to the study. The questions in interview schedule framed were simple, clear and directly related to the purpose of the study and were arranged in logical sequence. Data collection was done with the help of pre-

tested interview schedule from October 2018 to December 2018. All the farmer respondents were personally interviewed by the researcher in the study area. The respondents were assured that the information given by them would be kept confidential and it would only be used for the academic purpose.

3.7 PREPARATION OF REPORT

The data thus collected through interview schedule were coded, tabulated, analysed and presented in tables to make findings easily understandable. The findings emerged out of data were suitably interpreted, necessary conclusions and inferences were drawn.

3.8 STATISTICAL TOOLS USED

The following statistical tools were used for the analysis and interpretation of the data.

3.8.1 Frequencies and Percentages

The data were subjected to frequencies and used to know the distribution of the respondents according to selected variable. Frequency is the number of times a variable is repeated. Percentage is the number, amount, rate etc. expressed as if it is part of a total which is 100.

3.8.2 Arithmetic Mean ($\overline{X}$)

This was used to compare the respondents in respect of their dependent variable. The arithmetic mean is the sum of scores divided by the number of respondents.

$$\overline{x} = \frac{\sum x}{n}$$

Where,

$\overline{x}$ = Arithmetic mean

$\sum x$ = Sum of respondent's scores

n = Number of respondents

3.8.3 Standard deviation (σ)

Standard deviation was calculated by taking the difference of each item in the series from the arithmetic mean($\overline{x}$), squaring these differences (x^2), summing all the square differences ($\sum x^2$) and dividing by the number of items (n) and lastly calculating the square root of product by using the following formula.

The formula is $$\sigma = \sqrt{\left(\frac{1}{n}\right)\left[\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right]}$$

Where,

σ	=	Standard deviation
$\sum x^2$	=	Sum of squares of observations
$(\sum x)^2$	=	Square of sum of 'x' values
n	=	Number of respondents

3.8.4 Karl Pearson's coefficient of correlation

This technique was used to find out the relationship between two variables. Following formula was used for calculation of 'r' value.

$$r = \frac{\Sigma xy - (\Sigma x)(\Sigma y)/n}{\sqrt{\left[\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right]\left[\Sigma y^2 - \frac{(\Sigma y)^2}{n}\right]}}$$

Where,

r	=	Coefficient of correlation between x and y
$\sum x$	=	Sum of scores of variables x
$\sum y$	=	Sum of scores of variables y
$\sum x^2$	=	Sum of squares of variables x
$\sum y^2$	=	Sum of squares of variables y
$(\sum x^2)$	=	Squares of sum of variables x
$(\sum y^2)$	=	Squares of sum of variables y
$\sum xy$	=	Sum of product of two variables
n	=	Size of the sample

The ‘r’ calculated value was compared with ‘r’ table value for n-2 degrees of freedom. If the ‘r’ calculated value was greater than or equal to ‘r’ table value, the null hypothesis was rejected, otherwise it was accepted and conclusions were drawn accordingly.

3.8.5 Regression Analysis

To find out the contribution of various independent variables of dependent variable regression analysis was done. In other words, the influence of various independent variables on the dependent variable was obtained by regression analysis.

3.8.5.1 Multiple Linear Regression Analysis

It was defined as the average expected change in the dependent variable to a unit change in each independent variable put together. MLR was used to study the combined effect of selected independent variables over dependent variable. MLR provides amount of relation among two or more predicted variables and the single criterion variable. The regression co-efficient b_1x_1 may be interpreted as the change in Y corresponding to a unit increase in x_1 when all the other variables are held constant. The Multiple Linear Coefficient ‘R’ is the highest possible constant between least squares of the independent variables and the squares of the independent variables and the observed dependent variable and R^2 is the portion of the variation on the criterion variable.

The regression equation may be written as

$$Y = a + b_1x_1 + b_2 x_2 + b_3x_3 + \ldots\ldots + b_kx_k$$

Where,

a = intercept

b_1 = the partial regression coefficient represents the amount of change in Y that can be associated with a unit change in x_1 when the remaining independent variables held constant.

x_k = k^{th} independent variable for k= 1,2,3,…….k

Chapter IV

RESULTS AND DISCUSSION

In this chapter an effort was made to scrutinize the results based on empirical data of the present study. The benefits gained by the farmers, problems faced by the farmers and the suggestions elicited by them to overcome the problems were dealt. Keeping the objectives in view, the required data were collected and analyzed using appropriate statistical tools. In this chapter, the results were also discussed and meaningful conclusions were drawn.

For the purpose of precision and conciseness, with orientation towards objectives, results and discussion are presented under the following headings

4.1 Profile characteristics of soil health card scheme farmers.
4.2 Awareness of farmers about soil health card scheme.
4.3 Perception of farmers towards soil health card scheme.
4.4 Relationship between profile characteristics with awareness and perception of farmers.
4.5 Benefits derived from the soil health card scheme by the farmers
4.6 Problems as perceived by the farmers regarding soil health card scheme and suggestions to overcome them.

4.1 PROFILE CHARACTERISTICS OF SOIL HEALTH CARD SCHEME FARMERS

4.1.1 Age

The data conferred in table 4.1 and figure 4.1 indicated that nearly three fourth (71.25 %) of the SHC scheme farmers were found in middle age group, followed by (15.83%) young and (12.92 %) old age groups.

The likely reason for the above inclination might be that, young farmers might have engaged in non- agricultural activities and paid less

attention towards agricultural sector and they moved to other enterprises. The old aged groups were there to convey their experience to young farmers.

The above result was in consonance with the results of Charel (2016), Chakrawarty (2018) and Lamkane (2018).

Table 4.1 Distribution of SHC scheme farmers according to their age

(n=240)

S.No	Category	Frequency	Percentage
1	Young age (upto 35 years)	38.00	15.83
2	Middle age (36-55 years)	171.00	71.25
3	Old age (above 55years)	31.00	12.92
	Total	**240**	**100.00**

4.1.2 Education

Table 4.2 Distribution of Soil health card scheme farmers according to their levels of education

(n=240)

S.No	Category	Frequency	Percentage
1	Illiterate	14.00	5.83
2	Primary (I to IVth stds)	47.00	19.58
3	Middle (V to VIIth stds**)**	68.00	28.34
4	High school(VIII to Xth stds)	56.00	23.33
5	Higher sec. School (XI to XIIth stds)	34.00	14.17
6	Graduate	15.00	6.25
7	Post Graduate	6.00	2.50
	Total	**240**	**100.00**

It was noticeable from table 4.2 and figure 4.2 that, nearly one third (28.34%) of SHC scheme farmers belonged to middle school, followed by high school (23.33%), primary school (19.58%), higher secondary school (14.17%), graduate (6.25%), illiterate (5.83%) and post graduation (2.50%) levels of education.

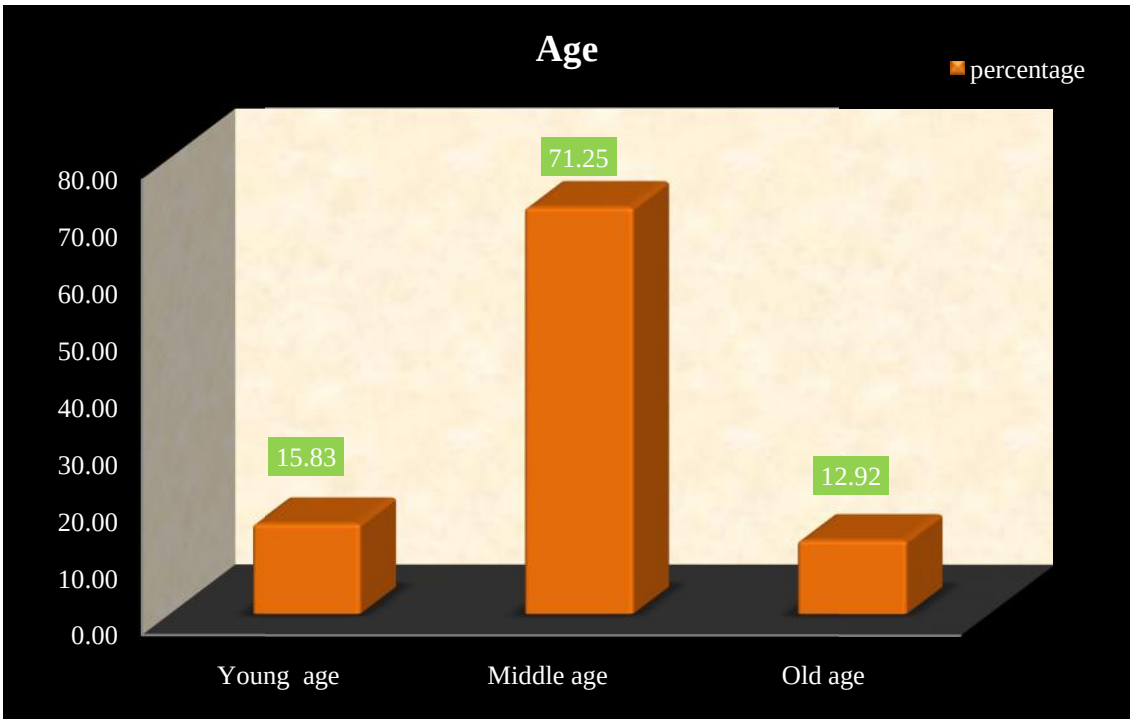

Figure 4.1 Distribution of SHC scheme farmers according to their age.

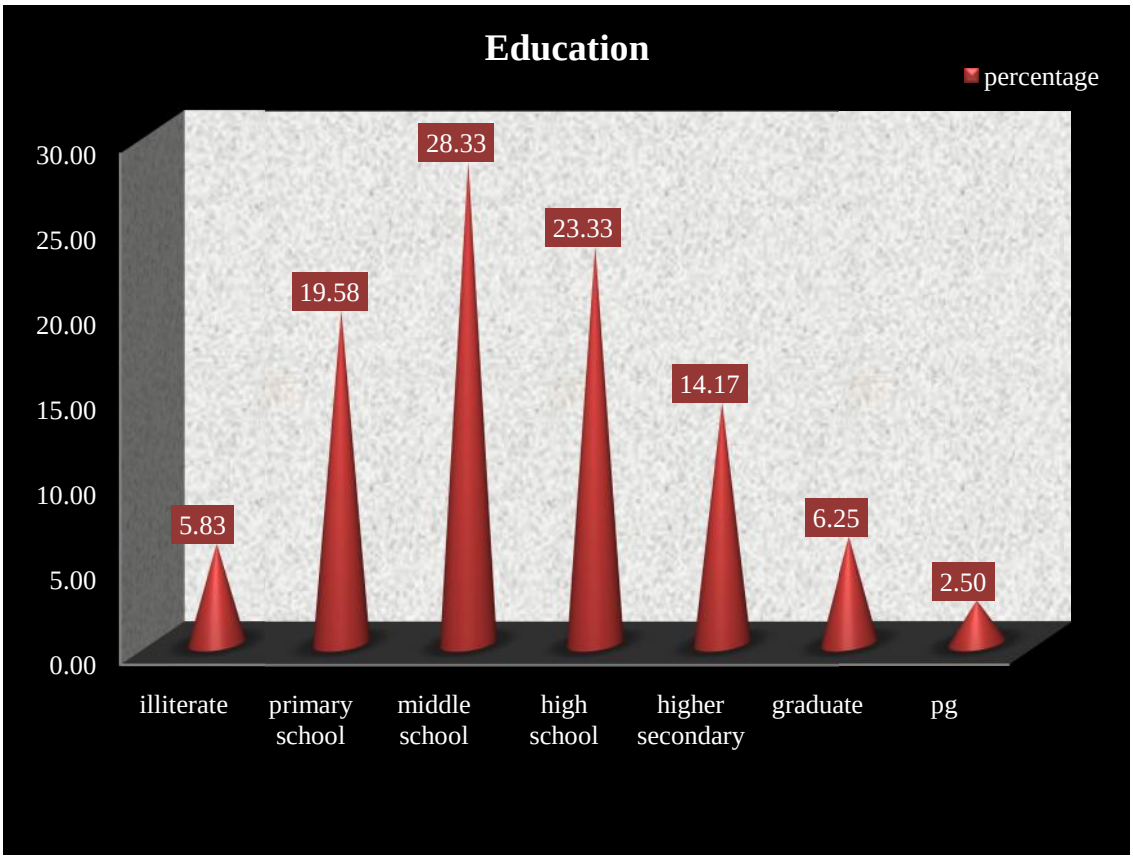

Figure 4.2 Distribution of SHC scheme farmers according to their education.

Most of SHC scheme farmers belonged to middle school level of education. The probable reason might be that almost everyone wants to be literate because of the increasing attentiveness about the importance of the education. It is observable that the availability of educational infrastructural facilities in rural areas has been increased as well as respondents had understood the importance of education for their economic and over all development.

The above result is in conformity with the results of Patel (2013) and Rathor (2018).

4.1.3 Family type

It was obvious from table 4.3 and figure 4.3 that majority (81.25%) of SHC scheme farmers were in nuclear family and 18.75 per cent in joint family.

Table 4.3 Distribution of SHC scheme farmers according to their type of family

(n=240)

S.No.	Category	Frequency	Percentage
1	Nuclear	195	81.25
2	Joint	45	18.75
	Total	**240**	**100.00**

Preponderance of SHC scheme farmers dwelled in nuclear family and few dwelled in joint family. The dominance of nuclear families might be due to apprehension of the benefits of nuclear families in terms of running the family, less responsibilities and privacy. Parents in nuclear type of family opined higher consistency in raising their children in terms of teaching discipline and appropriate behaviour. Majority of people become sense of being in nuclear family will help them in overall development of family. This finding is in accordance with the results of Laxman (2016), Naik and Deshmukh (2016), Panda and Singh (2016).

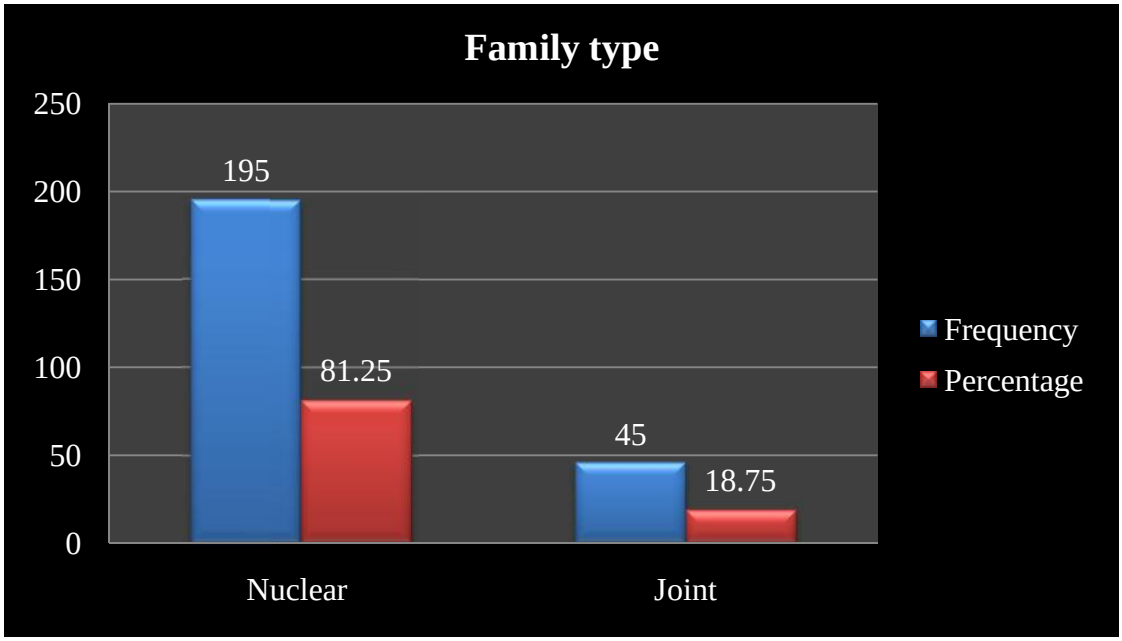

Figure 4.3 Distribution of SHC scheme farmers according to their family type.

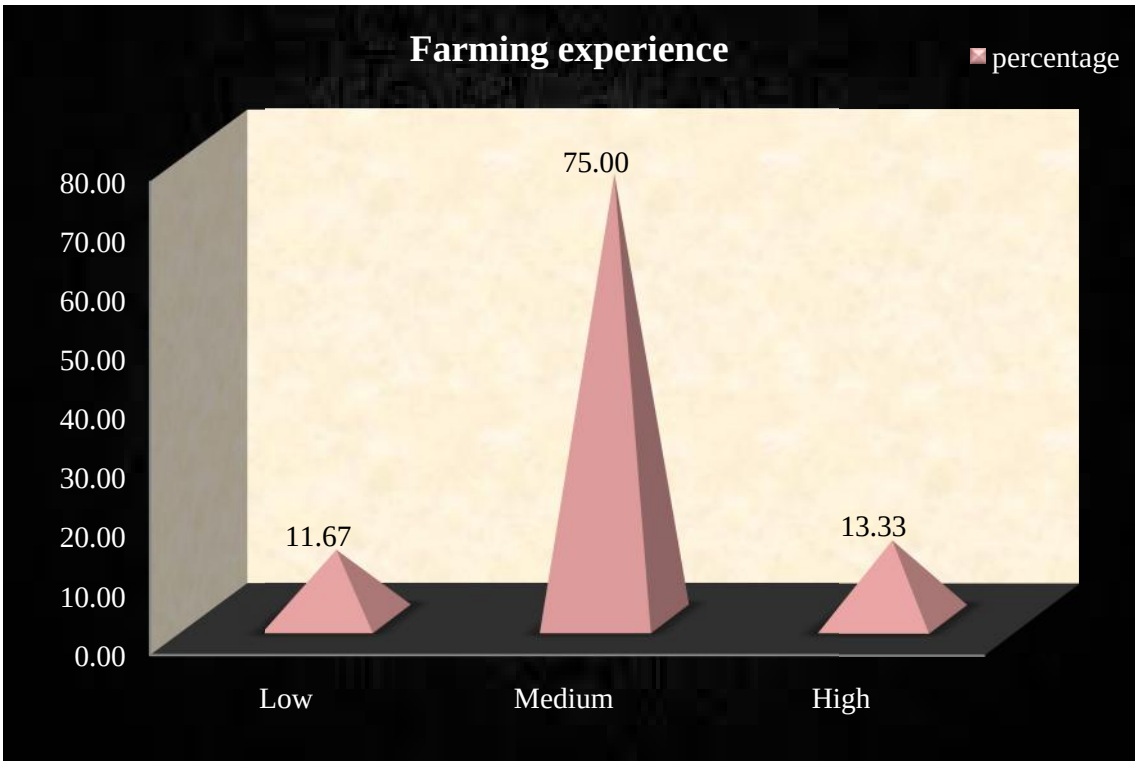

Figure 4.4 Distribution of SHC scheme farmers according to their farming experience.

4.1.4 Farming experience

It was seen from the table 4.4 and figure 4.4 that, majority (75.00%) of SHC scheme farmers had medium farming experience, whereas 13.33 and 11.67 per cent of them had high and low level of experience in farming respectively.

Table 4.4 Distribution of SHC scheme farmers according to their farming experience

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low farming experience	28.00	11.67
2.	Medium farming experience	180.00	75.00
3.	High farming experience	32.00	13.33
	Total	**240**	**100.00**
		Mean = 14.20	**SD=6.89**

Three fourth of SHC scheme farmers had medium level of experience in farming. The probable reason might be that the working with elder members of the family, they might be getting the benefit of farming skills from their guardians and increasing awareness of shouldering responsibilities to rural youth at early age.

The above outcome is similar with the outcome of Mukati (2016) and Rathor (2018).

4.1.5 Land holding

It was perceptible from the table 4.5 and figure 4.5 that, majority (57.08%) of SHC scheme farmers were having semi-medium land holding followed by small (27.92%), medium (9.58%), large (2.92%) and (2.50%) marginal holding. It could be substantiated that, the sub division and fragmentation of the farm land from one generation to another generation was the foremost reason for decline in the land holding size of each farmer in the rural areas.

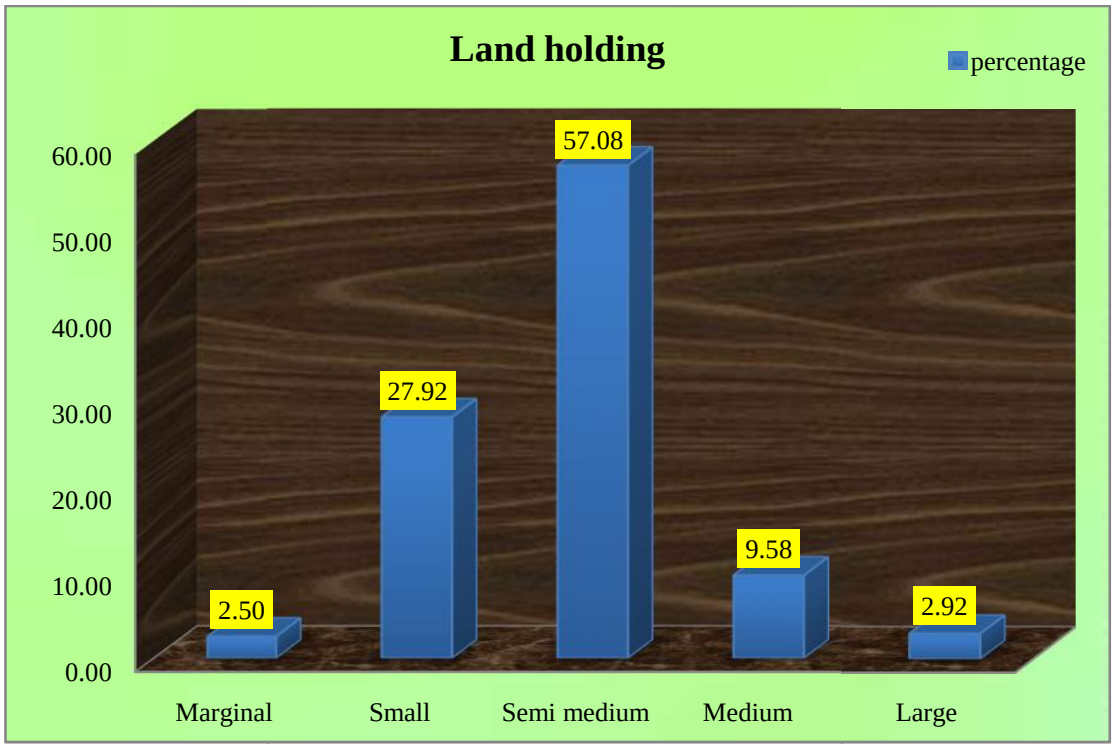

Figure 4.5 Distribution of SHC scheme farmers according to their land holding.

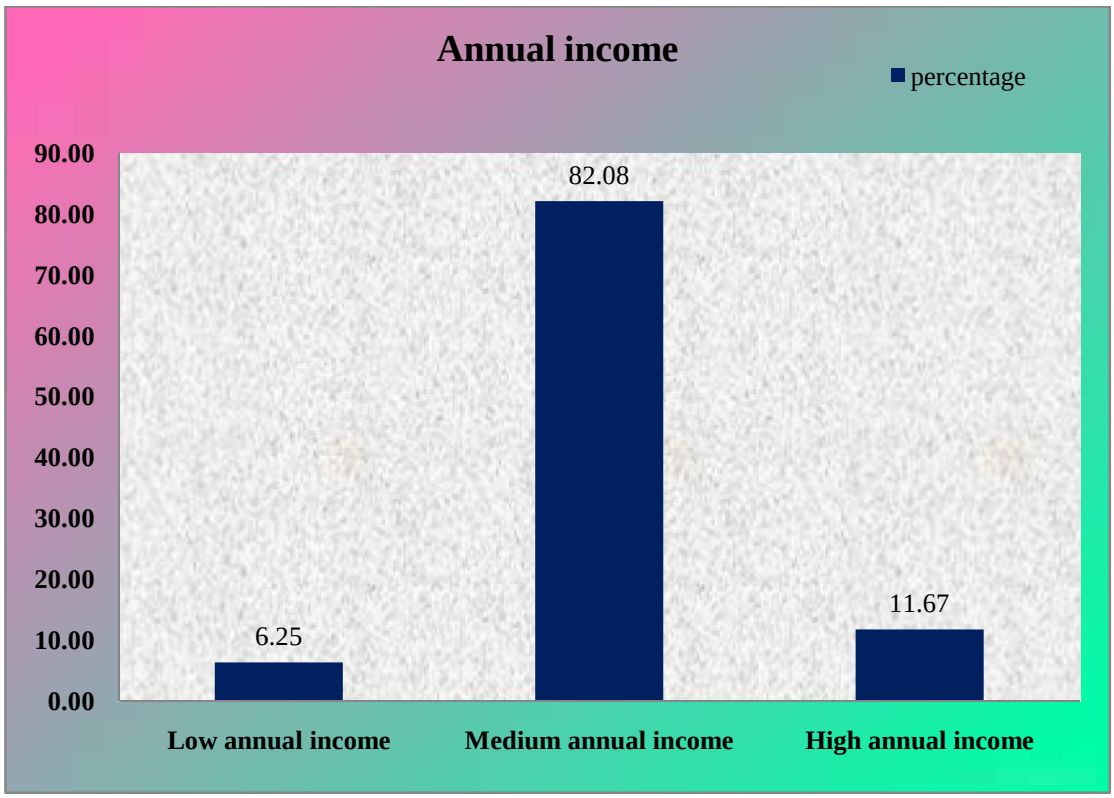

Figure 4.6 Distribution of SHC scheme farmers according to their annual income.

Table 4.5 Distribution of Soil health card scheme farmers according to their Land holding

(n=240)

S.No.	Category	Area of land (ha)	Frequency	Percentage
1.	Marginal	Below 1.00 Hectare	6.00	02.50
2.	Small	1.01 to 2.00 Hectare	67.00	27.92
3.	Semi- medium	2.01 to 4.00 Hectare	137.00	57.08
4.	Medium	4.01 to 10.00 Hectare	23.00	09.58
5.	Large	10.01 Hectare and above	7.00	02.92
		Total	**240**	**100.00**

4.1.6 Annual income

It was indicated from the table 4.6 and figure 4.6 that, majority (82.08%) of SHC scheme farmers had medium family income, less than one eighth (11.67%) high and meager portion (06.25%) of farmers had low annual income, respectively.

Table 4.6 Distribution of Soil health card scheme farmers according to their annual income

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low annual income	15.00	06.25
2.	Medium annual income	197.00	82.08
3.	High annual income	28.00	11.67
	Total	**240**	**100.00**
		Mean = 81.44	**SD=47.63**

Majority of SHC scheme beneficiaries had medium family income. It is quite usual when the farmers are having semi-medium land holding with agriculture as a major occupation farmer can earn only medium family income and agriculture in present days suffers frequently with vagaries of

climatic conditions which make them to have medium to high family income. The result was in agreement with findings of Rathor (2018).

4.1.7 Cropping intensity

Table 4.7 Distribution of SHC scheme farmers according to their cropping intensity

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low cropping intensity	45.00	18.75
2	Medium cropping intensity	165.00	68.75
3	High cropping intensity	30.00	12.50
	Total	**240**	**100.00**
		Mean= 105.20	**SD=38.21**

It was distinct from the table 4.7 and figure 4.7 that, above two third (68.75%) of SHC scheme farmers had medium cropping intensity followed by low (18.75%) and high (12.50%) cropping intensity.

Majority of SHC scheme farmers had medium cropping intensity. This may be accredited to the fact that, most of the farmers were having semi-medium and medium land holdings and more than half of the farmers were growing three crops annually on the same land. In addition, the respondents were making use of both land and irrigation potential available to them.

The above finding was in conformity with findings of Madhukar (2015) and Prajapati *et. al*. (2016)

4.1.8 Mass media exposure (MME)

Table 4.8 and figure 4.8 indicated that, majority (72.91%) of SHC scheme farmers had medium level of MME, followed by low (14.17%) and high (12.92%) levels of MME respectively.

Majority of SHC scheme farmers had medium level of MME. The probable reason might be due to their low education, medium

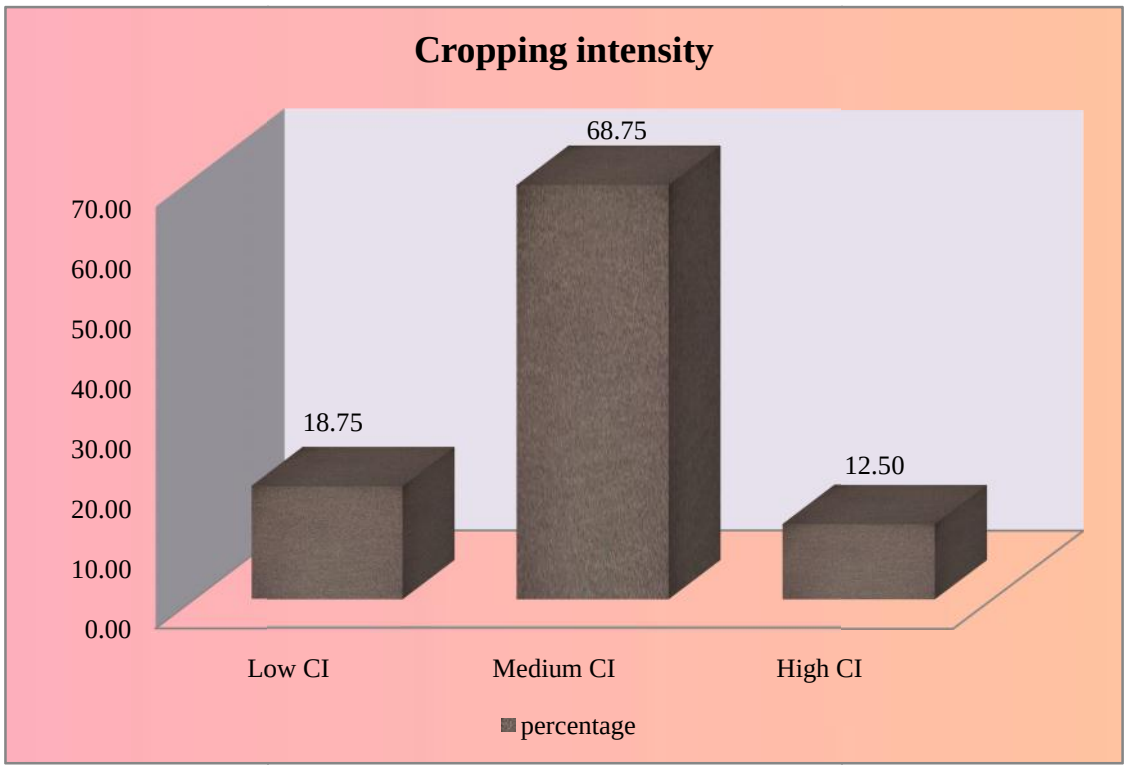

Figure 4.7 Distribution of SHC scheme farmers according to their cropping intensity.

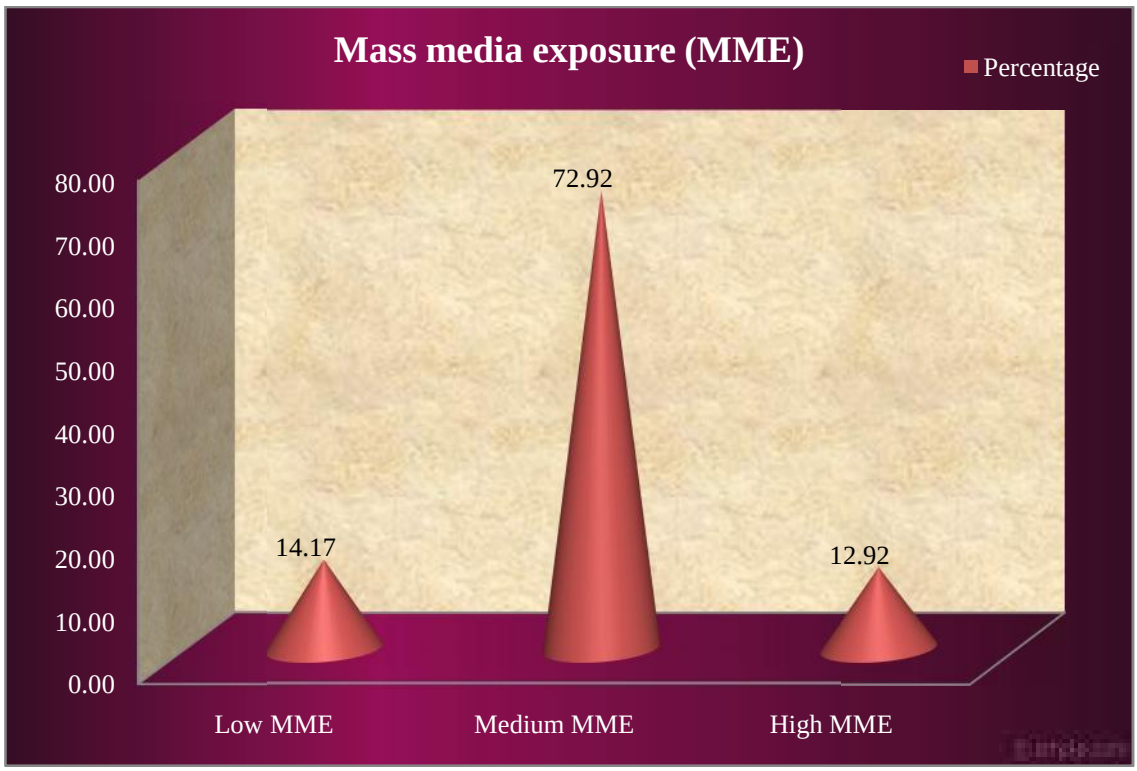

Figure 4.8 Distribution of SHC scheme farmers according to their mass media exposure.

family income. Due to their low education level, farmers may perhaps not be able to read newspapers, farm magazines and news articles. The poor economic status also does not smooth the progress of the farmers to own electronic mass media devices like television, smart phone, computers, internet and cable net work.

Table 4.8 Distribution of Soil health card scheme farmers according to their mass media exposure

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low mass media exposure	34.00	14.17
2	Medium mass media exposure	175.00	72.91
3	High mass media exposure	31.00	12.92
	Total	**240**	**100.00**
		Mean =13.20	**SD=2.39**

The above result is in accordance with results of Charel (2016), Mukati (2016), and Jaiswal and Singh (2018).

4.1.9 Social participation

Table 4.9 Distribution of Soil health card scheme farmers according to their social participation

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low social participation	33.00	13.75
2.	Medium social participation	160.00	66.68
3.	High social participation	47.00	19.57
	Total	**240**	**100.00**
		Mean=14.00	**SD=5.17**

An overview of the table 4.9 and figure 4.9 indicated that, majority (66.68%) of SHC scheme farmers had medium level of social participation followed by high (19.57%) and slight above one ninth (13.75%) farmers had low level of social participation respectively.

Majority of SHC scheme farmers had medium social participation. The attainable reason may well be that major proportions of farmers were having quite good educational status with intermediate level of extension contact and mass media exposure. On the opposite hand there might be existence of inactive organizations at village level, they either realized the importance of social participation or got opportunities of social participation.

The above result is in consonance with results of Jaiswal and Singh (2018), Lamkane (2018) and Rathor (2018).

4.1.10 Extension contact

A cursory look at the table 4.10 and figure 4.10 inferred that, majority (72.91%) of SHC scheme farmers had medium extension contact followed by (15.42%) low and (11.67%) high extension contact respectively.

Table 4.10 Distribution of SHC scheme farmers according to their extension contact

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low extension contact	37.00	15.42
2.	Medium extension contact	175.00	72.91
3.	High extension contact	28.00	11.67
	Total	**240**	**100.00**
		Mean= 12.29	**SD= 2.85**

Nearly three fourth of SHC scheme farmers had medium extension contact. The probable reason for the medium level of extension contact could be that preponderance of the farmers was beckoned by the premiums provided by government. A scanty portion of the farmers who resided in first two portions of the adopter categories were enthusiastic in keeping touch with department officials and they had high level of extension contact.

The above result is in agreement with results of Deshmukh *et. al*. (2007).

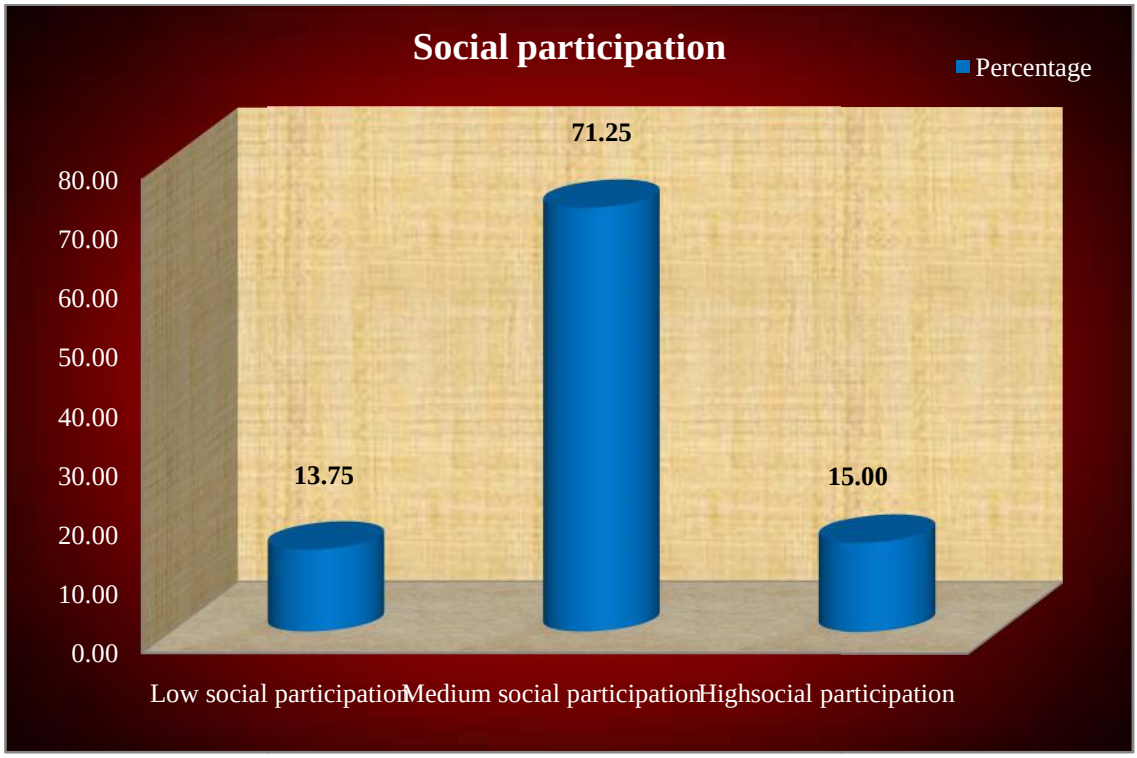

Figure 4.9 Distribution of SHC scheme farmers according to their social participation.

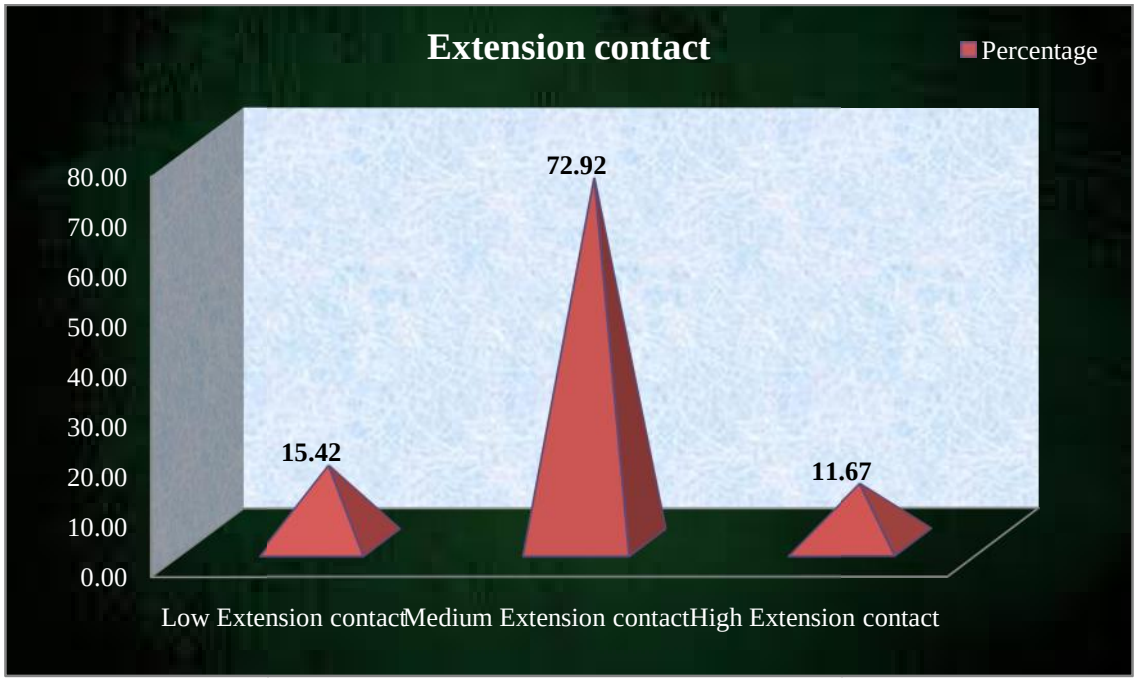

Figure 4.10 Distribution of SHC scheme farmers according to their extension contact.

4.1.11 Scientific orientation

An outlook from the table 4.11 and figure 4.11 inferred that, majority (82.50%) of SHC scheme farmers had medium scientific orientation followed by low (12.50%) and high (5.00%) levels of scientific orientation respectively.

Table 4.11 Distribution of Soil health card scheme farmers according to their scientific orientation

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low scientific orientation	30.00	12.50
2.	Medium scientific orientation	198.00	82.50
3.	High scientific orientation	12.00	05.00
	Total	**240**	**100.00**
		Mean= 25.23	**SD= 3.16**

Majority of SHC scheme farmers had medium scientific orientation. Generally farmers with scientific orientation are tilting towards adoption of new improved technologies in farming. On the other hand they believed in science and technology associated with agriculture will help in augmenting their socio economic status as well as they might have possessed good innovativeness.

The above results are in conformity with findings of Charel (2016), Dalvi and Pandya (2016), Mukati (2016) and Rathor (2018).

4.1.12 Economic motivation

It was discerned from table 4.12 and figure 4.12 that majority (74.59%) of SHC scheme farmers had medium level of economic motivation followed by 13.33 and 12.08 per cent low and high levels of economic motivation respectively.

Preponderance of SHC scheme farmers had medium level of economic motivation. The above finding might be due to more than half of the farmers

were endowed with middle and high school education, had medium annual income, medium extension contact and medium market orientation because of that it has become tough to orient them towards profit maximization in farming and the farmers were not getting the remunerative prices for their produce.

This finding is in line with findings of Narbaria (2017), Sadashive *et. al*. (2017) and Pawar *et. al*. (2019).

Table 4.12 Distribution of Soil health card scheme farmers according to their economic motivation

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low economic motivation	32.00	13.33
2.	Medium economic motivation	179.00	74.59
3.	High economic motivation	29.00	12.08
	Total	**240**	**100.00**
		Mean = 25.66	**SD= 3.12**

4.1.13 Innovativeness

It could be observed from the table 4.13 and figure 4.13 that majority (68.34%) of SHC scheme farmers had medium innovativeness followed by low (22.08%) had high (09.58%) innovativeness respectively.

Table 4.13 Distribution of Soil health card scheme farmers according to their innovativeness

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low innovativeness	53.00	22.08
2.	Medium innovativeness	164.00	68.34
3.	High innovativeness	23.00	09.58
	Total	**240**	**100.00**
		Mean = 16.67	**SD=2.61**

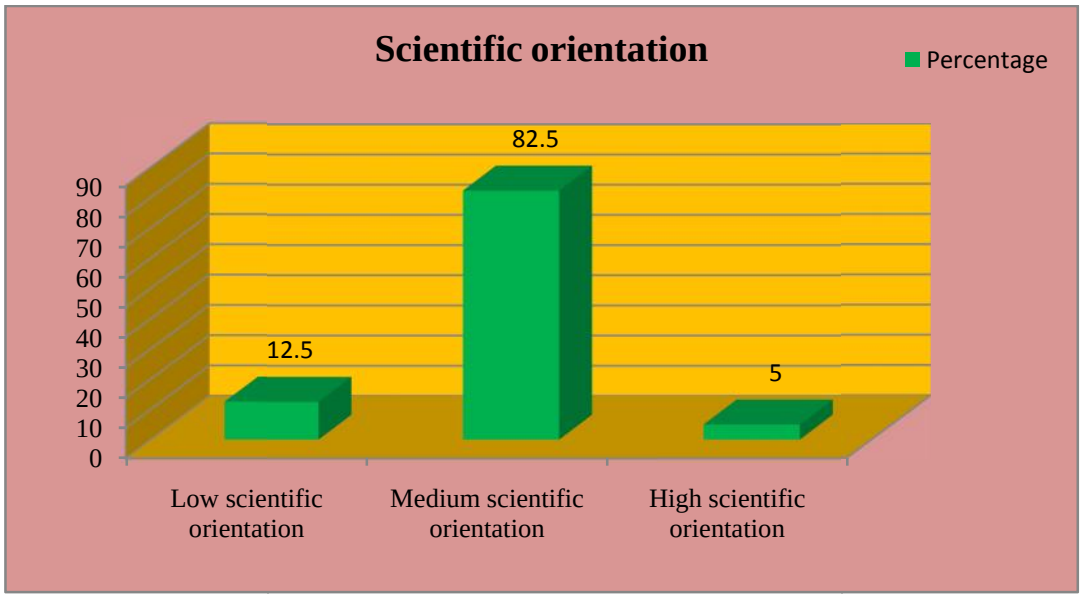

Figure 4.11 Distribution of SHC scheme farmers according to their scientific orientation.

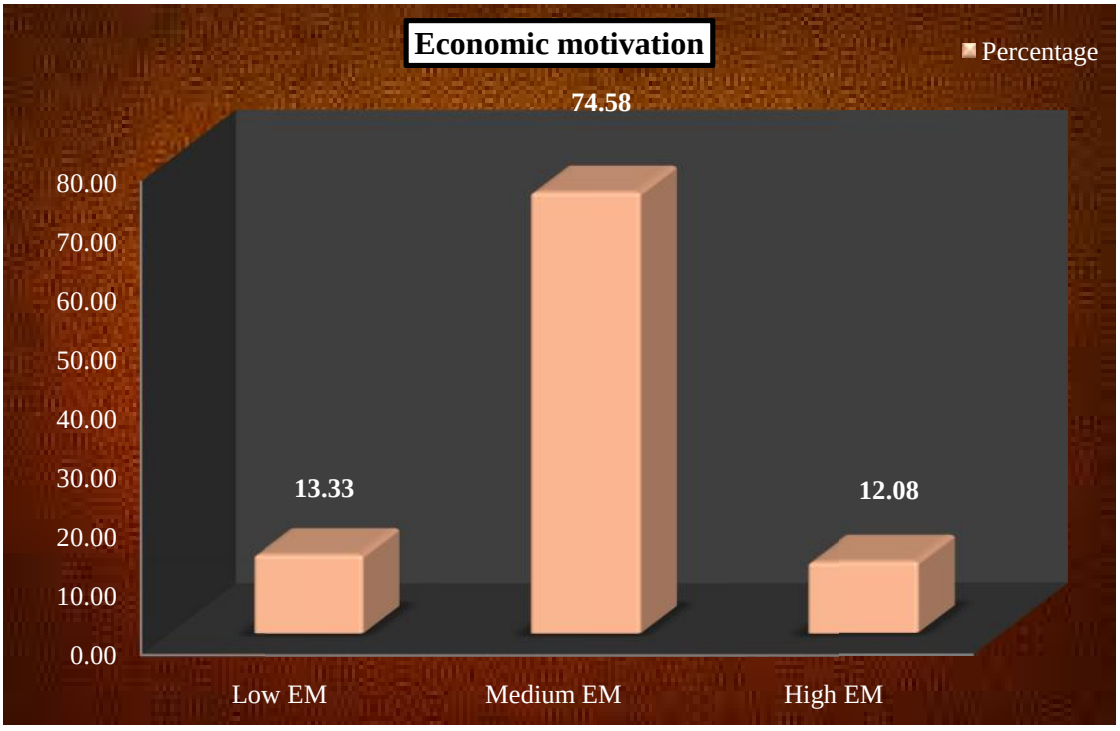

Figure 4.12 Distribution of SHC scheme farmers according to their economic motivation

Majority of SHC scheme farmers had medium innovativeness. Innovativeness triggers the farmers for effective utilization of available information. The possible reason for medium innovativeness might be that, greater part of the farmers who involved in farming were of middle to old aged category and innovativeness is generally associated with younger age. On the opposite end it may be due to their inimitable nature and the venture in which they are engaged. But it was experiential that the farmers because of their medium educational status and medium extension contact were inquisitive about novel technologies as they were involved in agriculture from generations together and they have shown more interest on the latest developments of technologies in agriculture.

The above finding is pursuant with findings of Charel (2016).

4.14 Risk orientation

It was comprehensible from table 4.14 and figure 4.14 that majority (67.50%) of SHC scheme farmers had medium level of risk orientation followed by high (19.17%) and low (13.33%) levels of risk orientation.

Table 4.14 Distribution of Soil health card scheme farmers according to their risk orientation

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low risk orientation	32.00	13.33
2.	Medium risk orientation	162.00	67.50
3.	High risk orientation	46.00	19.17
	Total	**240**	**100.00**
		Mean= 25.14	**SD= 2.77**

Majority of SHC scheme farmers had medium level of risk orientation. The possible reason might be due to preponderance of farmers were of middle age and think that it is better for them not to try all the new technologies unless most others had used them successfully. This revealed that

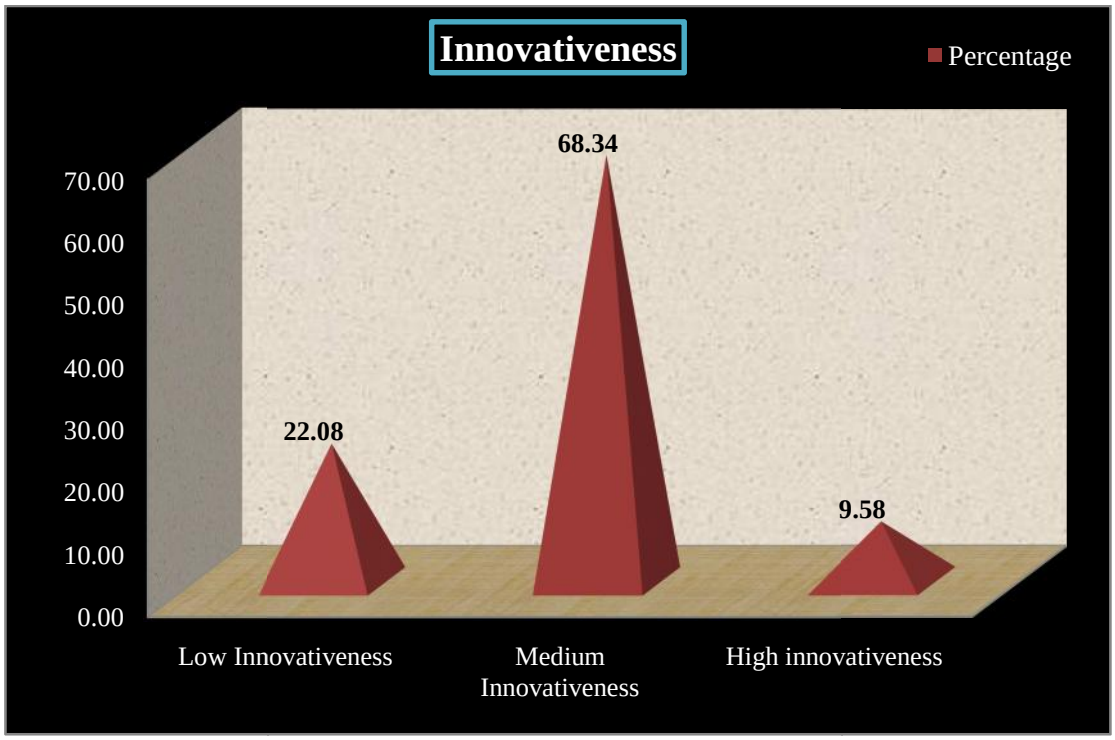

Figure 4.13 Distribution of SHC scheme farmers according to their innovativeness.

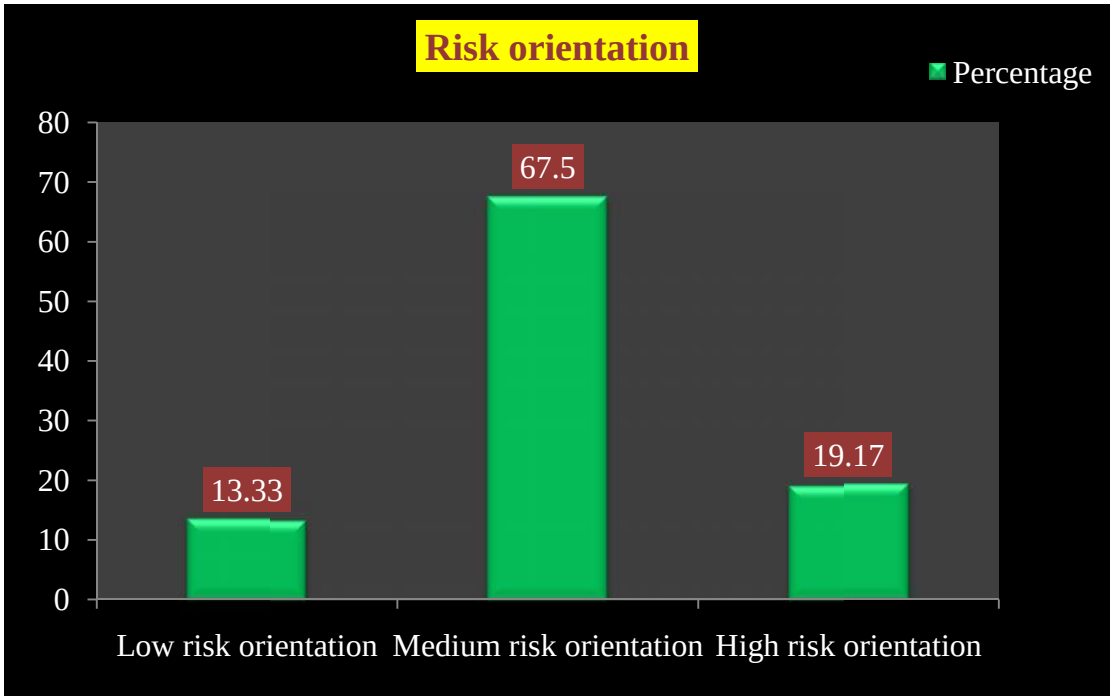

Figure 4.14 Distribution of SHC scheme farmers according to their risk orientation.

the young, educated and interested respondents with high levels of innovativeness were ready to face the risk.

The above finding is in conformity with findings of Kesharam *et. al*. (2015) and Rajashekar *et. al*. (2017).

4.15 Management orientation

Table 4.15 and figure 4.15 depicts that, three fourth (75.00%) of SHC scheme farmers had medium management orientation, followed by 13.33 and 11.67 per cent high and low levels of management orientation respectively.

Table 4.15 Distribution of Soil health card scheme farmers according to their management orientation

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low management orientation	28.00	11.67
2.	Medium management orientation	180.00	75.00
3.	High management orientation	32.00	13.33
	Total	**240**	**100.00**
		Mean = 61.08	**SD= 5.39**

Three fourth of SHC scheme farmers had medium level of management orientation. The feasible reason might be that, management orientation which comprises of planning, production and marketing of enterprise may be having some influence of entrepreneurial experience and education. Preponderance of the respondents might not have premeditated earlier about the crops to be cultivated in each type of land every year. Similarly, more than half of them would have preferred the crops based on the availability of the rain and did not think that increased yield could be obtained through preplanning. With regard to production functions, generally soil test based nutrient and determination of seed rate and other production related decisions through consultation with a crop specialist was not in the agenda of a more than half of the farmers. Similar was the case of marketing

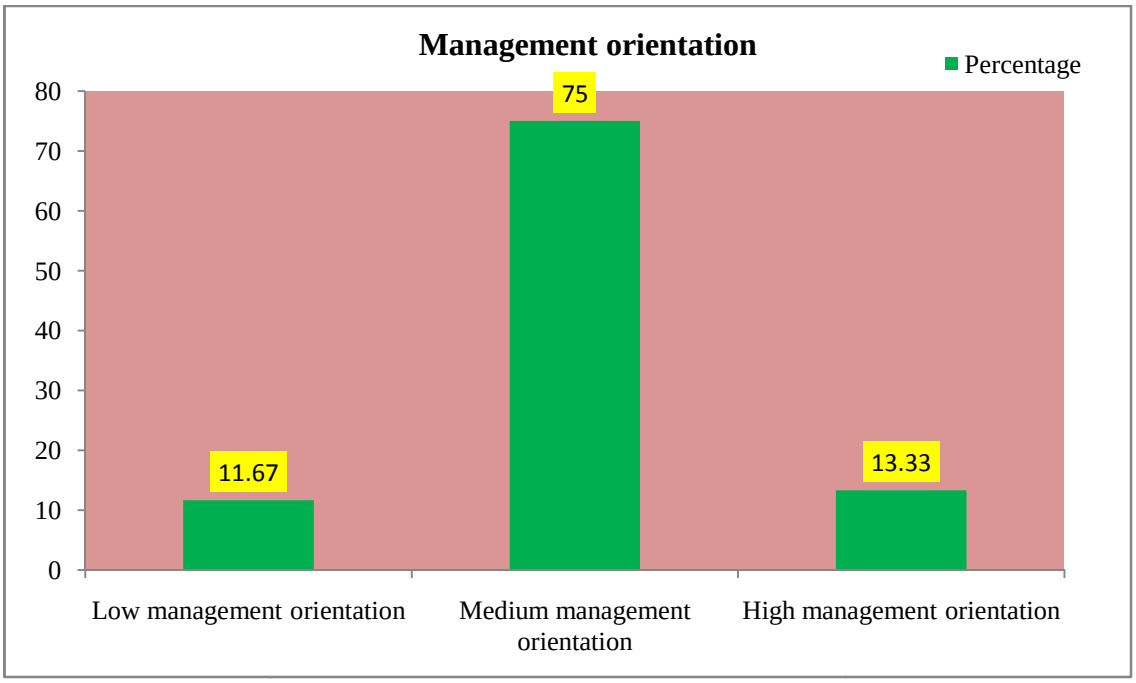

Figure 4.15 Distribution of SHC scheme farmers according to their management orientation

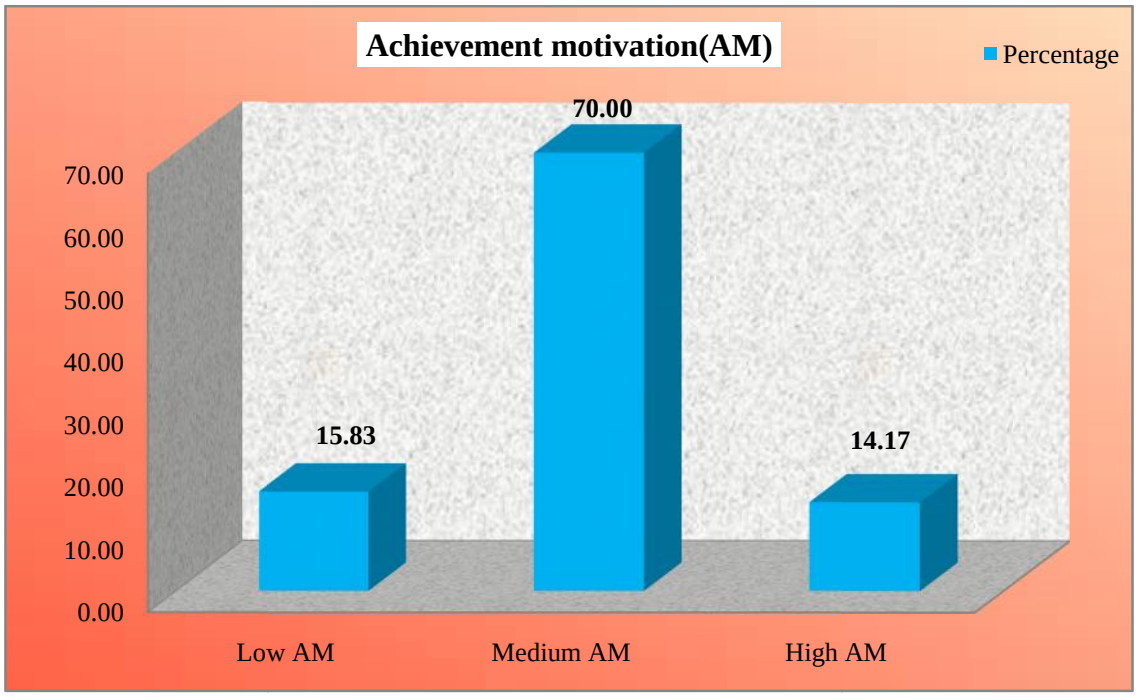

Figure 4.16 Distribution of SHC scheme farmers according to their achievement motivation

function that farmers were not much aware about the grading and the use of warehouses to get better prices for their produce. Many of the farmers had not grown their crops based on market demand. Hence, the intermediate level of management orientation was found.

This results are in accordance with findings of Sreeram (2013), Stephency and Vengatesan (2018) and Pawar *et. al.* (2019).

4.1.16 Achievement motivation

It was obvious from table 4.16 and figure 4.16 that major portion (70.00%) of SHC scheme farmers had medium level of achievement motivation followed by low (15.83%) and high (14.17%) levels of achievement motivation.

Table 4.16 Distribution of Soil health card scheme farmers according to their achievement motivation

(n=240)

S.No.	Category	Frequency	Percentage
1.	Low achievement motivation	38.00	15.83
2.	Medium achievement motivation	168.00	70.00
3.	High achievement motivation	34.00	14.17
	Total	**240**	**100.00**
		Mean = 14.53	**SD= 2.42**

Farmers with high n-Ach factor are well motivated by themselves and they venture into diversified areas of development. Achievement motivation is a psychological factor which is internalized and drives an individual to desire for higher level of earning and passion to become economically sound. It is unsaid that achievement motivation guides the individual towards reaching the goals, which one has set for their well being. Dry land farming being a activity involving more physical work, strong achievement motivation which hold back farmers strongly towards farming enterprise and motivate them to do extremely well. It was quite apparent that the social

participation, mass media exposure, extension contact, management orientation and risk orientation might have encouraged them to set the higher goals. All these variables may have contributed differently in achieving superiority in the farming and helps in reaching the set goals.

The above result is as similar as of Mukati (2016), Jaiswal and Singh (2018) and Rathor (2018).

4.2 AWARENESS OF FARMERS ABOUT SOIL HEALTH CARD SCHEME

Awareness is the ability to directly know and perceive, to feel or to be conscious of events, objects, thoughts, emotions or sensory pattern. For the present investigation, it was operationalized as awareness level of farmers about usefulness of soil health card. For quantifying this variable, the farmers were queried whether they are aware about SHC and its benefits. Accordingly, the feedback from farmers was recorded as yes with score of '1' and no with score '0'. The farmers were grouped into three categories namely low, medium and high on the basis of mean and S.D.

Table 4.17 Distribution of SHC scheme farmers according to their awareness about SHC scheme

(n=240)

S.No	Level of awareness	Frequency	Percentage
1	Low awareness	34.00	14.17
2	Medium awareness	163.00	67.91
3	High awareness	43.00	17.92
	Total	**240**	**100.00**
		Mean = 27.79	**SD= 5.57**

It was clear from the data manifested in table 4.17 and figure 4.17 that, majority (67.91 %) of SHC scheme farmers had possessed medium level of awareness about SHC scheme followed by high (17.92%) and low (14.17%) levels of awareness about SHC scheme respectively.

Majority of SHC scheme farmers possessed medium level of awareness about SHC scheme. The possible reason behind medium level of awareness may be due to different factors namely medium level of education, extension contact, risk orientation, exposure to mass media, social participation and farmers' interest in new technology. Now a day's farmers

are feeling the need of balanced utilization of fertilizers which made them to fetch requisite information regarding the SHC scheme.

The above result is in agreement with results of Bunkar (2018).

Table 4.17(a) Item wise awareness of farmers towards SHC scheme

(n=240)

S.No	Awareness about soil health card	Answers			
		Yes (1)		No (0)	
		f	%	f	%
1	S.H.C is worth for balance use of chemical fertilizer	234	97.5	6	2.5
2	S.H.C is useful scheme to understand fertility status of the soil	195	81.3	45	18.8
3	S.H.C scheme is not useful for illiterate farmers	176	73.3	64	26.7
4	S.H.C is useful to know the physical properties of the soil influence the soil production	178	74.2	62	25.8
5	Are the results discussed among farmers in the village?	184	76.7	56	23.3
6	Do you follow the recommended dosage of fertilizers as per soil health card	172	71.7	68	28.3
7	It is important to read instructions present on Soil health card	191	79.6	49	20.4
8	S.H. C lowers the cost of cultivation	172	71.7	68	28.3
9	S.H.C helps in increasing the agricultural productivity	174	72.5	66	27.5
10	S.H.C helps in providing the site specific nutrient management	179	74.6	61	25.4
11	Soil samples from irrigated areas for testing are drawn in a grid of 2.5hac.	186	77.5	54	22.5
12	SHC scheme was started in the year 2015.	164	68.3	76	31.7
13	SHC scheme was first started by Rajasthan state	186	77.5	54	22.5
14	The web portal for SHC is	183	76.3	57	23.8

	www.soilhealth.dac.gov.in				
15	There are totally 91 soil testing laboratories in Andhra Pradesh	175	72.9	65	27.1
16	Soil health card consist of details about 12 parameters.	181	75.4	59	24.6
17	Soil samples from rainfed areas for testing are drawn in a grid of 10 hac	172	71.7	68	28.3
18	Soil samples will be collected by staff of state department of agriculture	163	67.9	77	32.1
19	Soil samples are taken after harvesting of kharif and rabi crop	184	76.7	56	23.3
20	The payment given to state government by central government per sample is Rs.190/-	176	73.3	64	26.7
21	The international year of soils is 2015.	201	83.8	39	16.3
22	SHC helps to improve soil quality and profitability of farmers	185	77.1	55	22.9
23	SHC provides online delivery of SHC to the farmers using soil health card portal	165	68.8	75	31.3
24	SHC scheme provides soil testing facilities to farmers at their doorstep	177	73.8	62	25.8
25	S.H.C is useful to adopt integrate nutrient management practices in the crop	171	71.3	69	28.8
26	SHC will be distributed to farmers once in three years cycle.	177	73.8	63	26.3
27	The physical parameters which are being reported in SHC are colour, Ph, EC.OC	187	77.9	53	22.1
28	The macro nutrients being tested under SHC scheme are N, P and K	170	70.8	70	29.2
29	The secondary nutrient being tested under SHC scheme is Sulphur	175	72.9	65	27.1
30	The micro nutrients being tested under SHC scheme are Zn, Fe, Cu, Mn and Bo	182	75.8	57	23.8

31	SHC provides recommendations for reclamation of acidic and alkaline soils	167	69.6	73	30.4
32	SHC provides guidelines for integrated nutrient management	187	77.9	53	22.1
33	Are you aware of recommended dosages of fertilizers for paddy crop as per soil health card?	191	79.6	49	20.4
34	Are you aware of recommended dosages of fertilizers for Bengal gram crop as per soil health card?	174	72.5	66	27.5
35	Are you aware of recommended dosages of fertilizers for ground nut crop as per soil health card?	173	72.1	67	27.9
36	Are you aware of recommended dosages of fertilizers for cotton crop as per soil health card?	182	75.8	58	24.2
37	Soil health card provides the farmers a well-monitored report of the soil which is chosen for cultivation of crops.	162	67.5	78	32.5
38	Are you aware of deficiencies of nutrients in your soil as per soil health card?	203	84.6	37	15.4
39	Are you aware of precautions to be taken while taking soil sample?	146	60.8	94	39.2
40	Are you aware of method of taking soil sample?	154	64.2	86	35.8

It is observable from the table 4.17(a) that, majority (97.50%) of farmers were aware about the statement “S.H.C is worth for balance use of chemical fertilizer” which ranked first among the 40 statements followed by Are you aware of deficiencies of nutrients in your soil as per soil health card?, The international year of soils is 2015, S.H.C is useful scheme to understand fertility status of the soil, Are you aware of recommended dosages of fertilizers for paddy crop as per soil health card?, It is important to read instructions present on Soil health card, SHC provides guidelines for integrated nutrient management, The physical parameters which are being

reported in SHC are colour, Ph, EC.OC, SHC scheme was first started in Rajasthan state, Soil samples from irrigated areas for testing are drawn in a grid of 2.5hac. The statements which ranked least in terms of awareness were "Are you aware of precautions to be taken while taking soil sample? (60.80%) followed by Are you aware of method of taking soil sample?, Soil health card provides the farmers a well-monitored report of the soil which is chosen for cultivation of crops, Soil samples will be collected by staff of state department of agriculture, SHC provides online delivery of SHC to the farmers using soil health card portal and SHC provides recommendations for reclamation of acidic and alkaline soils.

The plausible reason may be that, now a day's farmers are moving towards the sustainable agriculture where there exists optimum utilization of the available resources which helps in reduction of the wastage of inputs and ultimately increase the income level of the farmers. Hence majority of the farmers were of medium level of education which made little bit difficult for the access to online services regarding the soil health card. Majority of farmers felt soil health card helps in balanced use of fertilizers which minimizes the wastage of fertilizers and increase production and in parallel increase in income of the farmers.

4.3 PERCEPTION OF FARMERS TOWARDS SOIL HEALTH CARD SCHEME

The perception regarding SHC scheme was the main aspect in the present investigation. Different statements with respect to perception regarding SHC scheme were placed in front of the farmers and the response against each statement were elicited in form of agreement or disagreement. Appropriate scoring techniques were used to calculate overall perception of every farmer towards SHC scheme. The responses of the respondents were classified into three levels viz., i) Poor level of perception ii) Moderate level

of perception and iii) Good level of perception by using mean and standard deviation.

Table 4.18 Distribution of farmers according to their level of perception towards SHC scheme

(n=240)

S.No	Level of perception	Frequency	Percentage
1	Poor perception	20.00	08.33
2	Moderate perception	191.00	79.58
3	Good perception	29.00	12.09
	Total	**240**	**100.00**
		Mean = 74.53	**SD= 12.24**

It was perceivable from the table 4.18 and figure 4.18 that majority (79.58%) of SHC scheme farmers had possessed moderate level of perception about SHC scheme followed by 12.09 and 8.33 per cent had good and poor level of perception about SHC scheme respectively. The likely reason for this result could be the fact that farmer had education above secondary level of education, medium level of mass media exposure and medium scientific orientation. So the level of perception of SHC scheme farmers was medium.

The above result is in accordance with results of Charel *et. al*. (2018).

Table 4.18 (a) Item wise perception of farmers towards SHC Scheme.

(n=240)

S.No	STATEMENTS	A(3)		UD(2)		DA(1)	
		f	%	f	%	f	%
1	Soil health card can be obtained after the soil testing	224	93.30	16	6.70	0	0.00
2	Soil health can be maintained by fulfilling the nutrient deficiency in soil as given in soil health card.	121	50.40	116	48.30	3	1.30
3	Soil fertility and productivity can be maintained with the help of soil health card.	139	57.90	90	37.50	11	4.60
4	Systematic crop planning can be	115	47.90	113	47.10	12	5.00

	done by using soil health card information.						
5	Economic achievement can be obtained by using soil health card information.	145	60.40	76	31.70	19	7.90
6	Fallow land can be converted into cultivable land by using soil health card information.	114	47.50	102	42.50	24	10.00
7	Farming can be done in scientific way by using SHC information.	145	60.40	75	31.30	20	8.30
8	Soil health card may help to establish coordination among farmers, extension workers and experts.	133	55.40	83	34.60	24	10.00
9	The quantity of available nutrients in soil can be known with help of soil health card.	132	55.00	84	35.00	24	10.00
10	Deficient soils can be reclaimed by using suitable reclamation activities.	116	48.30	99	41.30	25	10.40
11	Soil health card gives information about amount of fertilizers to be applied.	131	54.60	83	34.60	26	10.80
12	Crop planning can be done according to type of land.	119	49.60	93	38.80	28	11.70
13	Unnecessary expenditure can be reduced by using information given in soil health card.	151	62.90	64	26.70	25	10.40
14	Soil degradation can be reduced.	99	41.30	105	43.80	36	15.00
15	Acidity, alkalinity of the soils can be known with help of soil health card information.	99	41.30	79	32.90	62	25.80
16	We can know the quantity of available organic elements in the soil by information given in soil health card.	169	70.40	51	21.30	20	8.30
17	We can apply the necessary quantity of organic matter in the soil with help of information given in soil health card.	116	48.30	103	42.90	21	8.80
18	We can know the quantity of available nitrogen in the soil by information given in soil health card.	112	46.70	95	39.60	33	13.80

19	We can apply the necessary quantity of nitrogen into the soil with the help of information given in soil health card.	110	45.80	97	40.40	33	13.80
20	We can know the quantity of available phosphorous in the soil by information given in soil health card.	118	49.20	84	35.00	38	15.80
21	We can apply the necessary quantity of phosphorous into the soil with the help of information given in soil health card.	133	55.40	79	32.90	28	11.70
22	We can know the quantity of available potassium in the soil by information given in soil health card.	139	57.90	78	32.50	23	9.60
23	We can apply the necessary quantity of potassium into the soil with the help of information given in soil health card.	114	47.50	90	37.50	36	15.00
24	We can apply necessary biofertilizers with the information in Soil health card	97	40.40	111	46.30	32	13.30
25	The quantity of biofertilizers to be applied in soil can be known with the help of information given in soil health card.	125	52.10	83	34.60	32	13.30
26	The quantity of combined fertilizers to be applied in soil can be known with the help of information given in soil health card.	122	50.80	89	37.10	29	12.10
27	The quantity of fertilizers to be applied for different crops can be known with the help of information given in soil health card.	123	51.30	84	35.00	33	13.80
28	We can apply the necessary quantity of sulphur into the soil with the help of information given in soil health card.	130	54.20	87	36.30	23	9.60
29	We can apply the necessary quantity of zinc into the soil with the help of information given in soil health card.	116	48.30	99	41.30	25	10.40
30	We can apply the necessary	109	45.40	96	40.00	35	14.60

	quantity of iron into the soil with the help of information given in soil health card.						
31	We can apply the necessary quantity of magnesium into the soil with the help of information given in soil health card.	111	46.30	91	37.90	38	15.80
32	We can apply the necessary quantity of Manganese into the soil with the help of information given in soil health card.	101	42.10	87	36.30	52	21.70

Table 4.18(a) revealed that, majority (93.30%) of farmers perceived “agree” towards the statement “Soil health card can be obtained after the soil testing”. Among undecided category of perception statement “Soil health can be maintained by fulfilling the nutrient deficiency in soil as given in soil health card” was perceived undecided by 48.3per cent of farmers. Among disagree category of perception statement “Acidity, alkalinity of the soils can be known with help of soil health card information” was perceived disagree by 25.8 per cent of farmers.

The plausible reason for the above trend of perception may be generally soil health cards can be issued only after testing the soil sample and farmers are well perceived about brief information about the soil health cards. Acidity and alkalinity which are the cause for problematic soils require reclamation measures which show the result in long run only without any immediate effect. This long run action of the reclamation measures which is invisible in short run made farmers to disagree with the statement regarding alkalinity and salinity. Though soil health card helps to increase soil fertility and take corrective measures against problematic soils the results are invisible in short run hence the measures which require long run for visibility are perceived as disagree by the farmers.

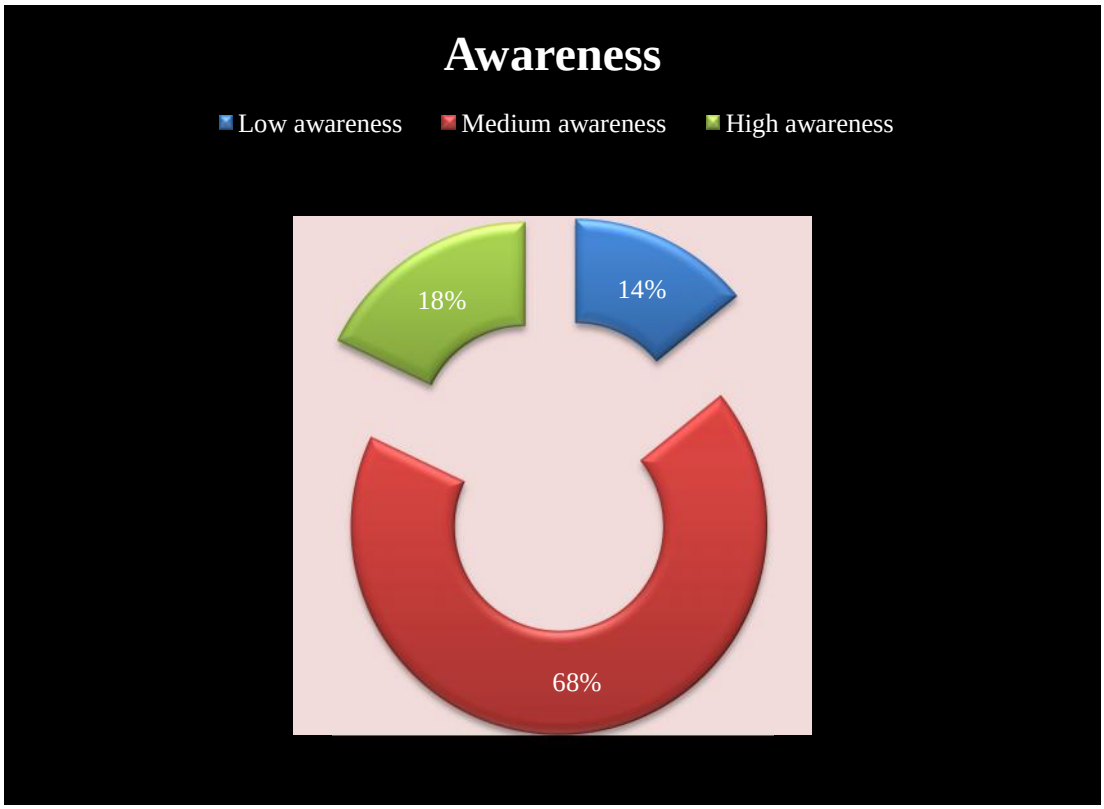

Figure 4.17 Distribution of farmers according to their awareness about soil health card scheme

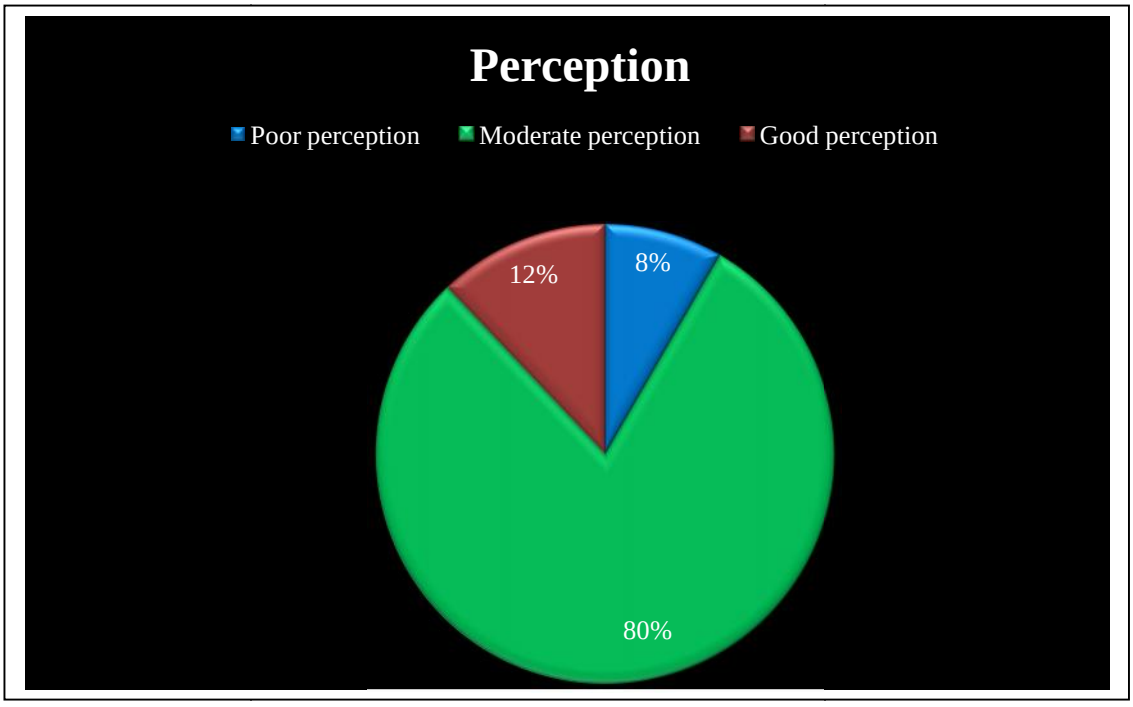

Figure 4.18 Distribution of farmers according to their perception towards soil health card scheme.

4.4 RELATIONSHIP BETWEEN PROFILE CHARACTERISTICS WITH AWARENESS AND PERCEPTION OF FARMERS

In order to explore the effect of profile characteristics of SHC scheme farmers with their level of awareness and perception towards SHC scheme, correlation coefficients (r) were figured out and the values were conferred in Tables 4.19 & 4.20.

Null hypothesis (H_0)

There doesn't exist any association between the profile characteristics of SHC scheme farmers with their awareness and perception towards SHC scheme.

Empirical hypothesis (H_e)

There exist a significant association between the profile characteristics of SHC scheme farmers with their awareness and perception towards SHC scheme.

If the calculated co-efficient of correlation value (r) between profile characteristics and awareness and perception was more than the table value of 'r' at 0.01 or 0.05 level of significance, then the null hypothesis (H_0) was rejected and empirical hypothesis (H_e) was accepted.

Table 4.19 Relationship between the selected profile characteristics of farmers with awareness about SHC scheme

(n=240)

S.No	Independent variables	Correlation coefficient ('r')
1	Age	0.013^{NS}
2	Education	0.305^{**}
3	Family type	-0.034^{NS}
4	Farming experience	-0.019^{NS}
5	Land holding	0.232^{**}

6	Annual income	0.042^{NS}
7	Cropping intensity	0.127^{*}
8	Mass media exposure	0.209^{**}
9	Social participation	0.303^{**}
10	Extension contact	0.281^{**}
11	Scientific orientation	0.206^{*}
12	Economic motivation	0.277^{**}
13	Innovativeness	0.153^{*}
14	Risk orientation	0.254^{**}
15	Management orientation	0.173^{*}
16	Achievement motivation	0.364^{**}

*: Significant at 0.05 level of probability
**: Significant at 0.01 level of probability
NS: Non Significant

4.4.1 Relationship between the selected profile characteristics of farmers with awareness about SHC scheme.

4.4.1.1 Age and Awareness

The data manifested in table 4.19 and figure 4.19 gives an idea that the obtained value of correlation coefficient (0.013) was less than the table value of 'r'. Hence the null hypothesis (H_0) was accepted. It implies that there doesn't exist any significant association between age and level of awareness about SHC scheme.

Hence, it can be concluded that the age of SHC scheme farmers doesn't exert any significant influence on awareness level of the respondents. The plausible reason might be that the respondents had good education level and awareness is generally influenced by need factor. If farmers feel the need of any novel technology simultaneously their interest to gain knowledge over novel technology automatically increases devoid of age. In the present investigation if farmers are interested to follow the recommended dose of

fertilizers simultaneously their interest over SHC scheme increases eventually awareness over SHC scheme increases devoid of age. Thus age doesn't exert any influence over awareness level of farmers.

The above result is in accordance with results of Ankit (2018), Minz (2018), Santhi and Sangeetha (2018).

4.4.1.2 Education and Awareness

The results illustrated in table 4.19 and figure 4.19 gives us an idea that the obtained value of correlation coefficient (0.305) was greater than the table value of 'r'. It connoted that education level of SHC scheme farmers had positive and significant association with level of awareness about SHC scheme. Hence, null hypothesis (H_0) was rejected and empirical hypothesis ($H_{e)}$ was accepted.

The feasible reason for the above association might be that most of the SHC scheme farmers possessed middle level to high level of education. Generally education enhances the understanding ability of any subject. Similarly in the present investigation SHC scheme farmers possessed middle level of education which enhances the perceptive ability ultimately leading to increase in awareness level. In other words we can also quote that educated farmers have ability to easily understand the scientific facts which finally increase their level of awareness.

The above result is in line with results of Bunkar (2018), Minz (2018) and Parmar (2018).

4.4.1.3 Family type and Awareness

Table 4.19 and figure 4.19 showed that the obtained value of correlation coefficient (-0.034) was less than the table value of 'r'. Hence, null hypothesis (H_0) was accepted. It implies that family type had non significant association with level of awareness about SHC scheme. The above finding is in agreement with findings of Chandranna *et. al.* (2009).

4.4.1.4 Farming experience and Awareness

From the table 4.19 and figure 4.19 it‘s clear that, the obtained value of correlation coefficient (-0.019) was found non significant. It revealed that farming experience doesn’t exert any association with level of awareness about SHC scheme. Hence, null hypothesis (H_0) was accepted.

The above result is in agreement with results of Ranjan (2013).

4.4.1.5 Land holding and Awareness

An analytical look at table 4.19 and figure 4.19 revealed that, the obtained value of correlation coefficient (0.232) was positive and significant. It connoted that land holding of SHC scheme farmers had positive and significant association with level of awareness about SHC scheme. Therefore, null hypothesis (H_0) was rejected.

The apparent reason for the above association was that farmers with large land holding feel to reduce the expenditure on fertilizers by decreasing the imbalanced use of fertilizers and wastage of fertilizers by utilizing soil test based recommended dose of fertilizers. Hence farmers with large land holding showed keenness towards soil testing and followed recommendations given in soil health card which makes the relationship positive and significant.

The above result is in consonance with results of Bunkar (2018) and Parmar (2018).

4.4.1.6 Annual income and Awareness

A cursory look at table 4.19 and figure 4.19 clearly depicted that, the obtained value of correlation coefficient (0.042) was less than the table value of ‘r’. Hence, null hypothesis (H_0) was accepted. It implies that annual income had non significant association with level of awareness about SHC scheme. The plausible reason for the obtained association might be that

government was testing the soils of farmer's fields for free of cost without considering annual income of the farmers. If farmers are willing to test their soils they will approach the government departments without considering their level of income. Hence the association between level of annual income and awareness exhibited positive and non significant.

The above result is in accordance with results of Ankit (2018) and Minz (2018).

4.4.1.7 Cropping intensity and Awareness

It could be seen from the table 4.19 and figure 4.19 that, the obtained value of correlation coefficient (0.127) was more than the table value of 'r'. Hence, null hypothesis (H_0) was rejected. It implies that cropping intensity had positive and significant association with level of awareness about SHC scheme.

The plausible reason might be that farmers with more cropping intensity i.e. cultivating crops all the three seasons, express interest in testing their soils to follow soil test based recommendations of fertilizers simultaneously to reduce the expenditure on inputs. Hence farmers gain more awareness about soil testing, Thus making the association positive and significant.

The above result is in line with results of Prakashrao (2016).

4.4.1.8 Mass media exposure and Awareness

It could be perceived from the table 4.19 and figure 4.19 that, the obtained value of correlation coefficient (0.209) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was rejected. It implies that mass media exposure had positive and significant association with level of awareness about SHC scheme.

The above result reiterates the general view that high mass media exposure of farmers enhances the awareness of the farmers on several aspects of farm technology. In modern era there exist diversified accelerators for disseminating agricultural innovations include newspapers, farm publications, television, radio, mobile technologies and other mass media channels. Farmers who have exposure to mass media are likely to have better awareness on the current advances in agriculture. Hence, the above association was observed.

The above result is in conformity with results of Sundhesha *et. al.* (2018).

4.4.1.9 Social participation and Awareness

It can be concluded from the table 4.19 and figure 4.19 that, the obtained value of correlation coefficient (0.303) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was rejected. It connotes that social participation had positive and significant association with level of awareness about SHC scheme.

The plausible reason for the above association could be that, the people who have more social participation ensures contact with various types of people, exchange one's opinions and experiences, find solutions for their problems and thereby gain more and more awareness. Social participation also create platform for contrived experiences, which essentially act as a strong motivational factor for attaining awareness. Similar was the case of SHC scheme farmers. Thus making the association positive and significant.

The above result is in consonance with results of Babu *et. al.* (2018) and Bunkar (2018).

4.4.1.10 Extension contact and Awareness

A bird's eye view at table 4.19 and figure 4.19 indicated that, the obtained value of correlation coefficient (0.281) was greater than the table

value ‘r’. Hence, null hypothesis (H_0) was rejected. It connotes that extension contact had positive and significant association with level of awareness about SHC scheme.

The tenable reason behind the above association was that farmers who frequently contact extension agencies and functionaries will become more aware about the new advancements in agriculture. Hence farmers with more extension contact gain more awareness. Similar was the case of SHC scheme farmers. Thus, making the association positive and significant.

The above result is in conformity with results of Younus (2013), Bunkar (2018) and Parmar (2018).

4.4.1.11 Scientific orientation and Awareness

From table 4.19 and figure 4.19 it is apparent that, the obtained value of correlation coefficient (0.206) was greater than table value of ‘r’. Hence, null hypothesis (H_0) was rejected. It connotes that scientific orientation had positive and significant association with level of awareness about SHC scheme.

Generally scientific orientation motivates the farmers towards application of scientific methods of farming. Farmers who have high scientific orientation and belief in science will always plan the farming activities as per the recommendations specified by the scientists and extension personnel. On the other hand farmers who possess more scientific orientation will always look for novel and superior technologies to keep away from the negative effects and have intense observation power to uncover the cause and effect relationship in any circumstances. Hence, farmers with more scientific orientation will always be ready to take on the newest technologies and are keen to congregate the information pertained to them. Similar was the case of SHC scheme farmers. Thus, making the association positive and significant.

The above result was in conformity with results of and Raghuvansi *et. al*. (2017) and Babu *et. al*. (2018).

4.4.1.12. Economic motivation and Awareness

From the table 4.19 and figure 4.19 it is clear that, the obtained value of correlation coefficient (0.277) was greater than table value of 'r'. Hence, null hypothesis (H_0) was discarded. It denotes that economic motivation exerted positive and significant association with level of awareness about SHC scheme.

The credible reason might be that, in general view economic motivation always drives the farmers in taking up activities which enhance their economical background. In the present investigation farmers with more economic motivation will always try to increase their economical background through increasing their yields by adopting the modern technologies and will be trying to gain better knowledge, than others do by constantly learning the new practices. Greater the economic motivation greater will be the contact with information sources generating pathway to acquirement of new knowledge ultimately leading to high awareness. Hence SHC scheme farmers with high economic motivation in turn will always have high level of awareness towards SHC scheme. Thus, making the association positive and significant.

The above results are similar to results of Dohare (2014) and Babu *et. al*. (2018).

4.4.1.13 Innovativeness and Awareness

It is evident from the table 4.19 and figure 4.19 that, the obtained value of correlation coefficient (0.153) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was rejected. It revealed that innovativeness had positive and significant association with level of awareness about SHC scheme.

The plausible reason for the above said relationship might be that, innovative farmers are always ready to adopt new technologies before others in the social system. They will strive to acquire more knowledge of those new technologies to decide the pros and cons of them prior to implementation. Hence SHC scheme farmers with more innovativeness obviously have high awareness towards SHC scheme, thus making the association positive and significant.

The above result was in conformity with results of Babu *et. al*. (2018) and Minz (2018).

4.4.1.14 Risk orientation and Awareness

It is clear from the table 4.19 and figure 4.19 that, the obtained value of correlation coefficient (0.254) was greater than the table value of 'r'. It connotes that scientific orientation had positive and significant association with level of awareness about SHC scheme. Hence, null hypothesis (H_0) was rejected.

The risk taking ability of a person in one of the important factors which motivates oneself to acquire knowledge about new ideas and try them. Soil health card scheme farmers with high risk orientation are aware about the SHC scheme making the relation positive and significant.

The above result was in accordance with results of and Raghuvansi *et. al*. (2017) and Babu *et. al*. (2018).

4.4.1.15 Management orientation and Awareness

It is apparent from the table 4.19 and figure 4.19 that, the obtained value of correlation coefficient (0.173) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was rejected. It denotes that management orientation had positive and significant association with level of awareness about SHC scheme.

Management orientation consists of three components viz., planning orientation, production orientation and marketing orientation. Farmers with high management orientation will always be good at planning aspect, production aspect and marketing aspect of the produce. Hence they always seek suggestions from extension functionaries and try the new technology in their local system and increasing their awareness level towards the technology. Soil health card scheme farmers with high management orientation are always careful at planning, production & marketing and have willingness to adopt the recommendations given in the soil health card, thus making the association positive and significant.

The above result is in accordance with findings of Ranjan (2013) and Raghuvansi *et al*. (2017).

4.4.1.16 Achievement motivation and Awareness

Table 4.19 and figure 4.19 clearly depicts that, the calculated value of correlation coefficient (0.364) was greater than table value of 'r'. Hence, null hypothesis (H_0) was rejected. It reveals that achievement motivation had positive and highly significant association with level of awareness about SHC scheme.

Farmers with more achievement motivation had a strong desire to have higher yields and better living conditions. So, they have urge to know about innovations and new technologies. Hence by adopting the SHC based recommendation of fertilizers they are able to reduce the input cost and reduce the wastage of fertilizers thereby making the soil fertile with balanced application of nutrients. Thus SHC scheme farmers with high achievement motivation were more aware about the SHC scheme, making the association positive and highly significant.

The above result was conforming to results of Chaudhary (2013) and Ranjan (2013).

DEPENDENT VARIABLE

Y_1: Awareness

INDEPENDENT VARIABLES

X_1: Age

X_2: Education

X_3: Family type

X_4: Farming experience

X_5: Land holding

X_6: Annual income

X_7: Cropping intensity

X_8: Mass media exposure

X_9: Social participation

X_{10}: Extension contact

X_{11}: Scientific orientation

X_{12}: Economic motivation

X_{13}: Innovativeness

X_{14}: Risk orientation

X_{15}: Management orientation

X_{16}: Achievement motivation

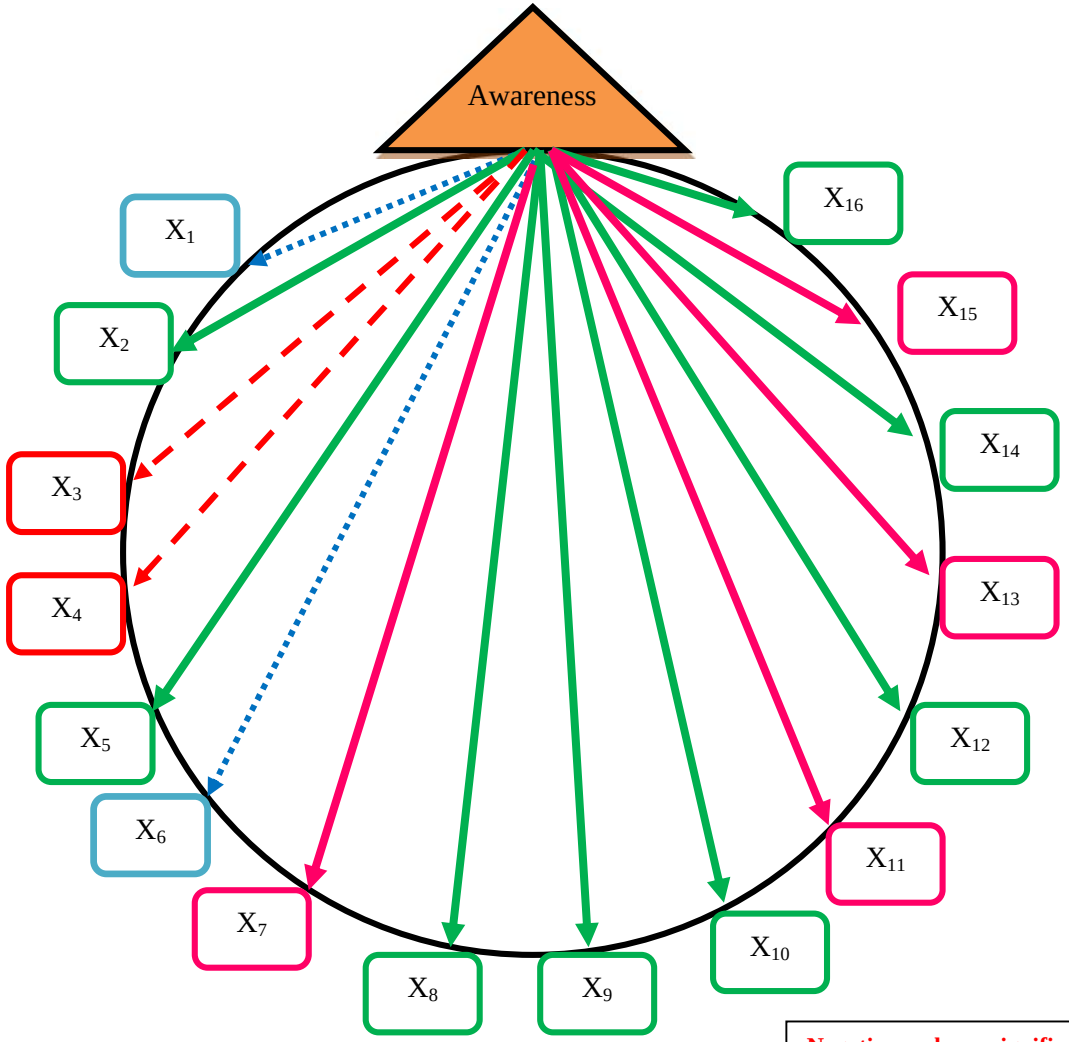

Fig. 4.19 Relationship between selected independent variables and Awareness

Negative and non significant (------)
Positive and non significant (……..)
Significant at 5%significance
Significant at 1% significance

4.20 Relationship between the selected profile characteristics of farmers with perception towards SHC scheme.

(n=240)

S.No	Independent variables	Correlation coefficients ('r' values)
1	Age	0.005^{NS}
2	Education	0.190^{**}
3	Family type	-0.049^{NS}
4	Farming experience	-0.070^{NS}
5	Land holding	0.234^{**}
6	Annual income	0.013^{NS}
7	Cropping intensity	0.197^{**}
8	Mass media exposure	0.224^{**}
9	Social participation	0.306^{**}
10	Extension contact	0.266^{**}
11	Scientific orientation	0.265^{**}
12	Economic motivation	0.291^{**}
13	Innovativeness	0.221^{**}
14	Risk orientation	0.271^{**}
15	Management orientation	0.189^{**}
16	Achievement motivation	0.351^{**}

*: Significant at 0.05 level of probability
**: Significant at 0.01 level of probability
NS: Non Significant

4.4.2.1 Age and perception

It could be seen from the table 4.20 and figure 4.20 that, the obtained value of correlation coefficient (0.005) less than the table value of 'r'. Hence null hypothesis (H_0) was accepted. It denotes that there was no significant association between age and level of perception about SHC scheme.

The probable reason might be the good education level of SHC scheme farmers which made them perceive the information given in the SHC without taking into consideration age. Thus, making the association non significant.

The above result is in accordance with results of Mukati *et. al.* (2018).

4.4.2.2 Education and Perception

A cursory look at table 4.20 and figure 4.20 indicated that, the obtained value of correlation coefficient (0.190) was greater than the table value of ‘r’. Hence, null hypothesis (H_0) was rejected. It connotes that education had positive and significant association with level of perception about SHC scheme.

The plausible reason for the above association might be that, most of the SHC scheme farmers were with good education level. In fact education can increase the perceptive ability of a farmer. Hence, educated farmers can easily perceive the scientific facts present in soil health card leading to increased level of perception.

The above result is in accordance with results of Dhakad (2018), Mukati *et. al.* (2018) and Parmar (2018)

4.4.2.3 Family type and Perception

It was evident from table 4.20 and figure 4.20 that, the obtained value of correlation coefficient (-0.049) was less than the table value of ‘r’. Hence, null hypothesis (H_0) was accepted. It connotes that family type had negative and non significant association with level of perception towards SHC scheme.

The possible rationale behind the above association might be that, majority of SHC scheme farmers possessed education upto higher secondary level. Perception is generally the ability to understand the things with the help of their past experiences irrespective of their family type. Hence farmers who possessed good education ultimately perceive the things well. Similar was the

case of SHC scheme farmers. Hence family type had non significant association with the perception levels towards SHC scheme.

The above result is confirming to results of Laxman (2016).

4.4.2.4 Farming experience and Perception

Table 4.20 and figure 4.20 depicted that, the obtained value of correlation coefficient (-0.070) was less than the table value of 'r'. Hence, null hypothesis (H_0) was accepted. It denotes that farming experience doesn't exert significant association with level of perception towards SHC scheme.

The plausible reason for the above association might be due to that, preponderance of the SHC scheme farmers had perceived that following of the recommendations as presented in soil health card is very easy which doesn't require high experience in farming.

The above discovery is in consonance with discoveries of Mukati *et. al. (*2018) and Shinde (2018).

4.4.2.5 Land holding and Perception

An analytical look at the table 4.20 and figure 4.20 disclosed that, the obtained value of correlation coefficient (0.234) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was discarded. It connotes that, land holding had positive and significant association with the level of perception about SHC scheme.

The plausible reason for the above result might be that, majority of SHC scheme farmers had medium to semi medium land holding and they always look way ahead to reduce the expenditure on fertilizers which share major proportion in overall input costs. Hence, farmers with large land holdings show eagerness in utilizing the SHC scheme. So the perception of large farmers towards SHC scheme obviously was at high level.

The above result is in line with findings of Parmar (2018)

4.4.2.6 Annual income and Perception

It was clearly visible from the table 4.20 and figure 4.20 that, the obtained value of correlation coefficient (0.013) was less than the table value of 'r'. Hence, null hypothesis (H_0) was discarded. It conveyed that, annual income had no significant association with level of perception about SHC scheme.

The tenable reason for the above finding might be that, soil testing is being done by government without considering the status of annual income. Hence farmers who do not have any income are also able to get their soil health data from government agencies. On the other hand perception is related to education levels irrespective of the annual income. Hence, the association between annual income and perception of farmers towards SHC scheme was non significant.

The above result is as similar as results reported by Kumari (2016).

4.4.2.7. Cropping intensity and Perception

It was clear from the table 4.20 and figure 4.20 that, the obtained value of correlation coefficient (0.197) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was discarded. It intimates that cropping intensity had positive and significant association with level of perception towards SHC scheme.

The plausible reason behind the above association is that, generally as the number of crops cultivated per annum increases planning of farmers for crop production also increases. Hence, farmer always strive to gain more profits with less expenditure on inputs. One major pathway to reduce expenditure on inputs is to minimize expenditure on fertilizers which is possible only by following recommendations as prescribed in soil health card. Hence, farmers show keen interest towards soil testing which ultimately increases the perception level towards SHC scheme.

The above discovery is in accordance with discovery of Saiva (2012).

4.4.2.8. Mass media exposure and Perception

It was obvious from the table 4.20 and figure 4.20 that, the obtained value of correlation coefficient (0.224) was greater than the table value of ‘r’. Hence, null hypothesis (H_0) was rejected. It indicates that mass media exposure had positive and significant association with level of perception towards SHC scheme.

In the present day agriculture for any developmental programme to be successful mass media plays major role. Through mass media farm information can be effectively disseminated to farmers there by, farmers are able to perceive easily the latest technical know-how and apply them in their own conditions. Hence farmers who are exposed to mass media for longer time will obviously have good perception levels of latest advances in agriculture. Similar was the case of SHC scheme farmers in the present study.

The above result is in conformity with findings of Parmar (2018), Prasad and Chandrashekar (2018).

4.4.2.9 Social participation and Perception

It was evident from table 4.20 and figure 4.20 that the obtained value of correlation coefficient (0.306) was greater than the table value of ‘r’. Hence, null hypothesis (H_0) was rejected. It connotes that social participation had positive and significant association with level of perception about SHC scheme.

Farmers with greater social participation will always possess good knowledge about the current advances in agriculture. This is possible because farmers who participate in different social organizations as member or office bearer come across various types of people and exchange their views, ideas and opinions there by finding appropriate solution to their problems. Hence the perception levels of farmers on novel technologies ultimately increases.

Similarly, SHC scheme farmers who participate in different social organizations had good perception levels towards SHC scheme making the association positive and significant.

The above result is in agreement with results of Dilipsinha (2015) and Kumari (2016).

4.4.2.10 Extension contact and Perception

It could be seen from the table 4.20 and figure 4.20 that the calculated value of correlation coefficient (0.266) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was discarded. It connotes that extension contact had positive and significant interaction with level of perception towards SHC scheme.

Famers in general contact extension functionaries to get appropriate solutions to their problems. Further extension functionaries they provide sufficient knowledge with regard to modern innovations and technologies prevailing in agriculture. Indeed, the effectiveness of the extension agent can often determine the success or failure of an extension programme or scheme. Hence farmers who frequently contact extension functionaries get appropriate solutions to the problems; on the other hand they gain knowledge regarding advancements, programmes/schemes, modern innovations and technologies thereby increasing the perception levels towards modern technologies. Similarly, SHC scheme farmers with good extension contact had good perception levels about SHC scheme making the interaction positive and significant.

The above finding is in accordance with findings of Parmar (2018), Prasad and Chandrashekar (2018).

4.4.2.11 Scientific orientation and Perception

A cursory look at table 4.20 and figure 4.20 clearly depicted that, the obtained value of correlation coefficient (0.265) was greater than the table

value of ‘r’. Hence, null hypothesis (H_0) was discarded. It indicates that scientific orientation had positive and significant interaction with level of perception towards SHC scheme.

The plausible reason behind the above interaction might be that, farmers who possess high scientific orientation always think about the available scientific recommendations to implement them in their own prevailing conditions. Hence, farmers in view of reducing the expenditure on fertilizers they think for following the recommendations as prescribed in SHC. Thereby, they increase the perception levels towards SHC scheme by gathering the pertinent information related to soil health card scheme. On the other hand SHC scheme farmers possessed good education levels which made them, to understand the scientific information given in the SHC and thereby increase their level of perception towards SHC scheme.

The above finding is in accordance with the findings of Mukati *et. al*. (2016) and Rathor (2018).

4.4.2.12. Economic motivation and Perception

It is clear from the table 4.20 and figure 4.20 that, the obtained value of correlation coefficient (0.291) was greater than the table value of ‘r’. Hence, null hypothesis (H_0) was rejected. It reveals that economic motivation had positive and significant interaction with level of perception towards SHC scheme.

The plausible reason might be that, farmers who are economically motivated set high goals and strive to reach the set goals to become economically sound and stable. Hence, they are always eager to use modern technologies and reduce the input costs. Similarly, SHC scheme farmers with high risk bearing capacity, high educational qualification, extension participation and more profit seeking behavior always gain pertinent knowledge and ultimately possess higher perception regarding SHC scheme, thus making the association positive and significant.

The above finding is in consonance with findings of Maravi (2017) and Dhakad (2018).

4.4.2.13 Innovativeness and Perception

The data shown in table 4.20 and figure 4.20 disclosed that, the calculated value of correlation coefficient (0.221) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was rejected. It reveals that there was significant interaction between innovativeness and level of perception towards SHC scheme.

In any social system innovators are the people who are the first to adopt any new innovation or technology. Innovativeness is the degree at which the individual is earlier in usage of new practices than other members of the social system. Farmers with high degree of innovativeness will always experiment with the new ideas and practices. In any problematic situations farmers with high levels of innovativeness will try out the new ways of doing things to alter the existing situation. Generally farmers with more innovativeness would be looking for new ideas and gain more knowledge pertaining to those new ideas and increase the level of perception towards those ideas. Similarly SHC scheme farmers with innovativeness had perceived the usefulness of information given in soil health card for better soil health. Thus, making the relation positive and significant.

The above result is in accordance with results of Mukati *et. al.* (2018).

4.4.2.14 Risk orientation and Perception

A perusal of the data presented in table 4.20 and figure 4.20 revealed that, the obtained value of correlation coefficient (0.271) was greater than the table value of 'r'. Hence, null hypothesis (H_0) was discarded. It connotes that there was positive and significant interaction between risk orientation and level of perception towards SHC scheme.

Risk indicates the degree of uncertainties faced by a farmer to attain greater success than others. Risk taking ability of farmers is influenced by viz., socio economic factor, psychological factors and societal factors. Among several factors motivational factor plays key role in making the farmers to take risk. In the present study majority of SHC scheme farmers had good achievement motivation and they are well motivated in trying out new ideas. In order to take risk they always try to obtain as much information as possible and increase their perception levels. Majority of SHC scheme farmers perceived the usefulness of SHC which does not involve any risk or adverse effect in adoption of the prescribed recommendations given in SHC.Thus making the relationship positive and significant.

The above result is in line with results of Maravi (2017) and Kurmi (2018).

4.4.2.15 Management orientation and Perception

It was perceivable from the table 4.20 and figure 4.20 that, the obtained value of correlation coefficient (0.189) was greater than the table value of ‘r’. Hence, null hypothesis (H_0) was rejected. It reveals that management orientation had positive and significant interaction with level of perception towards SHC scheme.

The plausible reason behind the above interaction might be that, farmers who had contact with extension functionaries and more number of discussions with the field extension personnel obviously possesses high knowledge about the changes undergoing in current agriculture and thereby increased levels of perception about the changes. On other hand the above mentioned contacts might have encouraged the farmers to reorient their traditional management practices to cope up with current management practices. Farmers in general attend to different professional situations like extension meetings, exhibitions, field days, krishi melas etc., in order to gain knowledge on current advancements and this exposure ultimately increase the

perception ability of farmers. Similarly SHC scheme farmers who try to reorient management practices perceived the usefulness of information given in soil health card, thus making the relation positive and significant.

The above discovery is in consonance with discovery of Parmar (2018).

4.4.2.16 Achievement motivation and Perception

It was apparent from the table 4.20 and figure 4.20 that, the obtained value of correlation coefficient (0.351) was less than the table value of ‘r’. Hence, null hypothesis (H_0) was casted off. It connotes that achievement motivation had positive and significant interaction with level of perception towards SHC scheme.

Achievement motivation always drives the person in achieving things. Farmers with high achievement motivation would be determined to reach their destination. Hence, they perceived the importance of scientific recommendations in view of reaching the destination and they acquire pertinent knowledge to reach their destiny. On other hand, education, annual income and economic motivation might have encouraged them to set the higher goal ultimately leading to higher achievement motivation. In present study good levels of achievement motivation among SHC scheme farmers made them to acquire pertinent knowledge and perceive the usefulness of soil health card. Thus, making the interaction positive and significant.

The above results are in conformity with the findings of Mukati *et. al*. (2018).

DEPENDENT VARIABLE

Y_1: **Perception**

INDEPENDENT VARIABLES

X_1: Age

X_2: Education

X_3: Family type

X_4: Farming experience

X_5: Land holding

X_6: Annual income

X_7: Cropping intensity

X_8: Mass media exposure

X_9: Social participation

X_{10}: Extension contact

X_{11}: Scientific orientation

X_{12}: Economic motivation

X_{13}: Innovativeness

X_{14}: Risk orientation

X_{15}: Management orientation

X_{16}: Achievement motivation

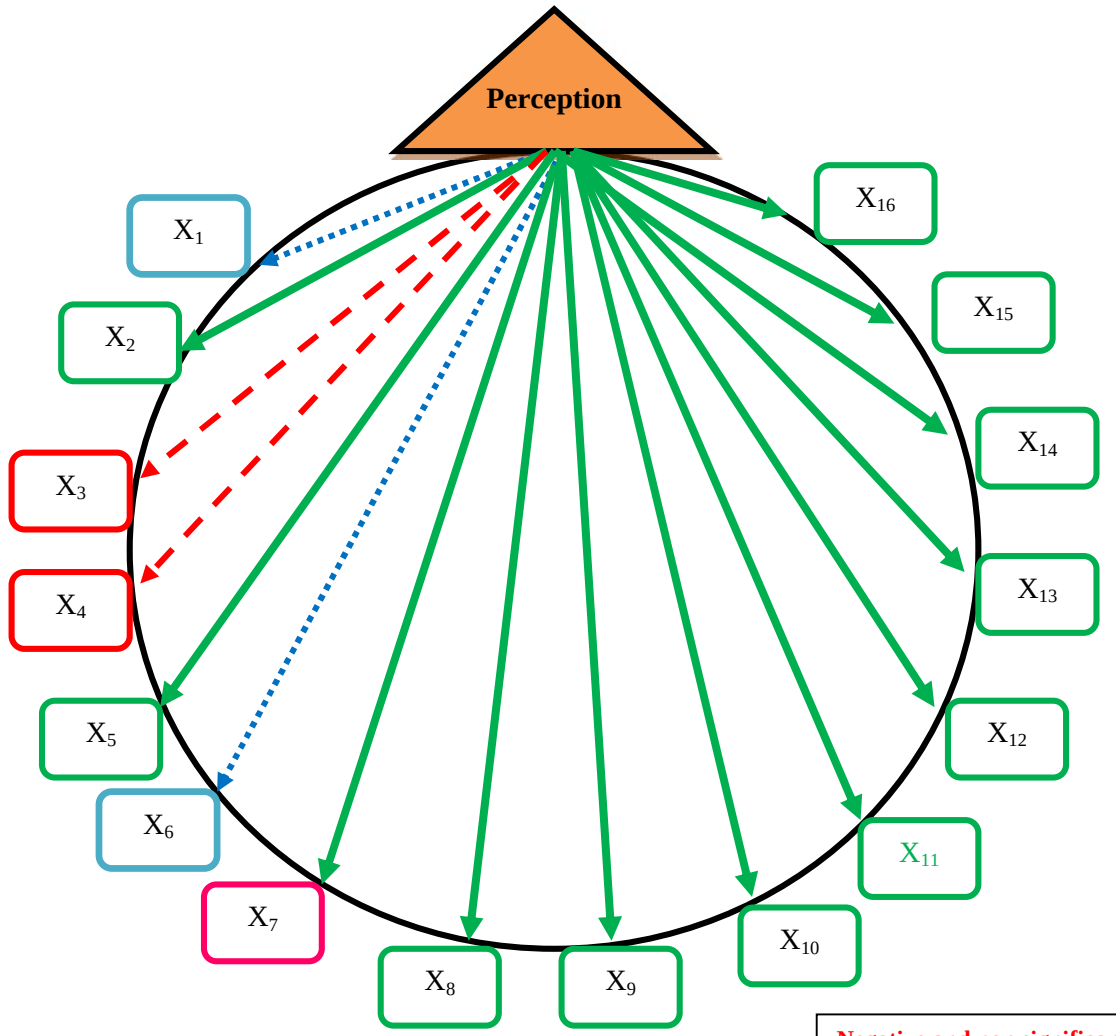

Fig. 4.20 Relationship between selected independent variables and Perception

Negative and non significant (-------)
Positive and non significant (……)
Significant at 5%significance
Significant at 1% significance

4.4.3 Influence of independent variables on Awareness about soil health card scheme

Table 4.21 Step wise regression analysis of the selected independent variables with Awareness about SHC scheme

. (n=240)

S.No.	Variable Number	Independent variables	b	Beta coefficient	Computed 't' values
1	X_1	Age	0.045	0.075	0.877
2	X_2	Education	1.218	0.311	5.269**
3	X_3	Family type	-0.715	-0.053	-0.940
4	X_4	Farming experience	0.007	0.008	0.099
5	X_5	Land holding	0.482	0.168	2.811*
6	X_6	Annual income	-0.047	-0.097	-1.574
7	X_7	Cropping intensity	-0.004	-0.028	-0.481
8	X_8	Mass media exposure	0.146	0.064	1.033
9	X_9	Social participation	0.161	0.170	2.856*
10	X_{10}	Extension contact	0.182	0.094	1.487
11	X_{11}	Scientific orientation	-0.043	-0.025	-0.346
12	X_{12}	Economic motivation	0.192	0.109	1.486
13	X_{13}	Innovativeness	0.169	.084	1.377
14	X_{14}	Risk orientation	0.121	0.061	0.821
15	X_{15}	Management orientation	-0.049	-0.048	-0.696
16	X_{16}	Achievement motivation	0.442	0.195	3.164*

Intercept=3.312; $R^2 = 0.542$

*: Significant at 0.05 level of probability

**: Significant at 0.01 level of probability

To determine the combined effect of all the selected profile characteristics of SHC scheme farmers in explaining awareness of farmers

about SHC scheme Multiple Linear Regression (MLR) was carried out. Regression was run on SPSS 20.0. The model given below was arrived with the step wise regression equation as follows.

$$Y = 3.312 + 0.045X_1 + 1.218\ X_2 - 0.715^{**}\ X_3 + 0.007\ X_4 + 0.482\ X_5 - 0.097^{*}\ X_6 + 0.004X_7 + 0.146\ X_8 + 0.161^{*}\ X_9 + 0.182\ X_{10} - 0.043\ X_{11} + 0.192\ X_{12} + 0.169\ X_{13} + 0.121\ X_{14} - 0.049\ X_{15} + 0.0442^{*}\ X_{16}$$

The 'R^2' value of 0.542 depicted that all the selected profile characteristics of SHC scheme farmers collectively explained about (54.20%) variation in awareness about SHC scheme. From table 4.21 it can be revealed that, profile characteristics viz., education, land holding, social participation and achievement motivation alone were the important variables in influencing the awareness of farmers about SHC scheme.

The table 4.21 in addition indicated that per unit increase in education, land holding, social participation and achievement motivation would increase the awareness about SHC scheme by 0.311, 0.168, 0.170 and 0.195 units respectively keeping other variables constant.

Since soil health card scheme is related to soil health and more the land holding more will be the interest to learn about technologies pertaining to maintenance of soil health, ultimately leading to more awareness. Farmers with more education levels, social participation and achievement motivation always try new technologies, have good contact with extension agencies to acquire latest technologies which increase production and productivity. SHC scheme is also one among them which enhances the production and productivity by delivering recommendations for application of fertilizers. Hence there exists more awareness regarding SHC scheme.

4.4.4 Influence of selected profile characteristics of soil health card scheme farmers on perception towards soil health card scheme.

To determine the combined effect of all the selected profile characteristics of soil health card scheme farmers in explaining perception of

farmers towards soil health card scheme Multiple Linear Regression (MLR) was carried out. Regression was run on SPSS 20.0. The model given below was arrived with the step wise regression equation as follows.

$Y = 33.207 + 0.086X_1 + 0.833^{**} X_2 - 0.270 X_3 - 0.099 X_4 + 0.752^{*} X_5 - 0.018 X_6 + 0.006X_7 + 0.212 X_8 + 0.148^{*} X_9 + 0.357X_{10} + 0.012 X_{11} + 0.377^{*} X_{12} + 0.158 X_{13} + 0.403 X_{14} - 0.062 X_{15} + 0.0465^{*} X_{16}$

Table 4.22 Step wise regression analysis of the selected independent variables with Perception about SHC scheme.

(n=240)

S.No.	Variable Number	Independent variables	(b)	Beta coefficient	Computed 't' values
1	X_1	Age	0.086	0.111	1.312
2	X_2	Education	0.833	0.161	2.775**
3	X_3	Family type	-0.270	-0.015	-.274
4	X_4	Farming experience	-0.099	-0.089	-1.066
5	X_5	Land holding	0.752	0.198	3.383*
6	X_6	Annual income	-0.018	-0.028	-.457
7	X_7	Cropping intensity	0.006	0.036	.641
8	X_8	Mass media exposure	0.212	0.070	1.158
9	X_9	Social participation	0.148	0.118	2.017*
10	X_{10}	Extension contact	0.357	0.140	2.248
11	X_{11}	Scientific orientation	0.012	0.005	.071
12	X_{12}	Economic motivation	0.377	0.162	2.248*
13	X_{13}	Innovativeness	0.158	0.060	.991
14	X_{14}	Risk orientation	0.403	0.154	2.114
15	X_{15}	Management orientation	-0.062	-0.046	-.672
16	X_{16}	Achievement motivation	0.465	0.155	2.565*

Intercept=33.207; $R^2 = 0.627$

*: Significant at 0.05 level of probability

**: Significant at 0.01 level of probability

The 'R^2' value of 0.627 depicted that all the selected sixteen profile characteristics collectively explained about (62.70%) variation in perception of farmers towards SHC scheme. From table 4.22 it can be revealed that, variables namely education, land holding, social participation, economic motivation and achievement motivation alone were the important variables in influencing the perception of farmers towards SHC scheme.

Table 4.22 further indicated that one unit increase in education, land holding, social participation, economic motivation and achievement motivation would increase the perception towards SHC scheme by 0.161, 0.198, 0.118, 0.162 and 0.155 units respectively keeping other variables constant.

Farmers with good education level will always perceive the information prescribed in soil health card easily. Larger the land holding more is the interest in technologies which reduces the input cost. Hence farmers with larger land holding are very keen in testing their soils prior to application of fertilizers and follow the recommendations prescribed in soil health card. Higher the social participation, achievement motivation and economic motivation higher the interest in utilizing the modern scientific technologies to become sustained with regards to production, productivity and income obtained from farming activities.

4.5 BENEFITS DERIVED FROM THE SOIL HEALTH CARD SCHEME (SHC) BY THE FARMERS

Benefits derived from SHC scheme were gathered by probing open ended questions through interview schedule. The benefits elicited by famers were noted down in the respective space provided in the interview schedule. The frequency and percentage was worked out and ranks were assigned. The data pertaining to benefits derived from soil health card scheme was presented in table 4.23 and figure 4.21.

Table 4.23 Distribution of the farmers according to benefits derived through soil health card scheme

(n=240)

S.No	Benefits	Frequency	Percentage	Rank
1	The farmer can decide well which crops they should cultivate and which ones they should skip	225	93.75	I
2	SHC helps farmers to improve soil health and ultimately increase productivity	211	87.92	II
3	The farmer will always have updated data about their soil	200	83.34	III
4	The SHC will help the farmers to get an idea on the crop-wise recommendations of nutrients and fertilizers required in each type of soil	195	81.25	IV
5	Reduces the over utilization of major nutrients (N,P,K)	172	71.66	V
6	The government will also employ experts to help farmers in carrying out the corrective measures	163	68.33	VI
7	Balanced application of fertilizers has increased	159	66.25	VII
8	Soil health card portal enables respondents to get immediate data relating to their soil	120	50.00	VIII
9	The farmers are also given advice by the experts to improve the productivity of the crops and the necessary methods that have to be practiced in order to implement the changes	116	48.33	IX
10	Reduces the loss of fertilizers and soil pollution	89	37.08	X

A bird's eye view at the table 4.23 and figure 4.21 depicts that, majority of farmers elicited that through soil health card scheme the farmer can decide well which crops they should cultivate and which ones they should skip (93.75%) and was ranked first followed by SHC helps farmers to improve soil health and ultimately increase productivity (87.92%) second, the farmer will always have updated data about their soil (83.34%) third, the soil health card will help the farmers to get an idea on the crop-wise recommendations of nutrients and fertilizers required in each type of soil (81.25%) fourth, soil health card helps in reducing the over utilization of major nutrients (N,P,K) (71.66%) fifth , the government will also employ experts to help farmers in carrying out the corrective measures (68.33%) sixth, balanced application of fertilizers has increased (66.25%) seventh, soil health card portal enables respondents to get immediate data relating to their soil (50.00%) eighth, the farmers are also given advice by the experts to improve the productivity of the crops and the necessary methods that have to be practiced in order to implement the changes(48.33%) ninth and reduces the loss of fertilizers and soil pollution((37.08%) was ranked tenth respectively.

Figure 4.21 Distribution of the farmers according to benefits derived through Soil health card scheme

4.6 PROBLEMS PERCEIVED BY FARMERS REGARDING SOIL HEALTH CARD SCHEME AND SUGGESTIONS TO OVERCOME THEM

4.6.1 Problems as perceived by the farmers regarding soil health card scheme

The desired data pertaining to issues experienced by farmers with respect to soil health card scheme were composed by probing open ended questions through interview schedule. The problems elicited by farmers regarding soil health card scheme were noted down in respective space provided in the interview schedule. For each problem elicited by farmers frequency and percentage was worked out and ranks were assigned.

Table 4.24 and figure.4 22 clearly depicted that, majority of farmers elicited difficulty in calculating fertilizer dosage as per available nutrient status of soil (85.84%)as major problem and was ranked first followed by soil health cards were delivered after completion of crop harvest (82.51%) second, time period between extraction of soil samples and issuing cards is very high (79.17%) third, soil sample extraction was done in absence of farmers (72.92%) fourth, lack of technical advice on method and time of fertilizer application (69.59%) fifth, recommended fertilizers not available in adequate quantity in local market (63.34%) sixth, soil testing labs are located far away (54.59%) seventh, high price of fertilizers (52.92%) eighth, doubt on the quality and reliability of the information provided in the SHC (46.67%) ninth, lack of training (37.50%) tenth, lack of proficiency in using internet (access to SHC portal) (34.59%) eleventh, irregularity of extension services (30.84%) twelfth respectively.

Thus, it can be concluded that major problems perceived by the farmers about SHC scheme were difficulty in calculating fertilizer dosage as per available nutrient status of soil and soil health cards were delivered after completion of crop harvest.

Table 4.24 Distribution of the farmers according to the problems regarding SHC scheme

(n=240)

S.No	Problems	Frequency	Percentage	Rank
1	Difficult to calculate dosage of fertilizers on the basis of nutrient status of soil|(complex fertilizers)	206	85.84	I
2	Soil health cards were issued after crop harvest.	198	82.51	II
3	Time interval between extraction of soil samples and issue of cards is very high	190	79.17	III
4	Soil sample was collected in absence of farmers	175	72.92	IV
5	Lack of technical advice on method and time of fertilizer application	167	69.59	V
6	Recommended fertilizers not available in adequate quantity in local market	152	63.34	VI
7	Soil testing labs are located far away	131	54.59	VII
8	High price of fertilizers	127	52.92	VIII
9	Doubt on the quality and reliability of the information provided in the SHC	112	46.67	IX
10	Lack of training	90	37.50	X
11	Lack of proficiency in using internet (access to SHC portal)	83	34.59	XI
12	Irregularity of extension services	74	30.84	XII

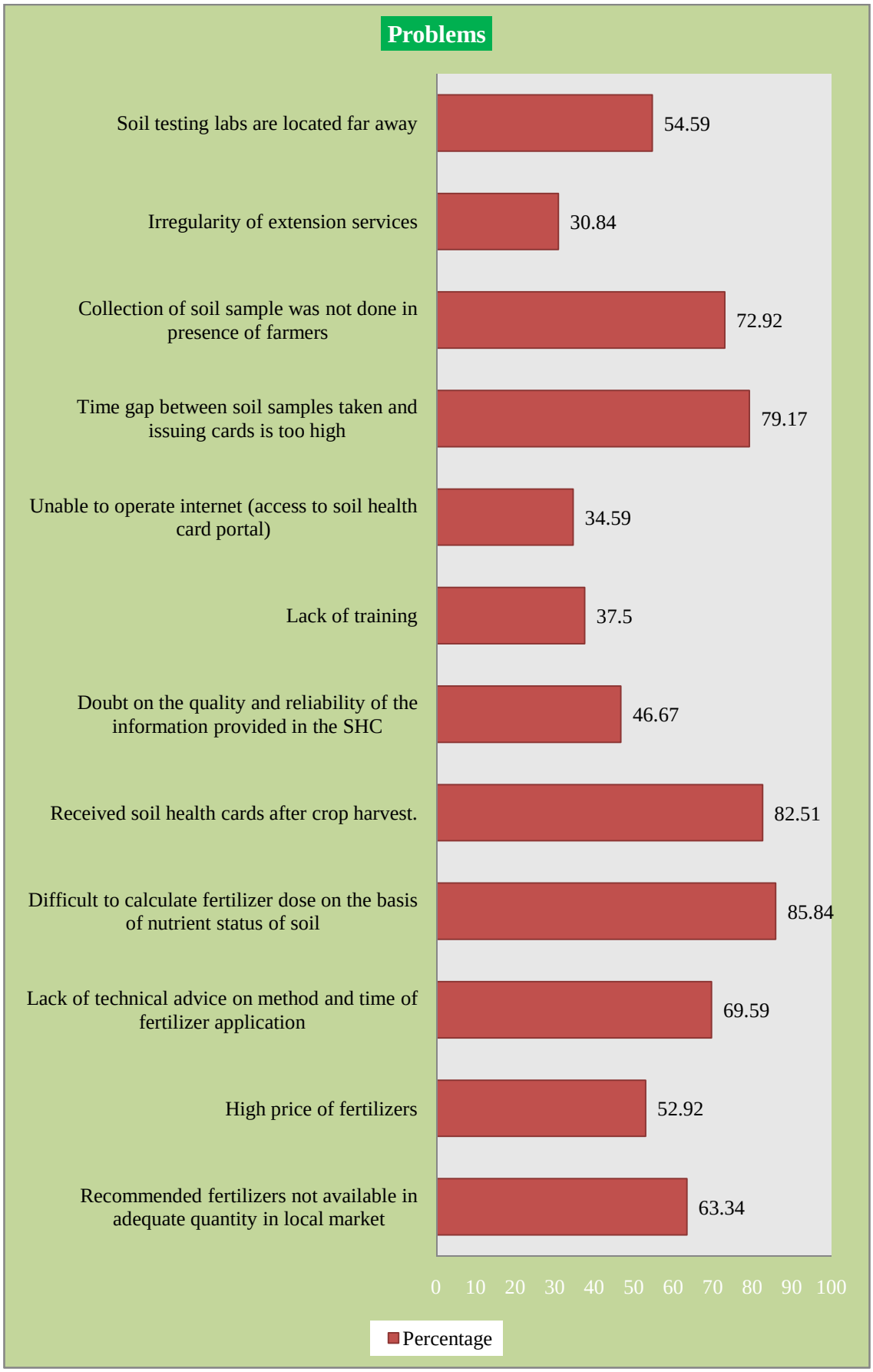

Figure 4.22 Distribution of the farmers according to problems in SHC scheme

4.6.2 Suggestions elicited by farmers to surmount the problems regarding SHC scheme

The farmers were requested to offer their valuable suggestions to overcome problems faced by them regarding SHC scheme. Frequency and percentage for each suggestion was calculated and ranks were assigned. The data with regards to suggestions were articulated in table 4.25 and figure 4.23.

It was noticeable from the table 4.25 and figure 4.25 that, majority of farmers suggested crop wise recommended dosage of fertilizers ought to be specified in the soil health card (91.67%) and was ranked first followed by, soil sample collection ought to be done in presence of farmer (85.42%) second, SHC should be disseminated prior to cropping season (83.34%) third, government should provide SHC every year to each farmer (80.42%) fourth, provide training for better understanding about information given in soil health cards (70.83%) fifth, training should be given to farmers to take soil sample of his own independent of others (67.08%) sixth, STL's should be entrenched at taluka level with profoundly qualified staff (62.50%) seventh, government should provide subsidy on inputs used by farmers (60.42%) eighth, ensure availability of recommended fertilizers in the market (54.17%) ninth and proper and timely agricultural extension services to be delivered (33.33%) ranked tenth respectively.

It can be terminated that major suggestions elicited by farmers to surmount problems regarding soil health card scheme were crop wise recommended dosage of fertilizer are supposed to be given in the soil health card, collection of samples of soil supposed to be done in presence of farmer, SHC's should be disseminated prior to crop season, government should provide SHC every year to each farmer, and provide training for better understanding about content of SHC's.

Table 4.25 Distribution of the farmers according to the suggestions offered by them in using SHC scheme

(n=240)

S.No	Suggestions	Frequency	Percentage	Rank
1	Crop wise recommended dosage of fertilizers ought to be specified in the soil health card(complex fertilizers)	220	91.67	I
2	Soil sample collection ought to be done in presence of farmer	205	85.42	II
3	SHC should be disseminated prior to cropping season	200	83.34	III
4	Government should provide SHC every year to each farmer.	193	80.42	IV
5	Provide training for better understanding about content of Soil Health Cards	170	70.83	V
6	Training should be given to farmers to take soil sample of his own independent of others	161	67.08	VI
7	Soil testing laboratory should be established at taluka level with highly qualified staff	150	62.50	VII
8	Government should provide subsidy on inputs used by farmers	145	60.42	VIII
9	Ensure availability of recommended fertilizers in the market	130	54.17	IX
10	Proper and timely agriculture extension services	80	33.33	X

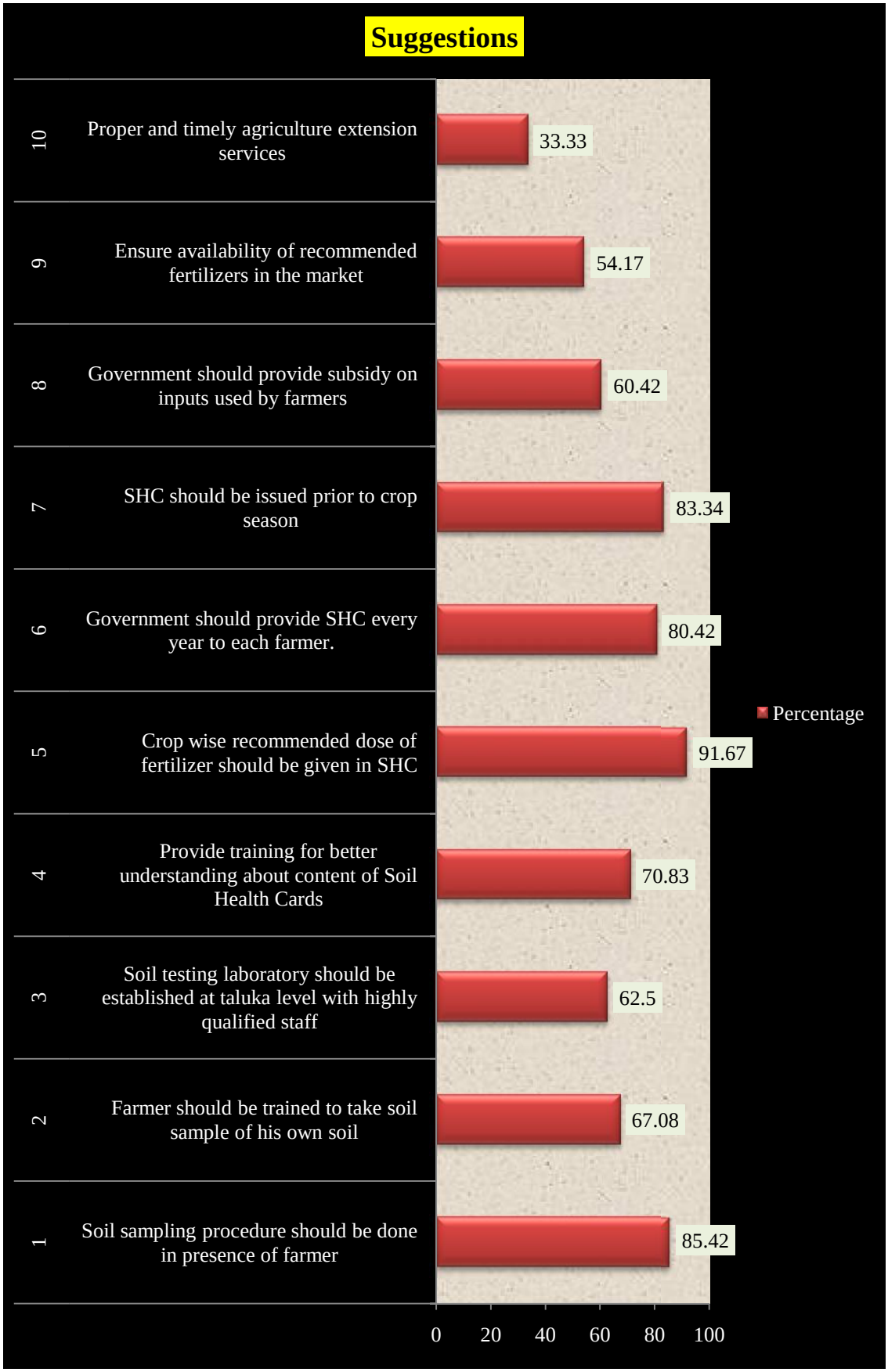

Figure 4.23 **Distribution of the farmers according to suggestions to overcome problems in SHC scheme**

Chapter –V

SUMMARY AND CONCLUSIONS

India is principally an agricultural country but still Indian farmers continue to be the poorest in the world. India has disparate climatic conditions, diversified soils which are rich in fertility and has immense potential to produce discrete agricultural products and become one among the top leading producer countries in agriculture. Though India has abundant natural resources as raw materials, India lags far behind in ensuring food security for its own citizens. This situation is a combined repercussion of various factors, such as lack in use of advanced scientific methods in agriculture, dearth of modern machinery to the farmers, lack of electricity in villages, lack of consciousness among farming community and lack of proper financial support. Tonnes of food grains are being wasted as spoilage in the godowns due to inefficiency in storage and maintenance. Farmers across the country depend more on the practices learnt by their ancestors and take various decisions based on illusion. Majority of farmers are uneducated and they believed that anything for improving soil fertility must have a direct response and the more they add it, the better things should become. So same notion they followed when it comes to the concept of fertilizer utilization. Indeed presently farmers are unaware of overuse of fertilizer and they keep on adding fertilizers in a view to get good production, but heating and complexation end up burning the roots.

Coming to the aspect of global fertilizer consumption, the consumption of the three main fertilizer nutrients viz., nitrogen, phosphorus and potassium is estimated to reach 199 million tonnes by 2022 which is greater by 1.8 per cent over 2015 consumption levels. Consistent with past trends, global demand is forecast to grow quicker for potassium (1.8% per annum) than for phosphorus (1.4% per annum) and nitrogen (1.0% per annum) as a consequence of steady improvements in nitrogen management practices and a

lot of balanced fertilization in some regions. Over subsequent five years, the global capacity of the fertilizers production, intermediates and raw materials assembling is additionally expected to extend (*World fertilizer trends and outlook to 2022*). In India the annual consumption of fertilizers, in nutrient terms (N, P and K), has increased from 0.07 MT in 1951 - 52 to more than 25.95 MT in 2016 -17 and per hectare consumption has increased from less than 1 Kg in 1951 - 52 to the level of 130.8 Kg now (*www.indiastat.com*). India is the leading consumer of fertilizers in the world subsequent to China, consuming about 259.49 lakh tonnes of fertilizers (*Agriculture statistics at a glance 2017*). It accounted for 15.3 per cent of the world's Nitrogen (N) consumption, 19 per cent of Phosphatic (P) and 14.4 per cent of Potassic (K) nutrients in 2017. The use of fertilizers is affected by a number of factors like irrigation, high yielding variety seeds, size of the farm and credit obtained. Increased area under high yielding varieties led to increased food grain production. The high yielding varieties respond well to the use of chemical fertilizers. The major nutrients which ought to be added to the soil in the form of fertilizers are Nitrogen, Phosphorus and Potassium. Micro nutrients such as calcium, magnesium, manganese and boron would even be required in few cases. The current level of nitrogen, potassium and phosphorus seems to be not fully balanced.

In India, in general, fertilizer recommendations are followed for N, P and K which rarely match soil fertility need and often ignoring secondary and micro nutrients, in various cropping systems followed by small and marginal farmers. In the view of the above facts, Indian government is taking specific measures to promote Integrated Nutrient Management (INM), alongside with bio-fertilizers and locally available organic manures based on soil testing to maintain soil health and crop productivity. In such scenario it becomes imperative to have report on soil testing to increase fertilizer use efficiency or use appropriate fertilizers for specific to soils and crops. Results in soil testing report can throw light on the health of soils and can build a way to

recommend dose of fertilizers required to their soils. In view of the critical role played by soil testing in ensuring balanced and efficient use of fertilizers the incumbent NDA regime has laid emphasis on the soil health card scheme**.** Soil health card scheme was launched for the first time in uniform manner by central government on February 2015 to provide soil health card to each and every farmer across the country.

A soil health card is a printed card that contains information on status of soil health indicators like plant nutrients available in farmer's field and provides recommendation on the dosage of different fertilizers for the major crops grown in farmers fields based on the soil test results. The soil health card presently portray the status of 12 essential parameters viz., available nitrogen, phosphorus and potassium (macro nutrients), available sulphur(secondary nutrient), available zinc, iron, copper, manganese and boron (micronutrients) and physical parameters like pH , EC, and organic carbon. Acharya and Srivastava (2017) stated the benefit of soil health card scheme as the adoption of soil health card based fertilizer recommendation is anticipated to cut back fertilizer use within the country by reducing the fertilizer consumption within the areas where soil fertility is build up and increasing its use within the areas wherever it is needed. This would guarantee an increased productivity on sustainable basis and also trim down the financial burden on government towards import of fertilizers and fertilizer raw material. They also disclosed about the possible obstacles before the scheme as to provide soil health cards to the farmers of India at an interval of three years about 4.67 crore soil samples need to be analyzed each year (assuming that one representative soil sample is collected from each of the 14 crore farmer's holding over a period of three years) which will be a devastating task with the available infrastructure of soil testing laboratories in the country. However, to accomplish the dream, government, private functionaries, private stakeholders in agriculture and students are working dynamically in mission

mode for soil sample collection and analysis in order to achieve this national goal.

The soil health card helps in studying and reviewing the health of soil or to a certain extent we can say a complete evaluation of the quality of soil right from its functional characteristics to water and nutrients content and other biological properties. These soil health cards are useful to farmers as they provide a well monitored report of their soil health. Monitoring of farm fields by experts regularly helps farmers to cultivate crops and use fertilizers in coherence with concept of sustainability and profitability. Regular monitoring of farm fields will help the farmers to get a long-term soil health record and accordingly can study and evaluate the results of different soil management practices. The soil health card helps the farmers to get an idea on the crop-wise recommendations of nutrients and fertilizers required in each type of soil. This can help in enhancing the crop yield. The card shall also be accompanied by advisory on curative measures a farmer should take for enhancing soil health and better yield. The advantage of the soil health card is that it would provide an appraisal about use of major fertilizers and making him aware of the missing nutrients and those which could be added for a balanced soil.

There is no doubt that soil health card scheme would provoke farmers about the scientific usage of fertilizers but the diffusion of the technology into farming community makes the difference. However, the diffusion process of any technology used to face a lot of hurdles before it reaches adoption phase from the awareness phase for greater part of the besieged beneficiaries. To surmount over diminishing output which is due to decrease in soil fertility, farmers should improve their production techniques by following scientific recommendations in farming. The decision to apply new agricultural technologies relies on farmer’s perception which is a key determinant in influencing adoption (Adesina and Baiduforson, 1995; Negatu and Parikh, 1999). Technology adoption is also influenced by perceived

profitability, costs of the technology and eloquence at which the new knowledge and information is communicated in a recipient population (Boahene *et. al.* 1999). Farmer's perception's regarding compatibility of sustainable practices with their farming systems have emerged as the best predictor of adoption of such practices (Alonge and Martin, 1995). Since perception refers to an individual's current appraisal of an object or program, assessing farmer's perception is an important means to evaluate their knowledge level on a particular issue (Hikson and Keith, 2000). People base their perception on precedent experience and knowledge thus if a person has limited knowledge and experience then he is incapable to perceive it in accurate manner. Many efforts were put forth by the central and state government to evaluate the soil health status of farmer's fields by introducing soil health card scheme (SHC), but how far farmers are aware, how farmers perceive about the soil health card and how efficiently they use the information given in the soil health card makes the difference.

Keeping the above quoted points in mind the present study entitled Awareness and Perception of farmers towards Soil health card scheme in Rayalaseema region of Andhra Pradesh was conducted with the following specific objectives.

5.1 Objectives of the Study

1. To study profile characteristics of Soil health card scheme farmers.
2. To measure the awareness of farmers about Soil health card scheme
3. To assess the perception of farmers towards Soil health card scheme.
4. To find out the relationship between profile characteristics with awareness and perception of farmers.
5. To document the benefits derived from the Soil health card scheme by the farmers.

6. To elicit the problems as perceived by the farmers regarding Soil health card scheme and suggestions to overcome them.

5.2 Review of Literature

Keeping in view of the above objectives, the relevant literature on various aspects was reviewed and strategy for the study was evolved.

5.3 Research Design

Ex post facto research design was used for conducting the study.

5.4 Sampling Procedure

Rayalaseema region of Andhra Pradesh state was selected purposively for the study as the researcher hails from the same area and was familiar with local language and culture. Anantapuramu district of Rayalaseema region was selected purposively based on the per cent of achievement in distribution of soil health cards. Six mandals from Anantapuramu district were selected randomly by following lottery method of simple random sampling. Six mandals from Ananthapuramu district were selected randomly for the study namely Raptadu, Kanekal, Tadipatri, Gudibanda, Dharmavaram and Gorantla. Two villages from each selected mandal were selected by following simple random sampling, thus making a total of 12 villages. From each village, 20 farmers were selected by following simple random sampling procedure, thus making a total of 240 respondents.

5.5 Variables Selected for the Study

5.5.1 Dependent Variables

Awareness and perception of respondents about SHC scheme were selected as the dependent variables for the study.

5.5.2 Independent variables

The independent variables selected for the study were age, education, family type, farming experience, land holding, annual income, cropping intensity, mass media exposure, social participation, extension contact,

scientific orientation, economic motivation,innovativeness,risk orientation, management orientation and achievement motivation. The same were measured with appropriate scales and schedules for the study.

5.6 Collection of data

5.6.1 Sources of data collection

5.6.1.1 Primary data

Data was collected from the selected respondents by using interview schedule developed for the study during the months of October 2018 to December 2018 in Anantapuramu district. The interview schedule was developed in consultation with the advisory committee, experts in the field of agricultural extension, Department of Agronomy and Department of Statistics and Computer Applications of S.V. Agricultural College, Tirupathi and scientists of Regional Agricultural Research Station (RARS), Tirupathi. The interview schedule was pre-tested with 40 respondents outside the study area, where similar conditions prevailed. Based on the experience gained in the village, the interview schedule was suitably modified wherever necessary. The finalized interview schedule used for the study was appended in Appendix A. Interview schedule consisted of three parts. The first part consisted of primary information of the respondent i.e., respondent number, name, village and mandal. The second part consisted of profile characteristics of the respondent and third part consisted of the dependent variable i.e., awareness and perception towards SHC. Farmers were also asked to elicit the benefits; problems they faced in utilizing the SHC and were asked to give their suggestions which they think will improve the situations. The data were collected and recorded in free and frank atmosphere where the interviewer and interviewee had a good rapport.

5.6.1.2 Secondary data

The needed secondary data were collected from the various Government offices like Department of Farmer Welfare and Agriculture Development, Tehsil office, mandal office and publications.

5.6.1.3 Interview schedule

In order to study perception of farmers towards soil health card scheme, list of 40 items related to soil health card scheme were developed after consulting various scientists ,experts in disciplines of soil science and agronomy and by referring different literature, books and journals. After a preliminary selection and editing of items, the items were subjected to judgment by 20 scientists (experts in agronomy and soil science) from RARS (Regional Agricultural Research Station), Tirupati, S.V. Agricultural College, Tirupati and DAATTC and KVK Kalikiri. The scientists were requested to go through the items and indicate their significance on a three point continuum as 'Highly relevant', 'Relevant' and 'Least relevant' with corresponding scores of 3, 2 and 1, respectively. After tabulating the responses of all the 20 scientists, weighted mean for all the items put together was calculated along with the means of each item to arrive at final relevant score of the each individual item. The individual item mean is compared with weighted mean. The item whose mean is more than 2 was considered as relevant and less than 2 was considered as irrelevant. Finally 32 statements were chosen to measure perception of farmers towards soil health card scheme .The items were subjected to check the validity and reliability also.

The interview schedule was designed for collecting the relevant information of selected variable .Schedule prepared consists of different types of questions related to the study. The questions in interview schedule framed were simple, clear and directly related to the purpose of the study and were arranged in logical sequence. Data collection was done with the help of pre-tested interview schedule from October 2018 to December 2018. All the respondents were personally interviewed by the researcher in the study area. The respondents were assured that the information given by them would be kept confidential and it would only be used for the academic purpose.

5.7 Major Findings of the Study

5.7.1 Profile Characteristics of SHC scheme farmers

The findings with regard to the selected profile characteristics of the SHC scheme farmers indicated that majority of the respondents belonged to middle age (71.25%) ,middle school education (28.34%), nuclear family (81.25%),medium farming experience(75.00%), semi medium land holding (57.08%), medium annual income (82.08%), medium cropping intensity (68.75%), medium mass media exposure (72.91%), medium social participation (66.68%), medium extension contact (72.91%),medium scientific orientation (82.50%), medium economic motivation(74.59%), medium innovativeness (68.34%), medium risk orientation(67.50%), medium management orientation (75.00%) and medium achievement motivation (70.00%).

5.7.2 Awareness of farmers about Soil health card scheme.

Majority (67.91%) of the farmers had possessed medium level of awareness about SHC scheme.

5.7.3 Perception of farmers towards Soil health card scheme.

Majority (79.58%) of the farmers had possessed medium level of perception about SHC scheme.

5.7.4. Relationship between profile characteristics with awareness of farmers about SHC scheme

In case of relationship between independent variables and awareness of farmers about SHC scheme there was a positive and significant relationship of awareness about SHC scheme with education, land holding, mass media exposure, social participation, extension contact, economic motivation, risk orientation and achievement motivation at 0.01 level of significance where as cropping intensity, scientific orientation, innovativeness and management orientation at 0.05 level of significance. Age and annual income exhibited positive and non-significant relationship with awareness about SHC scheme

where as farming experience and family type exhibited negative and non-significant relationship with awareness about SHC scheme.

5.7.5 Relationship between profile characteristics with perception of farmers towards SHC scheme

In case of relationship between independent variables and perception of farmers towards SHC scheme there was a positive and significant relationship of perception towards SHC scheme with education, land holding, mass media exposure, social participation, extension contact, scientific orientation, economic motivation, risk orientation, innovativeness, management orientation and achievement motivation at 0.01 per cent level of significance where as cropping intensity at 0.05 per cent level of significance. Age and annual income exhibited positive and non-significant relationship with perception of farmers towards SHC scheme where as farming experience and family type exhibited negative and non-significant relationship with perception of farmers towards SHC scheme.

5.7.6 Benefits derived from the SHC scheme

The data related to benefits derived by utilizing SHC by the respondents are as follows ,the farmer can decide well which crops they should cultivate and which ones they should skip (93.75%), SHC helps farmers to improve soil health and ultimately increase productivity (87.92%), the farmer will always have updated data about their soil (83.34%), the soil health card will help the farmers to get an idea on the crop-wise recommendations of nutrients and fertilizers required in each type of soil (81.25%), reduces the over utilization of major nutrients (N,P,K) (71.66%), the government will also employ experts to help farmers in carrying out the corrective measures (68.33%), balanced application of fertilizers has increased (66.25%), SHC portal enables respondents to get immediate data relating to their soil (50.00%), the farmers are also given advice by the experts to improve the productivity of the crops and the necessary methods

that have to be practiced in order to implement the changes(48.33%) and reduces the loss of fertilizers and soil pollution (37.08%).

5.7.7 Problems and suggestions as perceived by farmers regarding soil health card scheme

5.7.7.1 Problems

Majority of Soil health card scheme farmers reported that difficult to calculate fertilizer dose on the basis of nutrient status of soil (85.84%) was the major problem in utilizing SHC scheme, received SHC's after crop harvest (82.51%),time gap between soil samples taken and issuing cards is too high (79.17%), collection of soil sample was not done in presence of farmers (72.92%) , lack of technical advice on method and time of fertilizer application (69.59%), recommended fertilizers not available in adequate quantity in local market (63.34%) ,soil testing labs are located far away (54.59%) , high price of fertilizers (52.92%) ,doubt on the quality and reliability of the information provided in the SHC (46.67%) ,lack of training (37.50%) ,unable to operate internet (access to SHC portal) (34.59%) and irregularity of extension services (30.84%).

5.7.7.2 Suggestions

Majority of the farmers suggested and crop wise recommended dose of fertilizer should be given in the SHC (91.67%) ranked as first, soil sampling procedure should be done in presence of farmer (85.42%), SHC should be issued prior to crop season (83.34%), SHC should be issued prior to crop season (80.42%), provide training for better understanding about content of SHC (70.83%), farmer should be trained to take soil sample of his own soil (67.08%), soil testing laboratory should be established at taluka level with highly qualified staff (62.50%), government should provide subsidy on inputs used by farmers (60.42%), ensure availability of recommended fertilizers in the market (54.17%), proper and timely agriculture extension services (33.33%).

5.8 Implications of the study

The results of this study will facilitate in knowing the characteristics of the SHC holders which would serve as a guideline for the planners, policy maker and implementing agencies engaged to promote SHC scheme. Hence, an attempt has been made to document the implications of the present study.

1. The present study facilitated in assessing the characteristics of the farmers who possessed SHC which would serve as a guideline for the planners and development agencies in planning and implementing programmes associated to soil health card.

2. The findings of this study revealed that majority of the SHC holders were of middle age and had moderate education level, who play imperative role in crop production technology based on application of soil health card and hence, such type of farmers should be approached for training and shaping the favourable perception towards soil health card scheme.

3. The findings of this study would facilitate in knowing the existing level of awareness and perception towards soil health card scheme which will serve as a guideline to planners and extension agencies to comprehend whether soil health card scheme is beneficial or not. It will help them in planning and implementing strategies to develop favourable opinion towards soil health card scheme.

4. The present study revealed that majority of SHC holders had medium level of awareness and moderate level of perception towards soil health card scheme. Hence, Intensive training programmes need to be conducted by government and nongovernment agencies for increasing awareness about soil health card scheme, which would enable for efficient utilization of fertilizer based on soil test recommendations.

5. Those variables which have established significant association with awareness and perception of the farmers towards SHC scheme must be taken into consideration while planning any programme related to soil health cards.

6. The problems and suggestions elicited by farmers should be taken into consideration by implementing agencies and concerned action should be taken to rectify the problems and strive for better and successful implementation of SHC scheme by gaining confidence of the farmers towards the soil health card scheme.

7. Efforts should be made to create awareness about SHC scheme i.e. the grid system of soil sample collection, soil health card and integrated nutrient management and their importance among all farmers. The prime focus should be on interpretation of information prescribed in soil health card and on conversion of recommended doses of nutrients into doses of fertilizers.

7. Farmers should be educated about fertilizer application in varying climatic conditions by giving appropriate training about application of various fertilisers before the beginning of the season and during the season.

8. There is a need of hour to strengthen the soil health card related extension services to provide better advisories regarding information about recommended doses of nutrients and their importance in increasing yields of the crops which ultimately lead to good interaction between the farmers and the officials at regular intervals.

9. Activities of soil health card scheme may be organised in a particular village in campaign mode. All stakeholders such as farmers, farmer friends (Grama mitras), village level workers (VLWs), Block level officers, fertilizer industries, Co-operative Society, SAU students (as part of their internship of farmer's field / village for technical

exposure), people representatives should be brought to common platform on some occasions so as to bring qualitative improvements and to raise the level of awareness about soil health card scheme in the villages.

10. The soil samples collection needed to be monitored properly, in view of the fact that about 70 per cent of soil test farmers reported they did not know when the soil samples were collected from their fields. Some of the farmers during discussion reported that samples had been collected from a single plot but had been shown for a large number of plots. Such findings raises questions about the reliability of the soil test results and debilitating farmers' confidence on the recommendations given in the SHCs. Therefore, necessary steps to be taken to ensure quality implementation so as to raise the confidence level of the farmers.

11. It was observed by study team that in some of the block agricultural offices, soil samples were kept aside for many days and soils were exposed to moisture and weather. After soil sampling, drying should be done within 15-20 days, grinding, machine sieving and bottling should be done in time for proper test results. Sample test results should reach farmers before sowing season. It may be a good idea to limit sample to the capacities. The target should be to provide more accurate results rather than coverage. This would create demand for soil testing once the credibility of the testing is established.

12. Appropriate internet connectivity should be provided so that the data can be uploaded easily on the portal. Adequate printers should also be made available at labs for printing SHC.

13. So far, the SHC scheme has remained a target oriented supply driven programme. Unless it is turned into demand driven programme by generating interests in the farmers and building their confidence

on the soil test results, it would be very difficult to enforce adoption of recommended doses of fertilizers among farmers.

5.9 Suggested areas for future research

1. The present study was conducted in Anantapuramu district of Andhra pradesh state with limited mandals as well as limited sample size. It is therefore necessary to conduct similar studies with larger samples in other districts of the state where similar conditions exist so that the conclusions can be generalised to a wider area.

2. Government agencies should conduct experiments to demonstrate the usefulness of the recommendations by applying recommended doses of fertiliser on experimental plots at every village or at least at Gram Panchayat level to raise the level of confidence of the farmers. If better results can be demonstrated on the experimental plots compared to farmers' field, farmers will be self-motivated to have SHCs.

3. The present study has taken into account only few selected independent variables of respondents, to find out the relationship with the dependent variables studied, whereas other factors besides the structure of needs are also likely to influence the dependent variables. Therefore, the future investigations should include need dimension factors while making attempts to study the similar problems.

4. Similar critical study can also be undertaken in different areas as to verify the results.

5. Impact studies should be conducted to know the consequences of soil health card scheme with respect to socio economic status of the farmers.

6. Studies should be conducted to know the level of knowledge and level of adoption about recommendations given in SHC by considering diversified farmers.

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APPENDIX - A

INTERVIEW SCHEDULE

ANGRAU

ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY
S.V. AGRICULTURAL COLLEGE, TIRUPATI
DEPARTMENT OF AGRICULTURAL EXTENSION,

AWARENESS AND PERCEPTION OF FARMERS TOWARDS SOIL HEALTH CARD SCHEME IN RAYALASEEMA REGION OF ANDHRA PRADESH

Respondent No :

Name of the respondent :

Village :

Mandal :

District :

Section A

PROFILE CHARACTERISTICS OF THE FARMERS

I AGE : _____ Years

II EDUCATION :

S.No.	Qualification	Score	Specify
1	Illiterate	0	
2	Primary School (I to IVth stds**)**	1	
3	Middle School (V to VIIth stds**)**	2	
4	High School (VIII to Xth stds)	3	
5	Higher Secondary School XI to XIIth stds)	4	
6	Graduate	5	
7	Post Graduate	6	

III FAMILY TYPE : Nuclear / Joint

IV FARMING EXPERIENCE _____ Years

V LAND HOLDING

Irrigated (acres)	Dry land (acres)	Total (acres)

VI ANNUAL INCOME

Main source (Rs)	Subsidiary source (Rs)	Other sources (Rs)	Total (Rs)

VII CROPPING INTENSITY :

S.No	Seasons	Cropped area
1	*Kharif*	
2	*Rabi*	
3	*Summer*	
4	**Total**	

VIII MASS MEDIA EXPOSURE:

S. No.	Mass media Sources	Frequency of use		
		Regularly(2)	Occasionally(1)	Never(0)
1	Radio			
2	Television			
3	Newspaper			
4	Farm magazine			
5	Posters, leaflets			
6	Campaigns			
7	Mobile phones			
8	Cyber media			
9	Exhibitions			
10	Kisan melas			

IX SOCIAL PARTICIPATION:

S. No.	Name of the Organization	Member	Non member	Office bearer	Extent of participation		
					Regularly (2)	Occasionally (1)	Never (0)
1	Gram panchayat						

2	Co-operatives						
3	Farmers clubs						
4	Panchayat samithi						
5	Zilla parishad						
6	Youth clubs						
7	Mahila Mandal						
8	School committee						
9	Womens club						
10	Others (specify)						

X EXTENSION CONTACT

Please indicate the frequency of contact whether you often (or) sometimes (or) never maintains contact with the extension agents

S.No.	Name of organization	Frequency of contact		
		Regularly (2)	Occasionally (1)	Never (0)
1.	AEO			
2.	AO			
3.	ADA			
4.	DDA			
5.	JDA			
6.	Horticulture officers			
7.	Scientists			
8.	Input dealers			
9.	NGOs			
10.	Contact with Agro service centers			

XI SCIENTIFIC ORIENTATION

. Please indicate whether you strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA) or Strongly Disagree (SDA) about each of them

S.No.	Statements	Response Categories				
		SA (5)	A (4)	UD (3)	DA (2)	SDA (1)
1.	New methods of farming give better results to farmer than traditional methods					
2.	Traditional methods have to be changed in order to raise the level of living					
3.	Even a farmer with lot of experience should use new methods of farming					
4.	Though it takes time for a farmer to learn					

	new methods of farming, it is worth the efforts					
5.	A modern farmer experiments with new ideas of farming					
6.	The way your forefathers did the farming is still the best way(-)					

XII ECONOMIC MOTIVATION

Please indicate whether you strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA) or Strongly Disagree (SDA) about each of them

S.No.	Statements	Response Categories				
		SA (5)	A (4)	UD (3)	DA (2)	SDA (1)
1.	A farmer should work towards higher yields and economic gains					
2.	The most successful farmer is one who makes more profits					
3.	The farmers should grow cash crops to increase monitory profits in comparison to growing food crops for home consumption					
4.	A farmer should try new farming ideas which may earn him more money					
5.	It is difficult for the farmer's children to make good start unless he provides them economic assistance					
6.	A farmer must earn his living but the most important thing in life cannot be defined in economic terms (-)					

XIII INNOVATIVENESS

Please indicate Yes, Undecided (UD), or No to each of the following statements pertaining to innovativeness

S.No.	Statements	Response categories		
		Yes (3)	UD(2)	No(1)
1.	Do you want to learn new ways of farming?			
2.	If the agricultural extension worker gives a talk on improved cultivation aspects will you attend it?			

3.	If the govt. helps you in establishing a farm elsewhere, will you accept the deal?			
4.	Do you want a change in your life?			
5.	A farmer should try to do farming the way his parents did (-)			
6.	Do you believe that man's future is in the hands of god? (-)			
7.	Do you want your sons to become farmers? (-)			

X IV RISK ORIENTATION

Please state the degree of your agreement with each of the following statements pertaining to risk orientation on the five point continuum viz., Strongly Agree (SA), agree (A), Un Decided (UD), Disagree (DA), Strongly Disagree(SDA)

S.No.	Statements	Response Categories				
		SA (5)	A (4)	UD (3)	DA (2)	SDA (1)
1.	A farmer should grow large number of crops to avoid greater risk involved in growing one or two crops					
2.	A farmer should rather take more of a chance in making a big profit that to be content with a smaller but less risky profits					
3.	A farmer who is willing to take greater risks than the average, success is fairly high					
4.	It is good for a farmer to take risks when he knows his chance of success is fairly high					
5.	Trying an entirely new practice in farming by a farmer involves risk but it is worth trying					
6.	It is better for a farmer not to try new farming methods unless most others have used them with success (-)					

XV MANAGEMENT ORIENTATION

S.No.	Statements	SA (4)	A (3)	DA (2)	SDA (1)
I	**Planning Orientation**				
1	Each year one should think fresh about the crop to be cultivated in each type of land				
2	It is possible to increase the yield through farm production plan				
3	It is not necessary to make prior decision about the				

	varieties of crop to be cultivated in the land.(-)				
4	It is not necessary to think ahead the cost involved in raising a crop (-)				
5	One need not consult agricultural experts for crop plan (-)				
6	It is not necessary to have training for crop production (-)				
II	**Production orientation**				
1	Timely planting of a crop ensures good yield				
2	For timely weed control one should use suitable herbicides				
3	Determining fertilizer quantities by soil testing saves money				
4	Seed rate should be used as recommended by the specialists				
5	One should use as much fertilizers as he likes (-)				
6	With low water rates one should use as much irrigation water as available (-)				
III	**Marketing orientation**				
1	Cooperative can help the farmers to get better price for their produce				
2	A farmer can fetch good price by grading his produce				
3	One should grow those varieties, which have more market demand.				
4	One should sell his produce to the nearest market irrespective of price (-)				
5	One should purchase inputs from the shop where his other relatives purchase (-)				
6	Market news is not useful to a farmer (-)				

XVI ACHIEVEMENT MOTIVATION

S. No.	Statements	A (3)	UD (2)	DA (1)
1	Work should come first even if one cannot get proper rest in order to achieve ones goals			
2	It is better to be content with whatever little one has, than to be always struggling for more			
3	No matter what I have done I always want to do more			
4	I would like to try hard at something really difficult even if it provides that I cannot do it			
5	The way things are now-a-days discourage one to work			

	hard			
6	One should succeed in occupation even if one has to neglect his family			

SECTION -B

I) FARMERS PERCEPTION ABOUT SOIL HEALTH CARD SCHEME

Please, put tick mark (√) against appropriate column given against each statement to show your level of perception about SHC**.**

S.NO	STATEMENTS	A(3)	UD(2)	DA(1)
1	Soil health card can be obtained after the soil testing			
2	Soil health can be maintained by fulfilling the nutrient deficiency in soil as given in soil health card.			
3	Soil fertility and productivity can be maintained with the help of soil health card.			
4	Systematic crop planning can be done by using soil health card information.			
5	Economic achievement can be obtained by using soil health card information.			
6	Fallow land can be converted into cultivable land by using soil health card information.			
7	Farming can be done in scientific way by using SHC information.			
8	Soil health card may help to establish coordination among farmers, extension workers and experts.			
9	The quantity of available nutrients in soil can be known with help of soil health card.			
10	Deficient soils can be reclaimed by using suitable reclamation activities.			
11	Soil health card gives information about amount of fertilizers to be applied.			
12	Crop planning can be done according to type of land.			

13	Unnecessary expenditure can be reduced by using information given in soil health card.			
14	Soil degradation can be reduced.			
15	Acidity, alkalinity of the soils can be known with help of soil health card information.			
16	We can know the quantity of available organic elements in the soil by information given in soil health card.			
17	We can apply the necessary quantity of organic matter in the soil with help of information given in soil health card.			
18	We can know the quantity of available nitrogen in the soil by information given in soil health card.			
19	We can apply the necessary quantity of nitrogen into the soil with the help of information given in soil health card.			
20	We can know the quantity of available phosphorous in the soil by information given in soil health card.			
21	We can apply the necessary quantity of phosphorous into the soil with the help of information given in soil health card.			
22	We can know the quantity of available potassium in the soil by information given in soil health card.			
23	We can apply the necessary quantity of potassium into the soil with the help of information given in soil health card.			
24	Biofertilizers can be applied with help of soil health card information			
25	The quantity of biofertilizers to be applied in soil can be known with the help of information given in soil health card.			
26	The quantity of combined fertilizers to be applied in soil can be known with the help of information given in soil health card.			
27	The quantity of fertilizers to be applied for different crops can be known with the help of information given in soil health card.			
28	We can apply the necessary quantity of sulphur into the soil with the help of information given in soil			

	health card.			
29	We can apply the necessary quantity of zinc into the soil with the help of information given in soil health card.			
30	We can apply the necessary quantity of iron into the soil with the help of information given in soil health card.			
31	We can apply the necessary quantity of magnesium into the soil with the help of information given in soil health card.			
32	We can apply the necessary quantity of Manganese into the soil with the help of information given in soil health card.			

II) AWARENESS OF FARMERS TOWARDS SOIL HEALTH CARD SCHEME

Please, put tick mark (√) against appropriate column given against each statement to show your level of awareness about SHC**.**

S.No	**Awareness about soil health card**	**Answers**	
		Yes (1)	**No (0)**
1	S.H.C is worth for balance use of chemical fertilizer		
2	S.H.C is useful scheme to understand fertility status of the soil		
3	S.H.C scheme is not useful for illiterate farmers		
4	S.H.C is useful to know the physical properties of the soil influence the soil production		
5	Are the results discussed among farmers in the village?		
6	Do you follow the recommended dosage of fertilizers as per soil health card		
7	It is important to read instructions present on Soil health card		
8	S.H. C lowers the cost of cultivation		
9	S.H.C helps in increasing the agricultural productivity		

10	S.H.C helps in providing the site specific nutrient management		
11	Soil samples from irrigated areas for testing are drawn in a grid of 2.5hac.		
12	SHC scheme was started in the year 2015.		
13	SHC scheme was first started by Rajasthan state		
14	The web portal for SHC is **www.soilhealth.dac.gov.in**		
15	There are totally 91 soil testing laboratories in Andhra Pradesh		
16	Soil health card consist of details about 12 parameters.		
17	Soil samples from rainfed areas for testing are drawn in a grid of 10 hac		
18	Soil samples will be collected by staff of state department of agriculture		
19	Soil samples are taken after harvesting of kharif and rabi crop		
20	The payment given to state government by central government per sample is Rs.190/-		
21	The international year of soils is 2015.		
22	SHC helps to improve soil quality and profitability of farmers		
23	SHC provides online delivery of SHC to the farmers using soil health card portal		
24	SHC scheme provides soil testing facilities to farmers at their doorstep		
25	S.H.C is useful to adopt integrate nutrient management practices in the crop		
26	SHC will be distributed to farmers once in three years cycle.		
27	The physical parameters which are being reported in SHC are colour, Ph, EC.OC		
28	The macro nutrients being tested under SHC scheme are N,		

	P and K		
29	The secondary nutrient being tested under SHC scheme is Sulphur		
30	The micro nutrients being tested under SHC scheme are Zn, Fe, Cu, Mn and Bo		
31	SHC provides recommendations for reclamation of acidic and alkaline soils		
32	SHC provides guidelines for integrated nutrient management		
33	Are you aware of recommended dosages of fertilizers for paddy crop as per soil health card?		
34	Are you aware of recommended dosages of fertilizers for Bengal gram crop as per soil health card?		
35	Are you aware of recommended dosages of fertilizers for ground nut crop as per soil health card?		
36	Are you aware of recommended dosages of fertilizers for cotton crop as per soil health card?		
37	Soil health card provides the farmers a well-monitored report of the soil which is chosen for cultivation of crops.		
38	Are you aware of deficiencies of nutrients in your soil as per soil health card?		
39	Are you aware of precautions to be taken while taking soil sample?		
40	Are you aware of method of taking soil sample?		

SECTION -C

1. State the benefits derived from Soil Health Card Scheme?

2. Problems faced by farmers for use of Soil Health Card Scheme?

3. Suggestions given by the farmers to overcome constraints in use of soil health card scheme?