

# **A STUDY ON PERFORMANCE OF CUSTOM HIRING CENTRES IN CHITTOOR DISTRICT OF ANDHRA PRADESH**

**BY**

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**B.Sc. (Ag.)**

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ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY  
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**CHAIRPERSON: Dr. V. SAILAJA**



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**2019**

## **DECLARATION**

I, **Smt. M.B. RAJYALAKSHMI**, hereby declare that the thesis entitled **“A STUDY ON PERFORMANCE OF CUSTOM HIRING CENTRES IN CHITTOOR DISTRICT OF ANDHRA PRADESH”** submitted to the **Acharya N. G. Ranga Agricultural University** for the degree of **Master of Science in Agriculture** is the result of original research work done by me. I also declare that the material contained in this thesis has not been published earlier in any manner.

Place: Tirupathi

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# CERTIFICATE

**Smt. M.B. RAJYALAKSHMI** has satisfactorily prosecuted the course of research and that the thesis entitled “**A STUDY ON PERFORMANCE OF CUSTOM HIRING CENTRES IN CHITTOOR DISTRICT 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 her for a degree of any university.

**(Dr. V. SAILAJA)**  
Chairperson

Date :

# CERTIFICATE

This is to certify that the thesis entitled “**A STUDY ON PERFORMANCE OF CUSTOM HIRING CENTRES IN CHITTOOR DISTRICT OF ANDHRA PRADESH**” submitted in partial fulfilment of the requirements for the degree of “**MASTER OF SCIENCE IN AGRICULTURE**” of the Acharya N. G. Ranga Agricultural University, Lam, Guntur is a record of the bonafide original research work carried out by **Smt. M.B. RAJYALAKSHMI** under our guidance and supervision.

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

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## LIST OF CONTENTS

<b>Chapter No.</b>	<b>Title</b>	<b>Page No.</b>
I	INTRODUCTION	1-9
II	REVIEW OF LITERATURE	10-43
III	MATERIAL AND METHODS	44-70
IV	RESULTS AND DISCUSSION	71-161
V	SUMMARY AND CONCLUSIONS	162-172
	LITERATURE CITED	173-182
	APPENDICES	183-194

## LIST OF TABLES

<b>Table No.</b>	<b>Title</b>	<b>Page No.</b>
1.1	Economic advantage of mechanization in per cent	2
1.2	Custom hiring centres in Chittoor district of Andhra Pradesh	6
3.1	Selection of mandals, villages and respondents from Chittoor district of Andhra Pradesh	47
3.2	Variables and their empirical measurement	50
4.1	Distribution of respondents according to their age	72
4.2	Distribution of respondents according to their gender	74
4.3	Distribution of respondents according to their education	74
4.4	Distribution of respondents according to their farm size	75
4.5	Distribution of respondents according to their farming experience	77
4.6	Distribution of respondents according to their level of social participation	77
4.7	Distribution of respondents according to their level of innovativeness	79
4.8	Distribution of respondents according to their management orientation	80
4.9	Distribution of respondents according to their annual income	82
4.10	Distribution of respondents according to their level of accessibility	82
4.11	Distribution of respondents according to their level of extension contact	84
4.12	Distribution of respondents according to their level of mass media exposure	86
4.13	Distribution of respondents according to their level of training received	86
4.14	Distribution of respondents according to their level of achievement motivation	87
4.15	Distribution of respondents according to their level of economic orientation	91

4.16	Implements and machinery available in CHCs along with full cost and subsidy	92-97
4.17	Custom hiring rates (average) charged for farm machinery by private owners and CHCs during the year 2017-18	98
4.18	Costs incurred and returns earned (Rs/Machine) during the year 2017-18	100-104
4.19	Distribution of custom hiring centres according to their level of performance	105
4.20	Distribution of the respondents based on the extent of utilization of services of custom hiring centres	107
4.21	Distribution of respondents according to the extent of utilization of farm machineries/equipments in CHC	108
4.22	Average usage of equipment in each custom hiring centre per annum	109
4.23	Distribution of respondents according to their overall extent of utilization of custom hiring centres	110
4.24	Correlation coefficients between the selected profile characteristics with the performance of the custom hiring centres	114
4.25	Multiple Linear Regression analysis of the selected independent variables with the performance of the custom hiring centres	123
4.26	Correlation coefficients between the selected profile characteristics with the extent of utilization of custom hiring centres	126
4.27	Multiple Linear Regression analysis of the selected independent variables with the extent of utilization of custom hiring centres	134
4.28	Constraints faced by the users for utilization of custom hiring centres	136
4.29	Suggestions for effective use of custom hiring centres	138
4.30	Package of machinery supplied under CHC	141
4.31	Group members of CHC in sompalli village	141
4.32	Working particulars of machinery in CHC	143
4.33	Package of machinery supplied under CHC	144
4.34	Group members of CHC in sompalli village	144

4.35	Working particulars of machinery in CHC	146
4.36	Package of machinery supplied under CHC	147
4.37	Group members of CHC in sompalli village	147
4.38	Working particulars of machinery in CHC	149
4.39	Package of machinery supplied under CHC	150
4.40	Group members of CHC in sompalli village	150
4.41	Working particulars of machinery in CHC	151

## LIST OF ILLUSTRATIONS

<b>Figure No.</b>	<b>Title</b>	<b>Page No.</b>
1.1	Need of custom hiring centre	4
2.1	Conceptual model of the study	43
3.1	Map showing Chittoor district of Andhra Pradesh	48
3.2	Map showing the selected mandals and villages in Chittoor district	49
3.3	Sampling procedure followed in the study	51
3.4	Calculation of net returns of a custom hiring centre	54
4.1	Distribution of respondents according to their age	73
4.2	Distribution of respondents according to their gender	73
4.3	Distribution of respondents according to their education	76
4.4	Distribution of respondents according to their farm size	76
4.5	Distribution of respondents according to their farming experience	78
4.6	Distribution of respondents according to their level of social participation	78
4.7	Distribution of respondents according to their level of innovativeness	81
4.8	Distribution of respondents according to their management orientation	81
4.9	Distribution of respondents according to their annual family income	83
4.10	Distribution of respondents according to the accessibility of custom hiring centres	83
4.11	Distribution of respondents according to their level of extension contact	85

4.12	Distribution of respondents according to their level of mass media exposure	85
4.13	Distribution of respondents according to their level of training received	88
4.14	Distribution of respondents according to their level of achievement motivation	89
4.15	Distribution of respondents according to their level of economic orientation	89
4.16	Distribution of custom hiring centres according to their level of performance	110
4.17	Distribution of respondents according to their overall extent of utilization of custom hiring centres	110
4.18	Correlation coefficients between the selected profile characteristics with the performance of the custom hiring centres	114
4.19	Correlation coefficients between the selected profile characteristics with the extent of utilization of custom hiring centres	123
4.20	Strategy for effective functioning of custom hiring centres	157
4.21	Empirical model of the study	161



## LIST OF SYMBOLS AND ABBREVIATIONS

CHCs	:	Custom Hiring Centres
%	:	Percent
CHSC	:	Custom Hiring Service Centre
PPP	:	Public Private Partnership
Kw/ha	:	Kilo watts per Hectare
SD	:	Standard Deviation
Rs.	:	Rupees
Fig.	:	Figure
RARS	:	Regional Agricultural Research Station
KVK	:	Krishi Vignan Kendra
NGO's	:	Non Governmental organizations
n	:	Number of respondents
i.e.	:	That is
ANGRAU	:	Acharya N.G.Ranga Agricultural University
Viz.,	:	Namely
<i>et al.</i>	:	and others
S.No.	:	Serial number

## **ABSTRACT**

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Agriculture is a labour intensive occupation. Increased cost of maintenance of draft animals and growing scarcity of farm labour has created new challenges to farmers. The basic requirement among farmers is to meet such competition by reducing labour usage and maximize labour productivity and judicious use of mechanized power by the farmers.

Mechanical power is largely consumed in big land holdings and is still beyond the reach of small and marginal holdings which constitutes around 80 per cent of the total land holdings. This is due to the fact that the small and marginal farmers, by virtue of their economic condition are unable to own the machinery on their own or through institutional credit. Therefore in order to bring farm machinery available within the reach of small and marginal land holdings collective ownership or custom hiring centre (CHC) play a major role.

Custom hiring has the potential to be one of the most effective strategies to introduce high quality and most efficient farm mechanization to the small farm holdings. The custom hiring enables new machines to be used at their maximum capacity and enables farmers to gain access to technology they would otherwise not be able to afford. Government of Andhra Pradesh promoting custom hiring centres in order to make available the high cost machinery within the reach of small and marginal farmers. Therefore, there is every need to analyze the performance and utilization of the services of custom hiring centres of the State Department of Agriculture that were maintained and utilized by the farmers. Keeping the above aspects in view, a comprehensive study entitled “A STUDY ON PERFORMANCE OF CUSTOM HIRING CENTRES IN CHITTOOR DISTRICT OF ANDHRA

PRADESH” was under taken which was presented in the State Level Technical Programme meeting at the University headquarters, Lam, Guntur in the month of May 2018 and approval has been obtained.

*Ex-post-facto* research design was followed in the present investigation. Chittoor district was purposively selected. Groundnut is the major crop in the district and considerably a good number of custom hiring centres were also functioning in the district for hiring machinery to carry various operations in groundnut cultivation. Eight mandals viz., Peddamandyam, B.Kothakota, Peddathippasamudram (P.T.M), Molakalacheruvu, Kalikiri, Kalakada, Kambhamvaripalli and Gurramkonda were purposively selected where maximum number of custom hiring centres were present. Two villages were selected purposively from each mandal where the maximum number of users of custom hiring centres were present. Thus sixteen custom hiring centres were selected from sixteen selected villages. Among the sixteen selected custom hiring centres, the respondents were selected based on proportionate random sampling procedure from each selected custom hiring centre thus making a total of 120 respondents. A pre tested interview schedule with measurement devices of all the variables was used for the collection of raw data. The data was collected by personal interview method through a structured interview schedule and analyzed by employing suitable statistical tools.

The analysis of profile characteristics of users of custom hiring centres indicated that majority of the respondents were middle aged, belonged to male category with primary school education, small farmers with medium farming experience, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, trainings received, achievement motivation and economic orientation.

Majority of the custom hiring centres have shown medium level of performance.

Majority of the respondents were utilizing the services of custom hiring centres upto medium extent.

Correlation analysis revealed that there was a positive and significant relationship between education, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, trainings received, achievement motivation, economic orientation with the performance of the custom hiring centres. However age, gender, farm size and farming experience had non-significant relationship with the performance of the custom hiring centres. All the selected 15 independent variables put together explained about 65.30 per cent variation in the performance of custom hiring centres.

Correlation analysis revealed that there was a positive and significant relationship between education, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, trainings received, achievement motivation, economic orientation with the extent of utilization of the custom hiring centres. However age, gender, farm size and farming experience had non-significant relationship with the extent of utilization of the custom hiring centres. All the selected 15 independent variables put together explained about 63.20 per cent variation in the utilization of custom hiring centres.

The most important constraints in the utilization of services of custom hiring centres based on rank as indicated by farmers were non availability of farm machinery during peak season; lack of timely availability of farm machinery; damage to the kernels due to the use of machinery (groundnut dry pod thresher); non availability of skilled farm machinery operator; overlapping farming operations; non availability of service centres for repairing the machinery in the vicinity of CHCs; lack of awareness about type of machinery available at CHCs; location of the field; lack of shelter for keeping the machinery.

The most important suggestions for efficient utilization of services of custom hiring centres based on rank as indicated by farmers were expansion of custom hiring centres each at panchayat where ever necessary so that small and marginal farmers can access the services of custom hiring centres; training of man power for efficient handling of the farm machinery; need to strengthen the custom hiring centres by increasing the number of farm machinery. This will overcome the problem of timely non availability particularly during the peak season, especially to the small and marginal farmers, other suggestions given were strengthen the subsidy component for these custom hiring centres by the government; creating awareness for hiring of machinery in CHCs; fixed hiring charges for the machinery by the district monitoring team and provision of subsidy for construction of shelter for keeping the machinery.

Based on the results obtained through the present research, the scope of custom hiring centres were explored and a suitable strategy was designed for effective functioning and utilization of services of custom hiring centres.

# *Chapter – I*

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## *Introduction*



## **Chapter I**

# **INTRODUCTION**

Agriculture is the backbone of Indian economy. It has a critical role to play in the country's economic development. With ever increasing human population, there is an increasing demand to raise the production. There are two basic ways of augmenting the production, first enlarging the area cultivated by expanding agriculture operation to virgin areas and secondly to increase the productivity of land already under cultivation. As there is almost no scope to expand the cultivated area because the average size of operational holding is decreasing day by day due to pressure of population, the ultimate way of increasing production is to raise the productivity level. Among all the measures like use of high yielding varieties, fertilizer application and plant protection measures to raise the productivity level, farm mechanization is one of the important aspect.

Agriculture is an extremely labour intensive occupation, which is now facing a challenge of labour shortage. Increasing urbanization and industrialization further aggravate the shortage of labour. The new work opportunities in off-farm occupation will also add to the pressure to raise efficiency of use of labour on the farm. Hence Indian agriculture is undergoing a gradual shift from dependence on human power and animal power to mechanical power because increasing cost for upkeep of animal and growing scarcity of human labour. Migration of labour from farm to non farm activities is a threat to agriculture because it creates scarcity of labour for farming operation. Therefore use of mechanical power has a direct bearing on the productivity of crops apart from reducing the drudgery and facilitating the timeliness of operations. Thus there is a strong need for taking up of farm mechanization.

In India the highest use of mechanical power is in the order of 3.5 kw/ha in Punjab and less than 1kw/ha in states like Bihar, Orissa, Jharkhand etc. Developing innovative crop-specific farm equipment and making them available at modest price so as to enhance the level of mechanization would contribute in

the long run to increase the output. As the growth in demand stimulates growth in output, there will be new employment opportunities on the farm as well.

“Farm mechanization refers to the development and use of machines that can take place of human and animal power in agricultural processes. Farm mechanization removes the drudgery associated with agricultural labour and overcomes time and labour bottlenecks to perform tasks within optimum time windows and can influence the environmental footprint of agriculture leading to sustainable outcomes.”

Agricultural mechanization implies the use of various power sources and improved farm tools and equipment, with a view to reduce the drudgery of the human beings and draught animals, enhance the cropping intensity, precision in metering and placement of inputs and timeliness of efficiency of utilization of various crop inputs (seed, chemical, fertilizer, irrigation, water etc) and reduce the losses at different stages of crop production with the lowest cost of production.

Timeliness of operations especially sowing and intercultural operations has significance for good crop stand and sustained productivity of crops. The inadequacy of farm power and machinery with the farm operators and particularly with the marginal and small farmers has always been perceived as an impediments to increasing agricultural production and productivity.

**Table 1.1 Economic advantage of mechanization in per cent**

S.No	Particulars	Per cent
1	Increase in productivity	12-34
2	<b>Seed-cum-fertilizer drill facilitates</b>	
i)	Saving in seeds	20
ii)	Saving in fertiliser	15-20
3	Enhancement in cropping intensity	5-22
4	Increase in gross income of the farmers	29-49

**Source:** Report of the Sub-group on Agricultural Implements and Machinery for Formulation of 9th Five year plan.



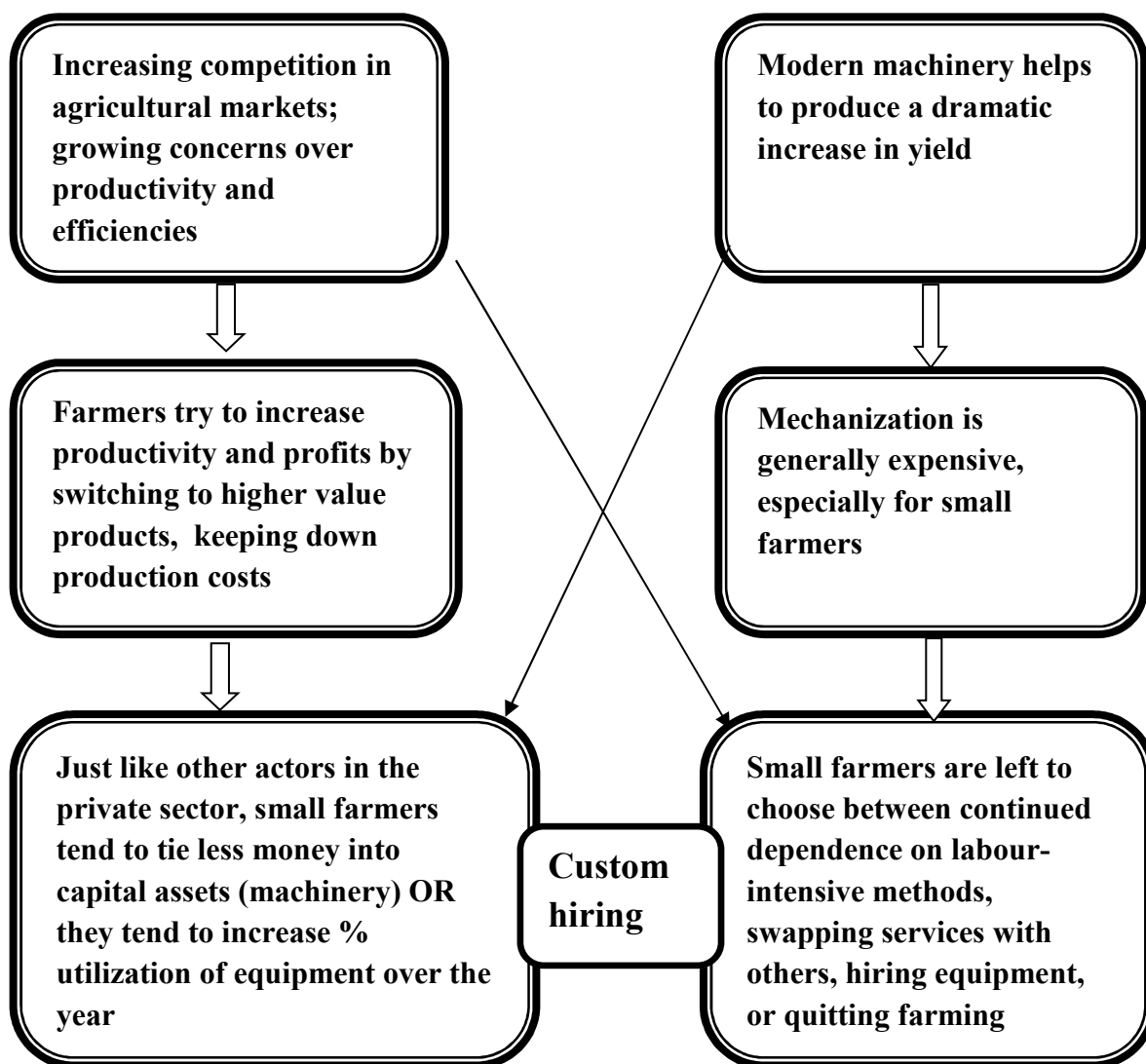
During the years 1960- 61, the animal power contributed 92 per cent of the total farm power whereas mechanical and electrical together contributed 8 per cent. However, as paradigm shift in 2004-05 the contribution from animal power considerably reduced to 16 per cent and from mechanical and electrical power it increased to 84 per cent ( Nagaraj *et al.* 2013).

Mechanical power is largely consumed in big land holdings and is still beyond the reach of small and marginal holdings which constitutes around 80 per cent of the total land holdings. This is due to the fact that the small and marginal farmers by virtue of their economic condition are unable to own the machinery on their own or through institutional credit. Therefore in order to bring farm machinery available within the reach of small and marginal land holdings collective ownership or Custom Hiring Centres (CHCs) need to be promoted in a big way.

## **1.1 CONCEPT OF CUSTOM HIRING CENTRES**

Custom hiring centres are basically a unit comprising a set of farm machinery, implements and equipment meant for custom hiring by farmers. Custom Hiring is an important mechanism through which most small holders can access services of agricultural machinery. Though certain implements and equipment are crop specific, the traction units like tractors, power tillers etc., and self-propelled machinery like combine harvesters etc., are used in common. An ideal model envisaged in custom hiring centres comprise farm machinery that are commonly used for tillage operations for all crops, multi crop equipment and a minimum of crop specific machinery.

Therefore Custom Hiring Centres need to be strengthened as they are going to support the farmers in a big way. Custom hiring centre concept was introduced in the year 2011-12 by the State Department of Agriculture in Andhra Pradesh.



**Fig.1.1. Need for custom hiring**

Custom hiring enables farmers to rent the appropriate equipment, often along with someone to operate it, for a defined period of time only, thus only paying for the services of the machine without having to own it.

Government of India, in recognition of this potential has envisaged increase of farm power availability from the present level of 0.93 kw/ha to 2.0 kw/ha during the 12th plan period.

In Andhra Pradesh, Department of agriculture is providing implements on subsidy to the individual farmers/group of farmers through the following schemes.

## **State Development Plan (SDP)**

Aims in supply of individual implement / equipment to individual farmers. This equipment performs a single operation or part of various operations in a crop. This normally being funded by the State Government through State Development Plan (SDP).

## **Rashtriya Krishi Vikas Yojana (RKVY)**

Central Sector Scheme with a funding pattern of 60:40 (Central : State) aims in supply of Crop based group (set) of machinery / equipment to a group (Rythu Mithra Groups / Joint Liability Groups etc.,) of farmers. These set of equipment aims in performing majority of feasible farm operations of a particular crop. The scheme is being funded by the Government of India through Rashtriya Krishi Vikas Yojana (RKVY).

## **Sub-Mission on Agriculture Mechanization (SMAM)**

Central Sector Scheme with a funding pattern of 60:40 (Central:State) for supply of farm machinery. Training and demonstrations have cent per cent central funding. Establishment of Custom Hiring Centres (CHCs) on Public Private Partnership mode in Andhra Pradesh on 50 per cent subsidy basis.

### **Objectives of custom hiring centres:**

- i. To promote mechanization in districts with low farm power availability.
- ii. To provide hiring services for various agricultural machinery/implements applied for different operations.
- iii. To expand mechanized activities during cropping seasons in large areas especially in small and marginal holdings.
- iv. To involve manufacturers/KVKs in operation and maintenance of machines in the hiring centres.
- v. To introduce improved/newly developed agricultural implements and machines in crop production.

## STATE SCENARIO

Custom hiring centers established under various schemes by the Department of Agriculture and Cooperation and Farmers Welfare during 2014-15 to 2016-17 in Andhra Pradesh with a total number of 1176 custom hiring centres.

(Source: <http://agricoop.nic.in>)

## DISTRICT SCENARIO

Custom hiring centres that were issued to the group of farmers on subsidy basis by the Department of Agriculture in Chittoor district furnished here under

**Table 1.2 Custom hiring centres in Chittoor district of Andhra Pradesh**

S.No	Year	Number of custom hiring centres	Subsidy (rupees in crores)
1	2014-15	15	1.30
2	2015-16	52	4.95
3	2016-17	164	15.40
4	2017-18	50	5.43

**SOURCE: Office of the Joint Director of Agriculture, Chittoor**

## 1.2 NEED AND IMPORTANCE OF THE STUDY

Providing machinery on custom hiring basis to farmers in time and at reasonable rates is possible through custom hiring centres. The small and marginal farmers are being benefitted through custom hiring centres. Government of Andhra Pradesh promoting custom hiring centres in order to make available the high cost machinery within the reach of small and marginal farmers. Custom hiring needs neither initial investment nor repair and maintenance costs from the farmers. The farmers need to pay only rental charges.

Hence, there is every need to analyze the performance and utilization of the services of custom hiring centres of the State Department of Agriculture that were utilized by the farmers. Moreover, such type of research was not carried out

on this aspect till date. Keeping the above aspects in view, a comprehensive study entitled “A STUDY ON PERFORMANCE OF CUSTOM HIRING CENTRES IN CHITTOOR DISTRICT OF ANDHRA PRADESH” has been contemplated with the following objectives.

### **1.3 OBJECTIVES OF THE STUDY**

1. To study the profile characteristics of users of custom hiring centres.
2. To analyse the performance of custom hiring centres.
3. To study the extent of utilization of custom hiring centres by the users.
4. To find out the relationship between the performance and the extent of utilization of custom hiring centres by the users with their independent variables.
5. To identify the constraints faced by the users in the utilization of custom hiring centres and to elicit suggestions to overcome the constraints .
6. To document a few successful and failure cases of custom hiring centres and to suggest a suitable strategy for effective functioning of custom hiring centres.

### **1.4. SCOPE OF THE STUDY**

This is a unique and pioneering study of this kind, where in an attempt has been made to explore the performance and utilization of services of custom hiring centres. The study makes a sincere attempt to know the socio-economic, communication and psychological characteristics of the farmer users of custom hiring centres (CHCs) and also will provide an insight into the performance and utilization of services of custom hiring centres.

The findings of the study would be useful for the administrators, scientists and extension workers of the Department of Agriculture and other agencies involved in the farming sector by way of knowing the performance and utilization of services of custom hiring centres in Chittoor district of Andhra Pradesh. The

results of the study would be helpful for all the stakeholders in modifying their strategies accordingly. Further, the results of the study could be effectively utilized in other areas of the country where similar conditions exist with necessary structural changes.

## **1.5 LIMITATIONS OF THE STUDY**

Since all the social science researchers are subjected to certain limitations, the present study was no exception. As such, the study has the certain limitations indicated below.

1. The study had the limitation of time and resources available for a single investigator.
2. The items included in the study for detailed investigation were also limited because it was not possible to study all the areas in a short span of time.
3. The area of investigation was restricted to eight mandals of chittoor district in Andhra Pradesh. As such, generalization of the study could be extended to the areas where similar conditions exist, but may not have wider applicability.
4. Since the study was based on individual perception and expression of the respondents, some degree of error may be possible in the data due to lack of accurate expression of the respondents.
5. Since the study is first of its kind in the state the review pertaining to the performance of custom hiring centres and the extent of utilization of custom hiring centres was not available but sincere effort was made by the researcher to collect the available ones.

## **1.6 LAYOUT OF THE THESIS**

This study is presented in five chapters as follows

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 including statistical tools.
- 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 and appendices were appended at the end.





# *Chapter – II*

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## *Review of Literature*



## **Chapter II**

### **REVIEW OF LITERATURE**

A comprehensive review of literature is an integral part of an investigation, as it not only gives an idea on the work done in the past and assist in delineation of problem area but also provides basis for interpretation and discussion of findings. Past studies pave the way for future research endeavors. An acquaintance with earlier pertinent studies has been felt necessary to develop good understanding of the present study. Since the study is first of its kind in the State, the review pertaining to the performance and utilization of custom hiring centres was not available. However, an earnest effort was made to review the available literature reported in other related fields.

The investigation was carried out to study the performance of custom hiring centres and the extent of utilization of custom hiring centres by the users. The review of literature is presented under the following headings.

- 2.1 Selected profile characteristics of the users of the custom hiring centres.
- 2.2 Performance of the custom hiring centres
- 2.3 Extent of utilization of custom hiring centres by the users.
- 2.4 Relationship between the performance and the extent of utilization of custom hiring centres by the users with their independent variables.
- 2.5 Constraints faced by the users in the utilization of custom hiring centres and suggestions to overcome the constraints .
- 2.6 Conceptual model of the study

## **2.1 SELECTED PROFILE CHARACTERISTICS OF THE USERS OF THE CUSTOM HIRING CENTRES**

### **2.1.1 Age**

Archana (2012) reported that majority of the respondents were middle age group (40.83%) where as 32.50 per cent were old age and rest of them (26.67%) were young age group.

Kumar (2012) in his study on adoption of System of Rice Intensification (SRI) technology among farmers in Nagapattinam district of Tamil Nadu has observed that majority (56.67%) of the respondents were found in the middle age category followed by 31.67 per cent in the old age category and only 11.66 per cent fell under young age category.

Nagaraj (2012) in his study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that majority of the respondents (75.00%) belonged to middle age group whereas 12.50 per cent of each of them belonged to young age and old age categories respectively.

Divaker (2013) found that majority of the respondents were categorized into old age group (49.37%) followed by middle age (31.87%) and rest of them (18.75%) belonged to young age group.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that 40.00 per cent of the sugarcane respondents belonged to middle age category followed by old age (36.66%). The respondents in young age group were found to be 23.34 per cent.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu has revealed that 46.67 per cent of the cotton respondents belonged to middle age category followed by old

age (33.33%). The respondents in young age group were found to be 20.00 per cent.

Lavanya (2014) in her study on mechanization of farm operations in Bengal gram in Prakasam district of Andhra Pradesh observed that the sample contains only single farmer was in the age group of 20 and 30, 26 farmers (28.89%) between the age group of 31 and 40, 34 farmers (37.78%) between the age group of 41 and 50, 18 farmers (20.00%) between the age group of 51 and 60 and 11 farmers (12.22%) between the age group of 61 and 70. It can be concluded that the sample contains a maximum number of farmers in the age group of 41-50 years.

Chandrasekhar (2016) in his study on perceived needs of custom hiring centres of farm machineries and implements revealed that more than one third (35.00%) of the small farmers, 42.50 per cent of the medium farmers, 27.50 percent of the large farmers and overall 35 per cent of the farmers belonged to young age group. Half of (50.00 %) the small farmers, 40.00 per cent of the medium farmers, 57.50 per cent of the large farmers and overall nearly half (49.17 %) of the farmers belonged to middle age category. Fifteen per cent each of small and large farmers, 17.50 per cent of the medium farmers and overall 15.83 per cent of the farmers belonged to old age.

Braimah *et al.* (2017) in their study on assessing the impact of agricultural mechanization centers on agriculture production and rural livelihoods in the upper east region, Ghana revealed that 36.89 per cent of the respondents were between the age group of 30-39, whereas individuals who were between the age group of 40 – 49 constituted 24.27 per cent of the total sample.

Gudadur (2017) in his study on adoption level of farm mechanization on paddy growers in Uttara Kannada, Karnataka has observed that majority of the paddy growers (67.50%) belonged to middle age category followed by

young age (21.67%). The respondents in old age group were found to be 10.83 per cent.

### **2.1.2 Gender**

Hassan *et al.* (2008) in their study on use of Information and Communication Technologies among agri-based entrepreneurs in Malaysia revealed that 67.10 per cent of the respondents were male and the rest (32.90%) were female.

Ansari *et al.* (2011) in their study on assessing the potential and use of mobile phones by the farmers in Uttarakhand (India) revealed that a large majority of them were male (98.34 %) and rest of the respondents were female (1.66 %).

Devesh (2014) in his study on impact assessment study of assistance to individuals for establishing custom hiring centres revealed that majority of the beneficiaries were male (77.14 %) where as the female beneficiaries constituted only 22.86 per cent.

Sabharwal and Panwar (2015) in their study on impact of trainings of fruits and vegetable preservation on the knowledge and attitude of rural women found that maximum percentage (85.00%) of women have participated in vegetable preservation.

Braimah *et al.* (2017) in their study on assessing the impact of agricultural mechanization centers on agriculture production and rural livelihoods in the upper east region, Ghana revealed that among the total sample 72.55 per cent of the respondents were male while 27.45 per cent of them were females.

Kharmudai *et al.* (2018) in their study on attitude of tribal farmers of Meghalaya towards ICT-based extension services revealed that more than half (70%) of the farmers were female and 30 per cent of them were male.

### 2.1.3 Education

Meena (2010) reported that 12.00 per cent of the farmers had primary school education where as 22.00 per cent had secondary education and only 7.00 per cent were graduated.

Archana (2012) opined that 43.33 per cent of the respondents were illiterate followed by primary school (19.17%), read and write only (15.00%), upper primary school (14.17%), high school (4.16%), intermediate (2.50%) and under graduation (1.67%) as their education qualification.

Nagaraj (2012) in his study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that 24.17 per cent of the respondents had high school education, 22.50 per cent had middle level of education, 19.17 percent had primary education, 10.83 per cent had collegiate education, about 10.00 per cent were illiterates and only 9.17 per cent of respondents were graduates.

Nirmala (2012) in her study on diffusion status and adoption of System of Rice intensification (SRI) in Mahaboob Nagar district of Andhra Pradesh revealed that 24.17 per cent of the respondents were educated up to primary school level followed by functionally literate (22.50%), high school (20.00%), middle school (15.83%), Illiterate (9.17%) and college level (8.33%) education.

Divaker (2013) inferred that majority (70.62%) of farmers were illiterate followed by read and write (10.00%), primary school (6.25%), read only and middle school categories 5.00 per cent each where as only 3.12 per cent had high school level education.

Lamidi *et al.* (2013) reported that 38.80 per cent of the respondents had primary school education followed by 37.90 per cent respondents who had no formal education, 16.70 per cent of respondents had secondary education and only 6.60 per cent of respondents were educated above secondary education.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that half of the sugarcane growers (50.00%) had middle level of education, 16.67 per cent of farmers had primary level of education, 13.33 percent of respondents had collegiate education, 6.67 per cent had secondary level of education and only 1.33 per cent of respondents were illiterates.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu has revealed that 36.66 per cent of cotton growers had primary level of education, 30.00 per cent of farmers had middle level of education, 16.67 percent of respondents had secondary education, 6.67 per cent had collegiate education and 10.00 per cent of respondents were illiterates.

Chandrasekhar (2016) in his study on perceived needs of custom hiring centres of farm machineries and implements has revealed that one fourth (25.00 %) of the small farmers, half (50.00 %) of the medium farmers, 27.50 per cent of the large farmers and overall nearly one third (34.17 %) of the farmers belonged to low education level group. Forty-five per cent of the small farmers, 22.5 per cent of medium farmers, 37.5 per cent of the large farmers and overall 35 per cent of the farmers belonged to medium education group

Braimah *et al* (2017) in their study on assessing the impact of agricultural mechanization centers on agriculture production and rural livelihoods in the upper east region, Ghana revealed that 29.13 per cent of the respondents had no formal education and were involved in the agriculture production, 22.33% had basic education, and 25.24% had obtained a secondary education as at the time of the study while 23.30% had either partially or fully completed tertiary education.



#### 2.1.4 Farm Size

Anup *et al.*, (2010) revealed that 42.60 per cent of respondents had medium land holdings, followed by small (33.33%) and large (24.00%) land holdings.

Prashanth (2011) observed that 36.66 per cent of the organic cotton farmers had small farm size followed by marginal (35.00%) and large (28.33%) whereas 41.66 per cent of the conventional cotton farmers had large farm size followed by small (38.33%) and marginal (20.00%) land holdings.

Kharumnuid (2011) indicated that the 44.17 per cent of the potato growers were marginal farmers, followed by small (25.83%), semi-medium (21.66%), medium (6.67%) and large farmers (1.67%).

Deshmukh *et al.* (2011) reported that 32.50 per cent of the respondents had small land holding followed by medium (24.17%) land holding, semi medium (19.17%), big (12.50%) land holding and 11.66 per cent had marginal land holding.

Archana (2012) revealed that nearly half (46.67%) of the respondents had small farm size followed by marginal (29.17%) and large (24.16%) farm size.

Nagaraj (2012) in his study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that 40.83 per cent of the respondents had large land holding and 34.17 per cent of respondents had medium land holding where as one fourth of the respondents (25.00%) had small land holding.

Nirmala (2012) in her study on diffusion status and adoption of System of Rice intensification (SRI) in Mahaboob Nagar district of Andhra Pradesh revealed that more than half (55.83%) of the respondents were small farmers followed by semi-medium (30.00%), medium (7.50%), marginal (4.17%) and large (2.50%) categories.

Channamallikarjuna (2013) in his study on adoption of SRI method of paddy cultivation by farmers revealed that 59.33 per cent of respondents were having marginal land holding while 20.00 per cent of them were in medium category followed by 12.00 and 8.67 per cent of respondents having small and big land holding categories respectively.

Divaker (2013) found that majority of the respondents were marginal farmers (70.62%), followed by small (20.62 %) and big (8.75%) farmers.

Lamidi *et al.*(2013) reported that 35.00 per cent of the respondents had a farm size of 16-20 acres followed by, 6-10 acres (30.00%), 11-15 acres (29.00%), 21-25 acres (18.00%) and 0-5 acres (8.00%).

Vanitha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that 40.00 per cent of the sugarcane respondents had a farm size of 2.5 -5.0 acres followed by a farm size upto 2.5 acres (36.66%) and above 5 acres (23.34%) of land holding.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that 40.00 per cent of the cotton respondents had a farm size of 2.5 -5.0 acres followed by a farm size upto 2.5 acres (30.00%) and above 5 acres (30.00%) of land holding.

### **2.1.5 Farming Experience**

Satish (2010) reported that high experience in paddy cultivation was possessed by 50.83 per cent of the paddy growers followed by medium and low experience by 34.16 and 15 per cent of the respondents respectively.

Sarthakchowdhury and Prabuddharay (2010) revealed that 38.00 per cent of respondents had up to 5 years of experience in vegetable cultivation followed by 5 to 10 years experience (24.66%) and more than 15 years of experience (20.67%).

Arathy (2011) found that majority of the rice farmers had medium level (49.17 %) of farming experience followed by high (30.00%) and low (20.83%) levels.

Archana (2012) revealed that 49.17 per cent of the respondents had medium farming experience followed by high (26.67%) and low (24.16%) levels of farming experience.

Nagaraj (2012) in his study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that 39.17 per cent of farmers belonged to medium farming experience category followed by low (28.33%) and high (32.50%) farming experience category.

Nirmala (2012) observed that 52.50 per cent of the respondents had medium farming experience followed by low (30.00%) and high (17.50%) levels of farming experience.

Praveen (2012) in his study on knowledge and adoption level of paddy farmers reported that more than half (53.33%) of the paddy farmers had high level of farming experience followed by medium (30.83%) and low (15.84%) levels.

Divaker (2013) observed that majority of respondents were having high level of farming experience (68.12%) followed by medium (21.87%) and low (10.00%) level.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that a little more than half of the sugarcane respondents (53.33%) had high level of farming experience followed by medium farming experience ( 33.33%) and low farming experience (13.34%).

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that 46.67 per cent of

the cotton respondents had high level of farming experience followed by medium farming experience (36.66%) and low farming experience (16.67%).

Chadrsekhar (2016) in his study on perceived needs of custom hiring centres of farm machineries and implements revealed that 30.00 per cent of both the small and large farmers, one fourth (25.00 %) of the medium farmers and overall 28.33 per cent of the farmers had low level of farming experience. One-fourth (25.00 %) of the small farmers, 27.50 per cent of both the medium and large farmers and overall 26.67 per cent of the farmers had medium level of farming experience. Forty five per cent of the small farmers, 47.50 per cent of the medium farmers, 42.50 per cent of the large farmers and overall 45 per cent of the farmers had high level of farming experience.

#### **2.1.6 Social Participation**

Deshmukh *et al.* (2011) reported that majority of respondents (71.67%) had low social participation followed by medium (15.83%) social participation and high social participation (12.50%).

Dhillon *et al.* (2011) reported that 59.16 per cent of respondents had low social participation followed by medium (37.50%) and low levels (3.34%) of social participation.

Vinod *et al.* (2011) reported that 67.65 per cent of respondents had membership in one organization followed by 23.53 per cent of respondents having membership in two organizations and only 8.82 per cent of respondents who had membership in more than two organizations.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that 60.00 per cent of sugarcane respondents had high social participation followed by medium (26.67%) social participation and low (13.33%) social participation.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that 63.33 per cent of

cotton respondents had high social participation followed by low (20.00%) social participation and high (16.67%) social participation.

Savita *et al.*, (2014) reported that 64.00 per cent of respondents had no social participation followed by low (28.00%), high (7.00%) and medium (1.00%) social participation.

#### **2.1.7 Innovativeness;**

Arathy (2011) reported that 59.17 per cent of the respondents had medium innovativeness followed by high (28.33%) and low (12.50%) levels of innovativeness.

Kalyan (2011) revealed that 59.17 per cent of the respondents had medium innovativeness followed by high (20.83%) and low (20.00%) levels of innovativeness.

Kumar (2012) found that 59.17 per cent of the respondents had medium level of innovativeness followed by high (22.50%) and low (18.33%) levels of innovativeness.

Nirmala (2012) in her study on diffusion status and adoption System of Rice intensification (SRI) in Mahaboob Nagar district of Andhra Pradesh reported that 64.17 per cent of respondents had medium innovativeness followed by high (20.00%) and low (15.83%) levels of innovativeness.

Ramalakshmi (2012) reported that 65.83 per cent of the respondents had medium innovativeness followed by high (17.50%) and low (16.67%) levels of innovativeness.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that 40.00 per cent of cotton respondents had medium innovativeness followed by low (33.33%) and high (26.67%) levels of innovativeness.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu has revealed that 60.00 per cent of sugarcane respondents had medium innovativeness followed by low (26.67%) and high (13.33%) levels of innovativeness.

Chandrasekhar (2016) in his study on perceived needs of custom hiring centres of farm machineries and implements revealed that nearly half (48.33 %) of the farmers had medium level of innovative proneness followed by high (30.00 %) and low (21.67%) levels.

### **2.1.8 Management Orientation:**

Arathy (2011) reported that 44.17 per cent of the respondents had medium management orientation followed by high (38.33%) and low (17.50%) levels of management orientation.

Kumar (2012) in his study on knowledge and adoption of System of Rice Intensification (SRI) technology among farmers in Nagapattinam district of Tamil Nadu revealed that majority (65.83%) of the respondents had medium management orientation followed by low (19.17%) and high (15.00%) levels of management orientation.

Ramalakshmi (2012) reported that 71.67 per cent of sugarcane farmers had medium level of management orientation, followed by high (15.83%) and low (12.50%) levels.

Nagaraj (2012) in his study on Knowledge and Adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that 55.00 per cent of the paddy growers had medium management orientation followed by low (22.50%) and high (22.50%) levels of management orientation.

Hrudayranjan (2013) reported that just above half (52.50%) of the groundnut farmers had medium level of management orientation followed by low (30.00%) and high (17.50%) levels.

Sriharinarayana (2013) observed that 47.50 per cent of the respondents had medium level of management orientation, followed by high (33.33%) and low (19.17%) levels.

Chandrasekhar (2016) in his study on perceived needs of custom hiring centres of farm machineries and implements revealed that 42.50 per cent of the farmers were having high level of management orientation followed by low (30.83 %) and medium (26.67 %) level.

### **2.1.9 Annual Family Income**

Gangadhar (2009) revealed that 40.83 per cent of respondents were grouped under the annual income category of Rs.20,000-30,000 followed by Rs.10,000-20,000 (19.16%), Rs.30,000-40,000 (17.50%), more than Rs.40,000 (14.16%) and less than Rs.10,000 (8.33%) categories.

Anup *et al.* (2010) revealed that 42.66 per cent, 34.66 per cent, and 22.66 per cent of organic farmers had medium, low and high annual income respectively.

Manjunath (2010) found that economic position of the families of the respondents indicated that only 38.85 per cent had annual income below Rs. 49,310.43, followed by 35.42 per cent had an annual income between Rs. 49,310 to Rs. 1,21,217 and rest of the respondents (25.71%) had an income more than Rs. 1,21,217, annually.

Satish (2010) studied farmers perceptions, preferences and utilization of SRI and traditional paddy straw for livestock and found that 36.66 percent of respondents belonged to high income group followed by medium (31.66%), semi medium (27.5%) income groups and 4.16 percent of them belonged to low income group.

Jyothi (2012) in her study on farm mechanization expectations of cotton growers revealed that 40.00 per cent of the cotton growers belonged to high income category (> Rs.51,000) , followed by 23.75 per cent under low

income category category (Rs.<17,000), while 22.50 per cent under semi-medium income category (Rs.17,001 – 34000) and only 13.75 per cent belonged to medium income category (Rs.43,000-51,000).

Kalyan (2012) found that more than three-fifth (65.00%) of the groundnut farmers had medium level of annual income followed by high (19.17%) and low (15.83%) levels of annual income.

Praveen (2012) analysed the profile characteristics of paddy farmers and inferred that majority (66.67%) of farmers had medium level of annual income followed by low (18.33%) and high(15.00%) level of annual income.

Taskeen (2012) in his study on mechanization needs of sugarcane growers in Belgam district of Karnataka found that 64.00 per cent of the sugarcane growers had high annual income while 22.67 per cent and 13.33 per cent of sugarcane growers belonged to medium and low annual income categories respectively.

Sadvi *et al.* (2015) revealed that 50.00 per cent of rice farmers were found in the medium annual income group followed by low (34.00%) and high (16.00%) annual income groups.

Yadavsandeepkumar *et al.*(2016) revealed that 55.83 per cent of tomato farmers were found in the medium income group followed by low income group (29.16%) and high (15.00%) income group.

Madhuri (2017) revealed that 46.67 per cent of respondents had medium level of annual income followed by low (30.83%) and high (22.50%) annual income levels.

#### **2.1.10 Accessibility**

Braimah, *et al.* (2017) in their study on assessing the impact of agricultural mechanization centers on agriculture production and rural livelihoods in the upper east region, Ghana revealed that majority of the farmers (92.16%) indicated they had access only to a rented/hired tractor



where as only 3.92 per cent of the respondents revealed owned a tractor and 2.94 per cent disclosed that they had access to a tractor that belonged to a family member.

Ferris et al., (2008) in their study on making market information services work better for the poor in Uganda reported that 86 per cent of the farmers had access to a mobile phone

#### **2.1.11 Extension Contact**

Jyothi (2012) in her study on farm mechanization expectations of cotton growers has revealed that nearly half of the cotton growers (48.13%) had low extension contact category, followed by high (30.00%) and medium (21.88%) extension contact categories.

Nagaraj (2012) in his study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that 41.67 per cent of the respondents had medium extension contact whereas 32.50 and 25.83 per cent of respondents had high and low extension contact categories respectively.

Nirmala (2012) in her study on diffusion status and adoption System of Rice Intensification (SRI) in Mahaboob Nagar district of Andhra Pradesh revealed that nearly half (47.50%) of the respondents were found to possess medium extension contact followed by low (29.17%), high (10.83%), very low (8.33%) and very high (4.17%) extension contacts.

Taskeen (2012) in his study on mechanization needs of sugarcane growers in Belgam district of Karnataka found that 49.33 per cent of the farmers had low extension contact, while 28.00 per cent of the farmers had high extension contact. Medium extension contact was observed in 22.67 per cent of sugarcane growers.

Channamallikarjuna (2013) in his study on adoption of SRI method of paddy cultivation by farmers revealed that 47.33 per cent of the respondents

be had medium extension contact followed by 28.67 and 24.00 per cent of respondents had low and high extension contact.

Divaker (2013) found that 61.25 per cent of the respondents possessed low extension contact followed by medium (21.25%) and high (17.50%) levels of extension contact.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that half (50.00%) of the sugarcane respondents had high extension contact where as 30.00 and 20.00 per cent of respondents had low and medium extension contacts respectively.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu has revealed that more than half (60.00 %) of the cotton respondents had high extension contact where as 23.33 and 16.67 per cent of respondents had low and medium extension contacts respectively .

Sahana (2013) observed that medium level of extension contact with respect to contract farmers cultivating tomato (47.50%), gherkin (42.50%), marigold (45.00%), watermelon (62.50%) and pearl millet (45.00%) whereas in the case of cotton farmers had low (45.00%) level of extension contact.

Sangeetha (2013) observed that 83.64 per cent of the tomato farmers were found to possess medium to high level of extension contact, followed by low (16.36%) extension contact.

Yashashwini (2013) reported that nearly two- third of the farmers were under medium extension contact category followed by high (17.50%) and low (15.83%) level of extension contact.

Yadavsandeepkumar (2016) found that 61.67 per cent of the respondents possessed medium extension contact followed by low (21.67%) and high (16.66%) levels of extension contact.

### **2.1.12 Mass Media Exposure**

Jyothi (2012) in her study on farm mechanization expectations of cotton growers revealed that 46.25 per cent of the cotton growers had low mass media exposure followed by high (40.62%) and medium (13.12%) categories respectively.

Taskeen (2012) in his study on mechanization needs of sugarcane growers in Belgam district of Karnataka found that that 46.67 per cent of the sugarcane growers had low mass media participation followed by medium (32.00%) and high (21.33%) levels.

Channamallikarjuna (2013) in his study on adoption of SRI method of paddy cultivation by farmers revealed that 31.33 per cent of SRI method of paddy growing farmers had high level of mass media utilization towards adoption of new technology on paddy cultivation. It was also found that 35.33 per cent and 33.34 per cent of SRI paddy farmers had medium and low mass media utilization respectively for adoption of new technology of in paddy cultivation.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that half of the sugarcane respondents (50.00%) had high level of mass media exposure followed by medium (36.67%) and low (13.33%) levels.

Vanetha and Senthil (2013) in their study on profile of farmers in utilization of farm equipments in Tamilnadu revealed that nearly (46.67%) of the cotton respondents had high level of mass media exposure followed by medium (30.00%) and low (23.33%) levels.

Chandrasekhar (2016) in his study on perceived needs of custom hiring centres of farm machineries and implements revealed that overall 20.83 per cent of the farmers had low level of mass media exposure where as 56.67 per cent of the farmers had medium level of mass media exposure and high (22.50%) level of mass media exposure.

### **2.1.13 Trainings Undergone:**

Gangadhar (2009) found that 42.50 per cent of the cotton farmers received medium level of training followed by low (40.00 %) and high (17.50 %) levels of training.

Kiran and Shenoy (2010) reported that 40.00 per cent of the SRI paddy farmers were under high trainings undergone category followed by medium (38.00%) and low (22.00%) trainings undergone categories.

Gungadi (2011) conducted a study on knowledge and adoption of recommended production practices of paddy by the farmers of Tungabhadra project area, Karnataka and found that less than fifty per cent of the respondents attended the field days (48.33%), demonstrations (38.33%), group meetings (30.00%), krishimela (28.33%) and field visits (20.83%), training programmes (19.17%), agriculture exhibition (15.00%) and educational tours (10.00%).

Shivaramu and Krishnamurthy (2011) conducted a study on economics and adoption of SRI technology by paddy growers and observed that majority (80.00%) of paddy growers have participated in training programmes followed by 63.33 per cent attended field days, 43.33 per cent have participated in demonstrations, 36.67 per cent were aware of study tours, and 30.00 per cent were attended exhibition.

Nirmala (2012) in her study on diffusion status and adoption of System of Rice intensification (SRI) in Mahaboob Nagar district of Andhra Pradesh revealed that 45.83 per cent of the respondents had received medium training followed by low (27.50%) and high (19.17%) levels whereas 7.50 per cent of the farmers did not receive any training.

Nagaraj (2012) conducted a study knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that the respondents attended demonstrations (46.67%), field days (36.67%), Krishimelas (31.67%), group meetings (30.00%) and field visits

(21.67%), training programmes (20.83%), agriculture exhibitions (15.00%) and educational tours (9.17%).

Rao *et al.* (2012) conducted a study in Karimnagar district of Andhra Pradesh state on impact of farmer field schools in KVK adopted villages on level of knowledge and extent of adoption of improved practices of paddy observed that half (50.00%) of the FFS respondents had received medium training followed by low (30.00%) and high (20.00%) levels of training.

Channamallikarjuna (2013) in his study on adoption of SRI method of paddy cultivation by farmers revealed that a maximum of 39.33 per cent of respondents belonged to medium level participation in trainings whereas 32.00 and 28.67 per cent of respondents belonged to low and high levels of training categories .

#### **2.1.14 Achievement Motivation**

Gopinath (2005) reported that 70.00 per cent of the bengal gram farmers had medium achievement motivation followed by farmers with low (13.33%) and high (16.67%) levels of achievement motivation.

Kalyan (2011) found that 46.66 per cent of groundnut farmers had medium level of achievement motivation followed by high (38.33%) and low (15.00%) levels.

Nagaraj (2012) in his study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that 45.83 per cent of the respondents were in medium achievement category while 38.33 and 15.83 per cent of respondents had low and high levels of achievement motivation respectively.

Hrudayranjan (2013) reported that more than half (57.50%) of groundnut farmers had medium level of achievement motivation followed by low (30.83%) and high (11.17%) levels.

Kumar *et al.* (2015) in his study on knowledge and adoption of recommended cultivation practices of black gram growers in north eastern region of Karnataka reported that 37.50 per cent of the respondents were in medium achievement motivation category while 34.17 and 28.33 per cent of respondents were in low and high achievement motivation categories respectively.

Chandrasekhar (2016) in his study on perceived needs of custom hiring centres of farm machineries and implements revealed that 45.00 per cent of the farmers were having high level of achievement motivation followed by low (28.33 %) and medium (26.67 %) levels.

#### **2.1.15. Economic Orientation**

Kiran and Shenoy (2010) revealed that majority (89.00%) of the rice farmers had medium economic orientation followed by low (11.00%) level of economic orientation.

Arathy (2011) found that 56.67 per cent of the rice farmers had medium economic motivation followed by high (25.83%) and low (17.50%) levels of economic motivation.

Chaudhari (2011) in his study on technological gap in rice-wheat production found that 45.00 per cent of the respondents had medium level of economic motivation followed by high (36.67%) and low (18.33%) levels economic motivation .

Thiyagarajan (2011) reported that 41.70 per cent of the SRI farmers had medium level of economic motivation followed by high (36.60%) and low (21.70%) levels.

Kumar (2012) in his study on knowledge and adoption of System of Rice Intensification technology among farmers in Nagapattinam district of Tamilnadu reported that nearly three-fourth (72.50%) of the SRI farmers had

medium level of economic motivation followed by low (18.33%) and high(9.17%) levels of economic motivation.

Mandlik (2012) studied knowledge and adoption of Integrated Pest Management technology in pigeonpea and observed that majority (74.17%) of respondents had medium level of economic motivation while 11.67 per cent and 14.16 per cent of the respondents had low and high level of economic motivation respectively.

Naidu (2012) concluded that nearly two-third (62.22%) of the sugarcane farmers had medium economic orientation followed by high (23.89%) and low (13.89%) economic orientation respectively.

Ghintala and Singh (2013) observed that majority (68.33%) of the beneficiaries had medium economic motivation followed by high(16.67%) and low (15.00%) level of economic motivation.

Kavad *et al.* (2015) from their study reported that majority (78.00%) of respondents had medium economic motivation followed by high economic motivation(21.00%) and only 1.00 per cent were having low economic motivation.

Agrawal *et al.* (2016) in their study on the effect of watershed observed that 42.00 per cent beneficiaries had medium economic motivation while equal percentage(29.00%) of respondents had low and high economic motivation.

Ahire and Kapse (2017) analysed socio-economic impact of National Initiative on Climate Resilient Agriculture and inferred that 53.34 per cent of the beneficiaries had medium level of economic motivation whereas 25.00 per cent and 21.66 per cent of the beneficiaries had low and high economic motivation respectively.

Pise *et al.*(2018) studied the profile of beneficiaries of NICRA project and identified that majority (76.25%) of the beneficiaries had medium level

of economic motivation followed by low (20.00%) and high(3.75%) level of economic motivation.

## **2.2. PERFORMANCE OF THE CUSTOM HIRING CENTRES**

Chahal *et al.* (2005) in their study on role of cooperatives in institutionalization of custom hiring services in Punjab revealed that the an increasing level of participation of agro-service centres through the acquisition of large numbers of farm machinery for custom hiring. The income of the sample Co-operative Agro Service Centres (CASCs) increased steadily with financial support extended to such centres in terms of subsidy on one hand and increasing reach on the other hand.

Kamboj *et al.* (2012) conducted a study on farm machinery services provided by selected co-operative societies revealed that profit per investment of cultivator and laser leveller is maximum whereas it is minimum for the land leveller. Also the implements like rotavator, cotton drill, wheat drill, discs, tractor, leveller provides good profit. There are also some implements like bund former, trolley which have negative values of profit per investment. This means that these implements cause loss on the initial investment

Sidhu and Kamal (2012) in their study on economic viability of cooperative agro machinery service centers in Punjab found that the operations of the Agro Machinery Service Centers (AMSCs) economically viable as the service centres generating profits to the extent of 2.30 per cent of the annualized costs. The hiring-in of the machinery services from the machinery centres has been found comparatively cheaper by 16 and 35 per cent when compared to the hiring-in from private operators and self-owning of machinery, respectively. The successful AMSCs have brought a significant reduction in the burden of capital investments of the farmers on farm machinery and implements



Devesh (2014) in his study on impact assessment study of assistance to individuals for establishing custom hiring centres revealed that the profit earned after one year of establishment of the CHC comes out to be 1.53 lakhs after deducting all the expenses and bank repayment.

Hiremath *et al.* (2015) in their study on accessibility of farm machinery services revealed that 25.00 per cent of CHSCs are high performing (Net returns > Rs.54,500), 25.00 per cent of CHSCs are medium performing (Net returns < Rs.20,000) and 50.00 per cent of CHSCs are low performing (Negative net returns) categories.

### **2.3. EXTENT OF UTILIZATION OF SERVICES OF CUSTOM HIRING CENTRES BY THE USERS.**

Kumar (1994) in his study on an elevation of capital investment pattern in a developed village economy in Punjab concluded that farmer can perform his operation of farms with the custom hiring of implements.

Chahal *et al.* (2005) in their study on analysis of custom hiring/ rental services of farm machinery through cooperative societies revealed that farmers who are having land holding less than 2.8 ha were potential users of farm implements through custom hiring/rental services.

Sidhu (2005) in his study on custom hiring of farm machinery-problems and prospects revealed that mechanization level in the state has increased manifolds and typical farm machinery decision may require choosing between owning a machine and hiring custom work.

Mehra (2007) conducted a study to find out the status of the farm machinery services under owning, private and cooperative societies in Punjab. The study showed that only 60.00 per cent and 4.00 per cent societies were using disc harrow and plankar respectively for more than 250 hours annually and about 50.00 per cent and 54.00 per cent farmers who owned disc harrows and cultivators respectively were working for less than 100 hours annually.

Shenoy (2008) highlighted the under utilization of tractors in Punjab agriculture. It was estimated that the state accounted for about 14 per cent of the total tractors in India. The average use of these machines per annum in the state was barely 450 hours, which was much below the minimum of 1,000 hours of productive use in agriculture. The over tractorization in Punjab had led to the under utilization of this costly machine.

Jyothi (2012) in her study on farm mechanization expectations of cotton growers has revealed that extent of utilization of farm implements and machinery by cotton growers. Cent per cent cotton growers used mould board plough regularly, equal number of the cotton growers (98.75%) had used cultivator, blade harrow regularly. Ridger was regularly used by majority of the cotton growers (86.25%) followed by tractor (78.75%), Balram plough (70.00%) further Pumpset (13.75%), Sprinkler (8.12%) and Sickle (34.37%), Knapsack sprayer (65.62%), power sprayer (37.50%) and rotavator (20.00%), respectively.

Kamboj *et al.* (2012) in their study on farm machinery services provided by selected cooperative societies concluded that in more than 70 per cent of the societies annual use of the rotavator was 550 hours and annual usage of tractor was 900 hours comes in more than 60.00 per cent of societies and more than 60.00 per cent of societies having disc harrow have annual use of 520 hours.

Singh *et al* (2013) in their study on economic impact of custom hiring services of machinery on farm economy in Punjab revealed that per hectare cost of crop cultivation on farms depending upon custom hiring services was about 12 per cent lower than that of the machinery owning farms.

Kumar (2014) in his study on the agricultural mechanization in Karimnagar has revealed that low extent of use of farm implements and machinery by small farmers and medium extent of use by medium and large

farmers was noticed in the four operations of land preparation, sowing, weeding, spraying and harvesting and post harvesting.

Hiremath *et al.* (2015) in their study on accessibility of farm machinery services revealed that utilization of machineries in custom hiring service centers (CHSCs) varied from 100 to zero per cent depending upon the type of machineries, suitability to the area, awareness about CHSCs etc. It was observed that private owners charged higher rates (average Rs.50 per hour) for machineries compared to CHSC's. Further the study revealed that CHSCs had helped to increase the productivity and income of small and marginal farmers to the extent of 10 to 15 per cent.

Gajpal *et al.* (2015) in their study on utilisation pattern and constraints in use of custom hiring of agricultural machinery in paddy crops in Raipur district of Chhattisgarh revealed that about 60.00 percent of farmers hired rotavator for puddling fields. Seed drill used by 100.00 per cent of farmers for sowing the paddy in field in line sowing method. About 72.50 per cent of farmers have their own sprayers and 27.50 per cent of farmers used sprayer as a custom hiring .

Vaja *et al.* (2016) in their study on exploration of custom hiring services of farm machines in Junagadh revealed that the level of mechanization is increasing in all aspects in Gujarat. Almost every types of agricultural equipment are being used either by owning or through custom hiring. The custom hiring is very useful method of having short term control of farm machinery particularly during the tillage operations, sowing and during their harvesting operations.

Shyam (2016) in his study on present status and future strategies of custom hiring of agricultural machinery in Paddy farm in Bilaspur district of Chhattisgarh revealed that out of 80 selected farmers, 76.7 percent of farmers used machinery in custom hiring basis for land preparation, transportation, threshing operation which required for paddy production. No farmer used

rotavator for puddling the field which required in paddy transplanting method of sowing. Seed drill was used by 100 per cent of farmers for sowing the paddy in field in line sowing method. About 28.75 per cent of farmers have their own sprayers and 71.25 per cent of farmers used sprayer as a custom hiring.

Salini (2018) in her study on impact of agro machinery service centres on labour cost in Paddy cultivation revealed that economically quantifiable benefits in terms of reduced cost of cultivation due to increase in efficiency in operations of mechanization, saving in machine buying costs and labour costs, and timeliness in farm management practices.

#### **2.4. RELATIONSHIP BETWEEN THE PERFORMANCE AND THE EXTENT OF UTILIZATION OF CUSTOM HIRING CENTRES BY THE USERS WITH THEIR INDEPENDENT VARIABLES**

Jyothi (2012) in her study on farm mechanization expectations of cotton growers has revealed that variables such as cropping intensity, material possession, extension contact, mass media exposure and risk orientation were not significantly related with the knowledge level of cotton growers whereas age was negatively significant with knowledge. Variables such as innovative proneness was found to be having positive significant relationship with knowledge level of the cotton growers variables such as education, land holding, annual income and economic motivation had highly positive and significant relationship with knowledge level of the cotton growers .

Jyothi (2012) in her study on farm mechanization expectations of cotton growers has revealed that variables such as age, land holding, annual income, cropping intensity, material possession, extension contact, mass media exposure and economic motivation were not significantly related with the extent of utilization. Whereas, variables such as education and innovative proneness were found to be having positive significant relationship with extent of utilization of the farm implements and machinery by the cotton

growers at 0.05% level of significance. variables such as risk orientation had highly positive and significant relationship with extent of utilization at 0.01% level of significance

Nagaraj (2012) conducted a study on study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that six independent variables viz., education, land holding, mass media participation, material possession, extension contact and extension participation showed positive and significant relationship at 0.01 level of probability, whereas farming experience and scientific orientation showed positive and significant relationship at 0.05 level of probability with their knowledge of farm mechanization practices by paddy growers. The remaining variables viz., livestock possession, risk orientation, achievement motivation and management orientation did not establish any significant relationship and age had non-significant and negatively correlated with their knowledge of farm mechanization practices by paddy growers.

Nagaraj (2012) conducted a study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that the six independent variables viz., mass media participation and extension participation showed positive and significant relationship at 0.05 level of probability whereas remaining variables namely education, farming experience, land holding, material possession and extension contacts and scientific orientation showed positive and significant relationship at 0.01 level of probability with their adoption of farm mechanization practices paddy growers. The remaining variables viz., livestock possession, achievement motivation, risk orientation and management orientation did not establish any significant relationship, age had non-significant and negatively correlated with their adoption of farm mechanization practices by paddy growers.

Channamallikarjuna (2013) in his study on adoption of SRI method of paddy cultivation by farmers revealed that among fourteen independent variables viz., education, area under SRI method, family income, experience in SRI method cultivation, innovative proneness, risk orientation, extension participation and extension contact showed positive and significant relationship at 0.01 level of probability where as land holding, social organization, mass media participation, cosmopoliteness and Farmers Field Schools training showed positive and Significant relationship at 0.05 level of probability with their knowledge of recommended practices of SRI method cultivation of paddy crop. The remaining only one variable *i.e.*, age did not establish any significant relationship with their knowledge of recommended practices.

Channamallikarjuna.(2013) in his study on adoption of SRI method of paddy cultivation by farmers revealed that that among ten independent variables of adoption of recommended practices, experience in SRI method cultivation, risk orientation, innovative prones, extension contact, extension participation, cosmopoliteness and Farmers Field Schools training at 0.01 level of probability, whereas remaining variables namely education, land holding, area under SRI method, family income, mass media participation and social organization, showed positive and Significant relationship at 0.05 level of probability with their adoption of recommended practices.

Kumar (2014) in his study on the agricultural mechanization in Karimnagar has revealed that independent variables namely socio-economic status, participation in extension activities related to agricultural implements and machinery, availability of repair centers and types of crops cultivated were found to be positive and significantly correlated with extent of use.

Nirmala (2012) in her study on farmers knowledge on System of Rice intensification (SRI) in Andhra Pradesh concluded that there was a positive and significant relationship between the level of knowledge of respondents on SRI technology and the variables viz., education, training in SRI, extension

contact, sources of information utilization, perception of respondents, innovativeness and input availability.

Yassing *et al.*(2016) in their study on mechanization of farm operations in selected crops of Assam revealed that the size of land holding and the extent of farm mechanization had a positive and significant relationship and also positive relationship between the annual income of the respondents and the extent of mechanization.

## **2.5 CONSTRAINTS FACED BY THE USERS IN THE UTILIZATION OF CUSTOM HIRING CENTRES AND SUGGESTIONS TO OVERCOME THE CONSTRAINTS.**

### **2.5.1. Constraints Faced by the Users in the Utilization of Custom Hiring Services**

Nagaraj (2012) conducted a study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area, Karnataka revealed that in adoption of farm mechanization practices by paddy cultivation farmers were facing the constraints of inadequate subsidy/loan (95.00), high cost of technology, including repair and maintenance charges (93.33%), high cost of implements (90.83%), lack of skilled laborers for handling of combine harvester and thresher (87.50%), inadequate guidance and co-operation from dealers (86.67%), poor economic conditions (85.83%), lack of expertise for repair of spray pump (85.00%), lack of skilled labourers for spraying (81.67%), lack of spare parts in local areas (80.83%), lack of knowledge about operation and maintenance (79.17%), small land holding is hindrance to adopt technologies (74.17%) and lack of technical detail about new implement (70.83%) were the main constraints as expressed by the farmers in the adoption of the farm mechanization practices in the cultivation of paddy crop.

Singh *et al.* (2013) in their study on custom hiring services of farm machinery in punjab:impact and policies revealed that the custom hiring farmers reported the problems of costly, inadequate and lack of timely availability of custom hiring services.

Singh *et al.* (2013) in their study on economic impact of custom hiring services of machinery on farm economy in Punjab revealed that custom hire out services of Agro Machinery Service Centres (AMSC) that 55.00 per cent of the farmers rued the unavailability of the machinery from the cooperatives at required time. Other 30.00 per cent of the farmers reported the bad condition of the implements due to multiple repairs and 10.00 per cent faced the problem of frequent break down of machinery.

Kumar (2014) in his study on the agricultural mechanization in Karimnagar revealed that majority of paddy farmers expressed the problem of wheel breakage (83.30%) in power tiller followed by wear and tear of blades in puddler (66.60%). In case of irrigated dry crop growers majority (75.00%) of farmers were expressed the problem of loosening of bolts and nuts in mould bold plough followed by plough shear wear out (63.30%).

Shadrack *et al.* (2012) in their study on potential and constraints of agricultural mechanization in Ghana revealed that the major constraints to mechanization were lack of skilled labour to operate such machinery, small farm sizes, unfavourable government policies and high cost of farm machinery.

Gajpal *et al.*(2015) in their study on utilisation pattern and constraints in use of custom hiring of agricultural machinery in paddy crops in Raipur district of Chhattisgarh reported that lack of availability of machinery in time was major constraint which was 70.37 percent of total custom hiring selected farmers. Lack of government custom hiring centers and higher rate of custom hiring were reported another major constraints *i.e.*, 66.66 percent and 59.25 percent of respondents respectively. Field situation was not appropriate for



machine use at time of harvesting and losses due to used of machine were reported another constraints by 29.62 percent and 20.37 percent of respondent respectively. Due to loss of grains at the time of harvesting in the field, which created trouble to change the variety of paddy to next upcoming year and due to weight of combine harvester the field soil was more compact, which created trouble at the time of ploughing. Field location and small field were other constraints as expressed by 20.37 percent and 11.11 percent of respondent respectively.

Parasunath *et al.* (2016) in their study on constraints of farmers in utilizing custom hiring service (CHS) of tractor based farm machineries revealed that the custom hiring farmers faced the problems that were associated with the utilization of private CHS like lack of timely, inadequate availability and high cost of tractor services.

#### **2.5.2. Suggestions to overcome constraints in utilization of custom hiring centres.**

Singh *et al.* (2013) in their study on economic impact of custom hiring services of machinery on farm economy in Punjab revealed that regarding non availability of required farm machinery as well as availability at crucial time can be solved through increasing the number of commonly used machines and implements at Agro Machinery Service Centre(AMSC).

Singh *et al.* (2013) conducted a study on impact and policies of custom hiring services of farm machinery in Punjab. The study came out with suggestion that the government should develop the Primary Agricultural Cooperative Societies as Agro-Service Centers for custom hiring services and take steps like fixing the custom hiring rates, reducing fuel costs and creating more awareness about custom hiring of farm machinery.

Gajpal *et al.*(2015) in their study on utilization pattern and constraints in use of custom hiring of agricultural machinery in paddy crops in Raipur district of Chhattisgarh reported that a government custom hiring centre

should required in block level, so the price of custom hiring of machinery is fixed and low as compared to offers by private owner of machinery, training relating to farm machinery and equipment should be imparted to the farmers, the useful equipment should be identified and farm machinery suitable for different types of soil and operations for important crops should be developed and manufactured.

Parasunath *et al.* (2016) in their study on constraints of farmers in utilizing custom hiring service (CHS) of tractor based farm machineries revealed that there is a need to expand and develop the more public CHSCs as these can contribute to solve the problem of timely availability of machinery to farmers and also there is need for creating more awareness about custom hiring of machineries through public agencies.

Sidhu and Kamal (2012) in their study on economic viability of cooperative agro machinery service centers in Punjab found that there is a need to strengthen the Agro Machinery Service Centres in Punjab by increasing the number of farm machinery to solve the problem of timely non-availability of machinery services to the farmers, particularly during the peak season, especially to the small and marginal farmers.

## **2.6 CONCEPTUAL MODEL OF THE STUDY**

Conceptual model is a diagrammatic representation outlining the dominant elements of a system and their interrelationships with respect to a criterion variable. Conceptual model is formulated based on experience and in the present study, review of related studies was also formed as the basis for the conceptual model. The variables included in the study were grouped into independent and dependent variable.

It is clear from the model that the two dependent variables viz., performance, extent of utilization of custom hiring centres was assessed on the basis of review of relevant literature with fifteen independent variables

representing the profile of the users of CHCs in Chittoor district of Andhra Pradesh.

This model was hopefully conceived with a view to give performance and extent of utilization of custom hiring centres by the users and 15 independent variables affecting them. The relationship was diagrammatically presented in Fig. 2.1 which will help to derive hypothesis for empirical testing.

## **RESEARCH HYPOTHESIS**

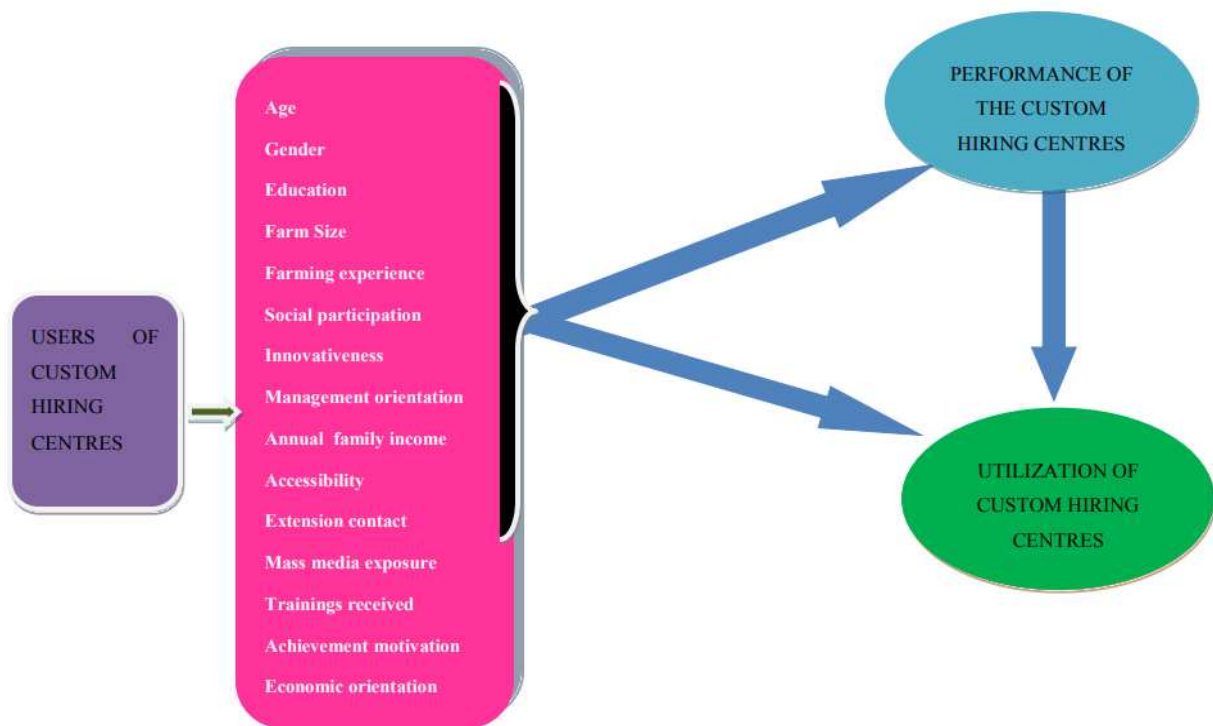
### **General Hypothesis I**

There will be a significant relationship between the profile characteristics of users of the custom hiring centres with the performance of the custom hiring centres.

### **General Hypothesis II**

There will be a significant relationship between the profile characteristics of users of the custom hiring centres with the extent of utilization of the services of custom hiring centres.

The null and empirical hypothesis deduced from the general hypothesis with respect to independent and dependent variables under study were reported ,tested and presented in the ‘Results’ chapter.



**Fig.2.1 Conceptual model of the study**

# *Chapter – III*

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## *Material and Methods*



## 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 measurement
- 3.4. Constraints faced and suggestions given by the users of CHCs
- 3.4 Devices used for data collection
- 3.5 Statistical procedures followed

### 3.1 RESEARCH DESIGN

*Ex-post-facto* research design was adopted for the study. Kerlinger (1973) defined *ex-post-facto* research design as any systematic enquiry in which the independent variables have not been directly manipulated because they have already occurred or they are inherently not manipulated. He further stated that *ex-post-facto* studies can be devised to deduce theories, identify behavioural phenomenon and explore conditions under which a phenomenon occurs.

Keeping in view, the adaptability of the proposed design with respect to the type of variables under consideration, size of the respondents and

phenomenon to be studied, *ex-post-facto* design was selected as an appropriate research design.

## **3.2 SAMPLING PROCEDURE**

### **3.2.1 Locale of the study**

Andhra Pradesh state was chosen as the locale of the study since the researcher belongs to the same state and was familiar with the local language and culture. Hence, building up of rapport with the respondents would become easier.

### **3.2.2 Selection of the district**

Chittoor district of Andhra Pradesh was purposively selected for the following reasons.

- a) Groundnut is a major crop in the district and considerably a good number of custom hiring centres were functioning in the district for hiring machinery to carry out various operations in groundnut cultivation.
- b) No similar type of research work was conducted in this district regarding the performance and utilization of custom hiring centres.
- c) The investigator is familiarity with the area and the language spoken helped to build up good rapport with the respondents.
- d) Further the researcher is an In-service candidate working as an Agricultural Officer (A.O) in the same district.

Chittoor district of Andhra Pradesh selected for the study is shown in Fig 3.1.



### **3.2.3 Selection of mandals**

Out of 66 mandals of Chittoor district, eight mandals viz., Peddamandyam, B.Kothakota, Peddathippasamudram (P.T.M), Molakalacheruvu, Kalikiri, Kalakada, Kambhamvaripalli and Gurramkonda were purposively selected where maximum number of custom hiring centres were present and shown in Fig.3.2.

### **3.2.4 Selection of villages**

Two villages were selected purposively from each mandal where the maximum number of users of custom hiring centres were present. Thus making a total of sixteen custom hiring centres from sixteen selected villages and shown in Fig.3.2.

### **3.2.5 Selection of respondents**

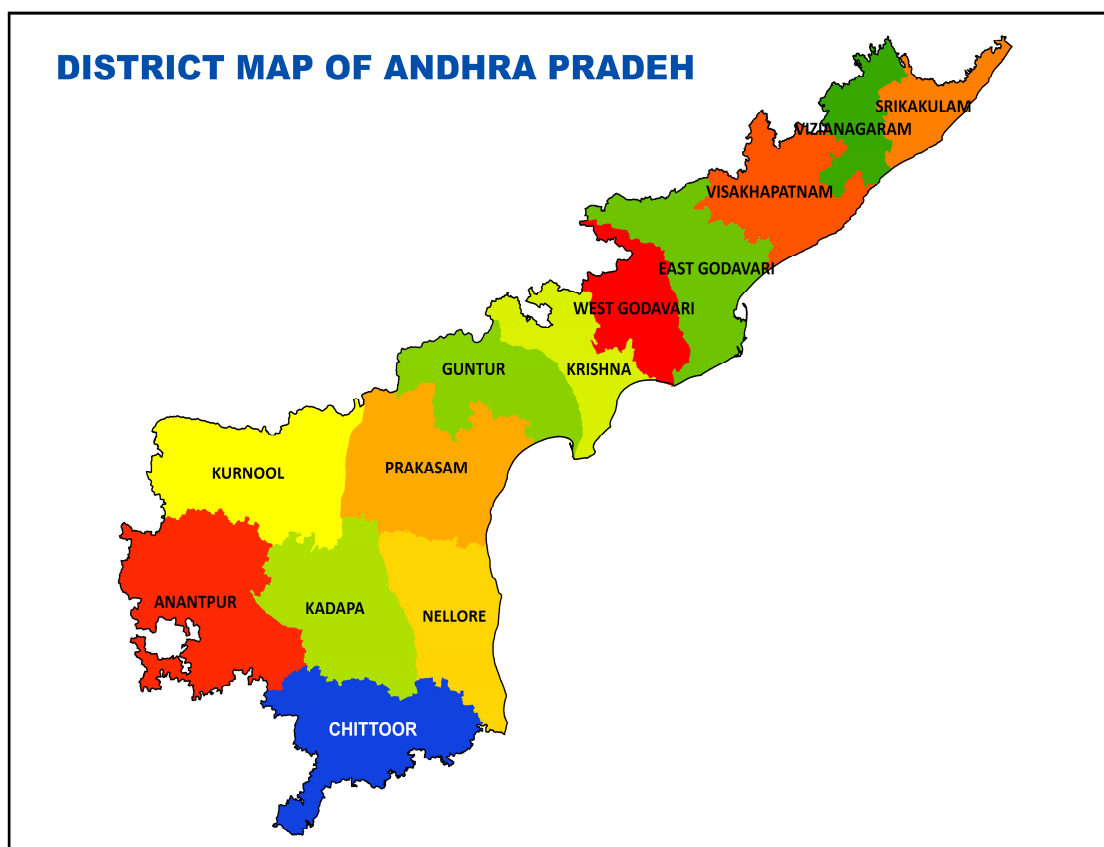
Among the users of sixteen selected custom hiring centres, the respondents were selected based on the proportionate random sampling procedure from each selected custom hiring centre thus making a total of 120 respondents. The details of sampling procedure shown in Table 3.1 and Fig.3.3.

**Table 3.1. Selection of mandals, villages and respondents from Chittoor district of Andhra Pradesh**

<b>S. No.</b>	<b>Name of the mandal</b>	<b>Name of the village</b>	<b>No of users</b>	<b>No of respondent</b>
1.	Peddamandyam	Mallaiahgaripalli	30	9
		Kotaguttapalli	20	6
2	B.Kothakota	B.Kothakota	25	8
		Sunkalavaripalli	30	9
3.	Peddathippasamudram	Peddathippasamudram	20	6
		T.sodam	15	5
4.	Molakalacheruvu	Sompalli	25	8
		Yesuvaripalli	30	9
5.	Kalikiri	Marrikuntlapalli	20	6
		Pallavolu	25	8
6.	Kalakada	Srinivasapuram	25	8
		Nadimcherla	20	6
7	Kambhamvaripalli	Kondakindapalli	20	6
		Kondakindapalli harijanawada	25	9
8	Gurramkonda	Majjigavandlapalli	25	8
		Jeevanathopu	30	9
		<b>Total</b>	<b>385</b>	<b>120</b>

### **3.3 VARIABLES AND THEIR EMPIRICAL MEASUREMENT**

The variables for the present study have been selected on the basis of extensive review of literature on the subject, consultation with the experts and previous studies taken up on the related subjects. Only those variables, which were having most relevance to the present investigation were selected for the study. The list of selected variables as shown in Table 3.2.

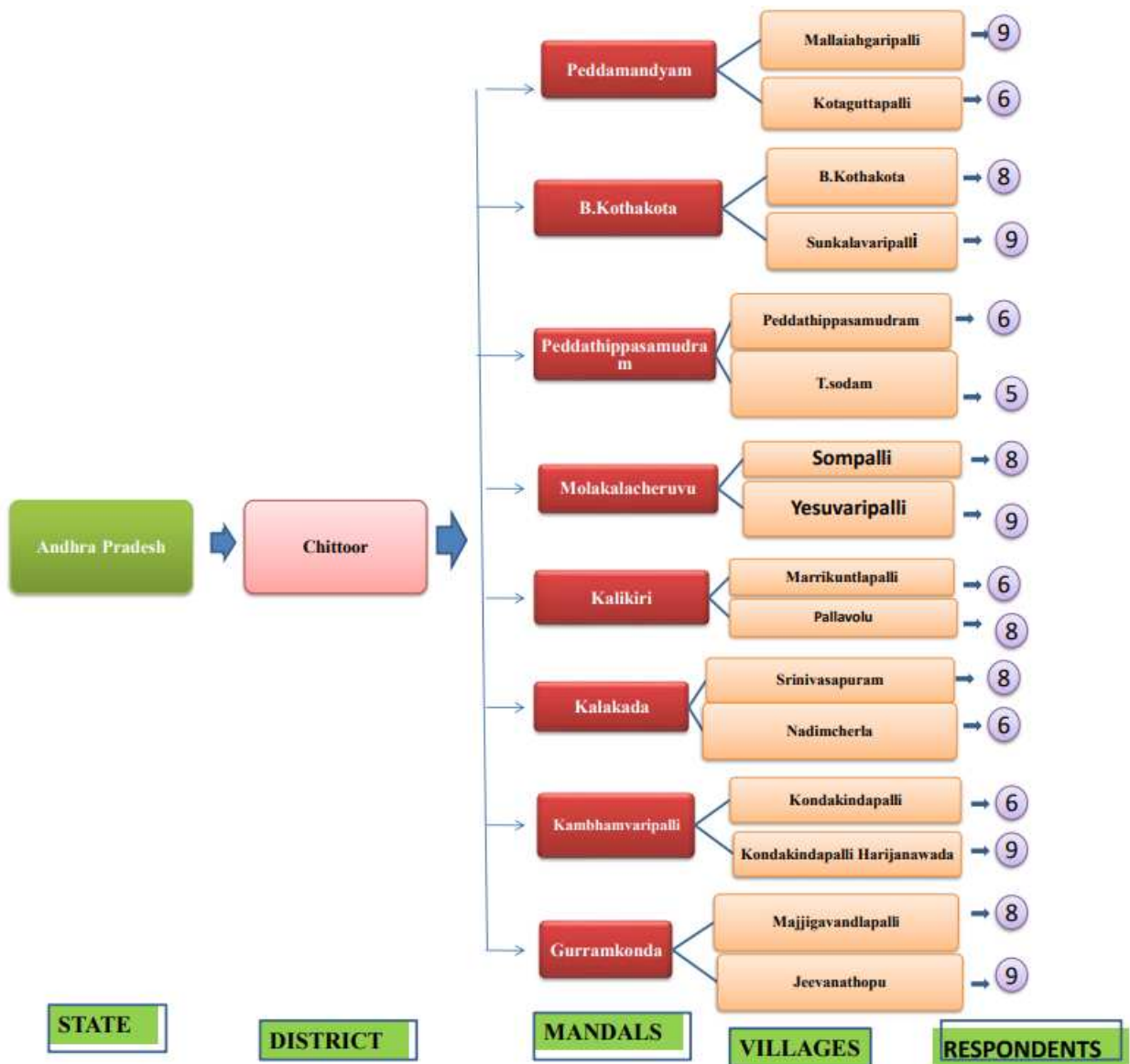


**Fig. 3.1. Map showing Chittoor District of Andhra Pradesh**



**Table 3.2. Variables and their empirical measurement**

<b>S.No.</b>	<b>Variable</b>	<b>Empirical Measurement</b>
<b>A.</b>	<b>Dependent Variables</b>	
1.	Performance of Custom hiring centres	Schedule developed for the study.
2.	Extent of utilization of Custom hiring centres	Schedule developed.
<b>B.</b>	<b>Independent variables</b>	
1.	Age	Chronological age of the respondents.
2.	Gender	Gender of the respondent.
3.	Education	Scale developed by Venkatramaiah (1991) with suitable modifications.
4.	Farm size	Number of acres possessed at the time of investigation.
5.	Farming experience	Number of years of experience in farming.
6.	Social participation	Schedule developed by Bawajir and Nandapurkar (1985) with suitable modifications.
7.	Innovativeness	Scale developed by Nandapurkar (1985) with suitable modifications.
8.	Management orientation	Schedule developed for the study
9.	Annual family income	Schedule developed for the study
10.	Accessibility	Schedule developed for the study
11.	Extension contact	Scale developed by Badrinarayana(1997) with suitable modifications
12.	Mass media exposure	Schedule developed for the study
13.	Trainings received	Number of trainings undergone
14.	Achievement motivation	Schedule developed for the study
15.	Economic orientation	Schedule developed for the study



**Fig.3.3 Sampling procedure followed in the study**

### 3.3.1 Dependent Variables

#### 3.3.1.1 Performance of custom hiring centres (Y1)

The performance of selected custom hiring centres was evaluated based on the net income generated per year and number of hours worked and operational costs per year. Based on the net income per year, the custom hiring centres were classified in to three categories viz., High, Medium and Low performing centres. For every one thousand rupees of net income a score of ‘one’ was given.

The costs incurred by the custom hiring centres in operating and maintaining the machinery was worked out considering both fixed and variable costs. The variable costs like cost of fuel, operating charges, repairs and maintenance and fixed costs like depreciation, interest and insurance were considered. Gross returns were worked out by multiplying the number of hours worked by each machinery/equipment in a year and per hour hiring charges for the respective operation. Calculation of net returns were given in the figure.3.4.

$$\text{Depreciation, } D = (P-S)/L$$

Where,

D=Yearly depreciation

P=Purchase price of the machinery

S=Salvage value or the selling price of the machine after its useful life (Rs).

(Assumed to be the 10% of the purchase price)

L=Useful life of the machine between buying and selling (years)

Interest on fixed capital

$$I = P \times i/100$$

Where,

$I$  = Rate of Interest on fixed capital

$P$  = Purchase price of the machine (Rs.)

Total fixed cost = Depreciation + Interest on investment + Insurance

Total variable cost = Fuel cost + Repair and maintenance cost + Operator  
and labour wages

Fuel cost (Rs) = Fuel price (Rs./lit) x Fuel consumption (lit/hr) x Number of  
Hours engaged

Total cost of farm machinery (TC) = Total Fixed Cost (TFC) + Total Variable  
Cost (TVC)

Net income = Gross income – Total cost of the farm machinery

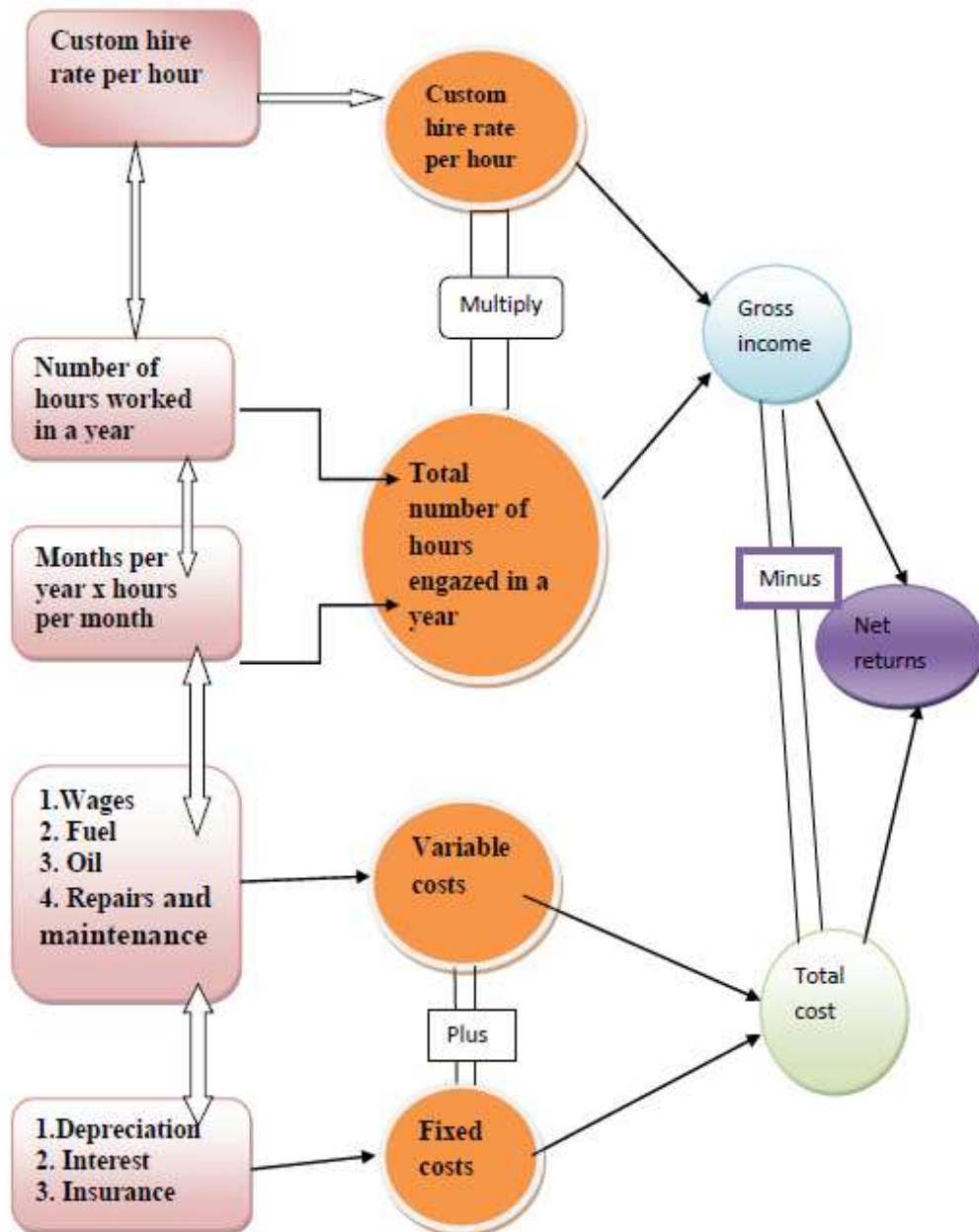
### **3.3.1.2 Extent of utilization of services of custom hiring centres(Y2)**

Extent of utilization of farm machinery and implements can be operationalized as the degree of usage of agricultural implements and machinery for the field operations.

Statements were developed to measure the extent of utilization of services of custom hiring centres by the respondents. There were eight statements listed out for eliciting the farmers responses on a two point continuum of yes and no with scores of 2 and 1 respectively. The maximum and minimum possible obtained scores were 16 and 8 respectively.

A schedule was developed to measure the extent of utilization of agricultural machineries under custom hiring centres by the respondents. The schedule consisted of eight machines along with tractor which was a package for ground nut crop were listed out eliciting farmers responses on a three point continuum of regularly used, occasionally used and never used with scores of 2, 1 and 0 respectively. The maximum and minimum possible scores obtained were 16 and 0 respectively.





**Fig.3.4 Calculation of net returns of a custom hiring centre**

Total score of the individual was obtained by summing up of individual scores obtained for each statement and each machinery and implements under custom hiring centre. The maximum and minimum possible scores obtained were 32 and 8 respectively. Based on the total scores of overall extent of utilization of agricultural implements and machinery, the respondents were grouped into three categories namely low, medium and high.

The results were expressed in the form of frequencies and percentages.

### **3.3.2 Independent Variables**

#### **3.3.2.1 Age (X1)**

It refers to the chronological age of the respondents in completed years at the time of investigation. A score of ‘one’ was given for every completed year. The respondents were grouped into three categories based on number of completed years as follows.

<b>S. No.</b>	<b>Category</b>	<b>Score</b>
1.	Young age	35 and below
2.	Middle age	36 to 55 years
3.	Old age	56 years and above

#### **3.3.2.2 Gender (X2)**

It refers to the gender of the respondent .A score of ‘two’ was given for ‘male’ gender and score of one was given for female gender

#### **3.3.2.3 Education (X3)**

It was operationally defined as the educational level attained by the individual respondent at the time of investigation. It was measured by using a schedule developed for the study.

S. No.	Category	Score
1	Illiterate	1
2	Primary school	2
3	Middle level	3
4	High school	4
5	Collegiate education	5
6	Graduate	6
7	Post-Graduate	7

#### 3.3.2.4 Farm Size (X<sub>4</sub>)

It was operationally defined as the total extent of land an individual farmer possessed and under cultivation at the time of enquiry. The respondents individual scores were noted for calculation and based on the scores obtained for land holding, the respondents were classified into three groups as follows.

S. No.	Category	Farm Size
1.	Small farmer	Below 2.5 acres
2.	Medium farmer	Between 2.5 to 5 acres
3.	Large farmer	Above 5 acres

#### 3.3.2.5 Farming experience (X<sub>5</sub>)

Farming experience was operationalized 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.

S. No.	Category	Score
1.	Low farming experience	Below mean-S.D.
2.	Medium farming experience	Between mean $\pm$ S.D.
3.	High farming experience	Above mean + S.D.

### 3.3.2.6 Social participation(X6)

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/she participates. Bawajir and Nandapurkar (1985) quantified this variable in the following manner.

Sl.No	Category	Score
1	Member of one organization	1
2	Member of more than one organization	2
3	Office Holder	3
4	Wider Public Leader	4

Based on the scores obtained by the respondents, they were grouped as:

S. No.	Category	Score
1.	Low social participation	Below Mean – S.D.
2.	Medium social participation	Between Mean $\pm$ S.D.
3.	High social participation	Above Mean + S.D.

### 3.3.2.7 Innovativeness (X<sub>7</sub>)

Innovativeness refers to the degree of relative earliness with which a respondent used a new improved technology in a social system. The scale developed by Nandapurkar (1980) was used with suitable modifications in the present study for measuring the innovativeness of users of custom hiring centres. The scale consisted of seven statements. These statements were rated on a five point scale viz., ‘strongly agree’, ‘agree’, ‘undecided’, ‘disagree’ and ‘strongly disagree’ with the scores 5,4, 3, 2 and 1 respectively for positive statements and 1, 2,3,4 and 5 respectively for negative statements. The

minimum and maximum scores were 7 and 35 respectively. Based on mean and standard deviation the respondents were divided into three categories as shown below.

S. No.	Category	Score
1.	Low innovativeness	Below Mean – S.D.
2.	Medium innovativeness	Between Mean $\pm$ S.D.
3.	High innovativeness	Above Mean + S.D.

### 3.3.2.8 Management orientation (X8)

Management orientation was operationalised as the degree to which a farmer was oriented towards scientific farm management comprising of planning and production functions of his farm enterprise. It was measured with the help of a scale developed by Samantha (1977) with suitable modifications. The scale consists of two sub sections *i.e.* Planning orientation with four positive and two negative statements and Production orientation with two negative and four positive statements.

The responses given were rated on a two point scale viz. agree and disagree with scores 2,1 for positive statements and 1, 2 for negative statements respectively.

Based on the total scores obtained by the respondents on management orientation they were grouped into three following categories based on mean and standard deviation.

S. No.	Category	Score
1.	Low management orientation	Below Mean – S.D.
2.	Medium management orientation	Between Mean $\pm$ S.D.
3.	High management orientation	Above Mean + S.D.

### 3.3.2.9 Annual family income (X<sub>9</sub>)

Annual family income was operationalized as the actual income of the respondent summed up for the whole year from agriculture and other sources. For every one thousand rupees of income a score of ‘one’ was given. Based on total scores obtained the respondents were divided into three categories by using mean and standard deviation as follows.

S. No	Category	Score
1.	Low annual income	Below Mean – S.D.
2.	Medium annual income	Between Mean $\pm$ S.D.
3.	High annual income	Above Mean + S.D.

### 3.2.2.10 Accessibility(X<sub>10</sub>)

Accessibility is the usability of a product, service, environment or facility by people with the widest range of capabilities according to International organization for standards.

S.No	Particulars	Strongly Agree	Agree	Disagree
1	Timely availability of farm machinery from CHC	3	2	1
2	CHC is located at strategic location (with in the radius of 5-7 km)	3	2	1
3	Farm machinery available at reasonable rates in CHC	3	2	1
4	No need for long term investment by farmers to own farm machinery	3	2	1
5	CHC machinery are in good condition	3	2	1
6	Flexibility in use of farm machinery (less or extend time period)	3	2	1

The responses were recorded in three point scale, i.e. “strongly agree”, “agree”, “disagree” and the scoring pattern followed was 3, 2 and 1 respectively. The extent of accessibility was measured on the basis of quantification followed by a structured schedule. The respondents were grouped into three categories based on the mean and standard deviation.

Based on the total score obtained the respondents were classified into three categories by considering the mean and standard deviation as follows.

S.No.	Category	Score
1.	Low accessibility	Below mean-S.D.
2.	Medium accessibility	Between mean $\pm$ S.D.
3.	High accessibility	Above mean + S.D.

### 3.3.2.11 Extension contact ( $X_{11}$ )

This variable was measured in terms of frequency of meeting of the user of custom hiring centre i.e. “frequency of extension contact” with the extension workers like Agricultural extension Officers, Village secretary, Multipurpose extension officers, Agricultural Officers, Joint director of Agriculture, Deputy Director of Agriculture, Assistant Director of Agriculture, Scientists of Acharya N.G. Ranga Agricultural university, N.G.O personnel, Private company officials, Input dealers, Bank officials, Fellow farmers/Progressive farmers and any others related. This variable is measured with the help of scale developed by Badrinarayana(1997) with suitable modification. The responses were recorded in three point scale, i.e. “regularly”, “occasionally”, “never” and the scoring system followed was 2, 1 and 0 respectively. The extent of extension contact was measured on the basis of quantification followed by a structured schedule. The respondents were grouped into three categories based on the mean and standard deviation.

S. No.	Extension personnel	Frequency of contact		
		Regularly (2)	Occasionally (1)	Never (0)
1.	Village Secretary/ MPEO/AEO			
3.	Agricultural officers			
4.	A.D.A/D.D.A/J.D.A			
6.	ANGRAU scientists			
7.	N.G.O personnel			
8.	Private company officials			
9.	Input dealers			
10.	Bank officials			
11.	Fellow farmers/Progressive farmers			
12.	Any other/s (specify)			

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

S.No.	Category	Score
1.	Low extension contact	Below mean-S.D.
2.	Medium extension contact	Between mean $\pm$ S.D.
3.	High extension contact	Above mean + S.D.

### 3.3.2.12 Mass media exposure (X12)

Mass media exposure was operationally defined as the utilization or exposure to different mass media sources by the respondent. To measure the degree of mass media exposure of the respondents, the different items included and scores assigned were given below.



S.No.	Item	Regularly (2)	Occasionally (1)	Never (0)
1	Listening to Radio			
2	Viewing Television			
3	Reading Newspaper			
4	Reading Farm Publications			
5	Attending Agriculture exhibitions			
6	Attending Kisan melas			
7	Attending Field trips			
8	Viewing C.D.s/DVDs on Agriculture and allied sector			
9	Browsing Internet/Mobile Apps			
10	Others (specify)			

Based on the total score obtained the respondents were classified into three categories by considering mean and standard deviation as follows.

S.No.	Category	Score
1.	Low mass media exposure	Below mean-S.D.
2.	Medium mass media exposure	Between mean $\pm$ S.D.
3.	High mass media exposure	Above mean + S.D.

### 3.2.2.13 Trainings received (X13):

Training received is operationally defined as the number of trainings received by the users of custom hiring centres. A score of one was given for each training received by the respondents.

S.No	Title of the training programme	Agency			
		State department of Agriculture	ANGRAU	NGO	Others
1	Number of Trainings received on farm mechanization				
2	Number of trainings received on crop technologies				
3	Others				
	<b>TOTAL</b>				

The respondents were grouped into three categories based on mean and standard deviation as given below

1.	Low trainings undergone	Below Mean – S.D.
2.	Medium trainings undergone	Between Mean $\pm$ S.D.
3.	High trainings undergone	Above Mean + S.D.

### **3.3.2.14 Achievement motivation (X14)**

Achievement motivation was operationally defined as the desire expressed by the respondent to achieve personal excellence in a given task in use of services of custom hiring centres. The schedule consisted of six statements of which three were positive and three were negative. The responses given were rated on a five point scale viz. strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2 and 1 for positive statements and 1, 2, 3, 4 and 5 for negative statements respectively. The respondents were classified into three groups based on mean and standard deviation as follows.

<b>S. No.</b>	<b>Category</b>	<b>Score</b>
1.	Low achievement motivation	Below Mean – S.D.
2.	Medium achievement motivation	Between Mean $\pm$ S.D.
3.	High achievement motivation	Above Mean + S.D.

### **3.3.2.15 Economic orientation (X15)**

Economic orientation was operationally defined as the occupational success in terms of profit maximization and the relative value placed by a farmer on economic ends. This variable was measured with the help of scale developed by Supe (2007). This scale consisted of six statements of which five statements are positive and one negative statement. The responses were recorded on five point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2 and 1 for positive statements and 1, 2, 3, 4 and 5 for negative statement respectively. The respondents were classified into three groups based on mean and standard deviation as follows.

<b>S. No.</b>	<b>Category</b>	<b>Score</b>
1.	Low economic orientation	Below Mean – S.D.
2.	Medium economic orientation	Between Mean $\pm$ S.D.
3.	High economic orientation	Above Mean + S.D.

### **3.4 CONSTRAINTS FACED AND SUGGESTIONS GIVEN BY THE USERS OF CHCS**

#### **3.4.1 Constraints Faced by the Users**

Constraints faced by the users were operationally defined as problems encountered by the users in utilizing the services of custom hiring centres. The respondents were asked to express if they faced any problems by asking them about various statements listed in the schedule, their responses were recorded and weightages were calculated and ranking was given based on it.

#### **3.4.2 Suggestions given by the Users of Custom Hiring Centres**

Suggestions by the respondents were operationally defined as the solutions given by the respondents for better utilization of services of custom hiring centres. The respondents were asked to express their suggestions by asking some questions, their responses were recorded and weightages were calculated and ranking was given based on it.

### **3.5. DEVICES USED FOR DATA COLLECTION**

#### **3.5.1 Interview Schedule**

The data were collected by administering interview schedule. Keeping in view, the specific objectives and different variables included in the study, a well structured interview schedule was developed in consultation with the experts in the field of extension and State department of Agriculture.

### **3.5.2 Pre-testing of the interview schedule**

Before giving a final shape to the interview schedule, the schedule was pretested with 30 carefully selected respondents in the non sample area. In the light of the difficulties encountered during pre-testing, the final interview schedule was modified and suitably worded for easy understanding by the respondents. The finally prepared interview schedule is given in Appendix-I

### **3.5.3 Establishing Rapport**

Prior to data collection, sufficient rapport was developed with the respondents for few days before investigation with the help of local leaders, extension personnel and officials of Agricultural department of that locality. The respondents were convinced and made clear that the study was purely academic in nature. This approach helped the investigator to establish friendly relationship with the respondents and gain their confidence and willingness to respond freely.

### **3.5.4 Method of Data Collection**

The investigator collected the data personally by administering the structured interview schedule after doing pretesting. The questions and statements were asked in local language i.e., Telugu. The personal interview with respondents helped in getting first hand information and the responses were recorded in the interview schedule.

### **3.5.5 Preparation of Report**

The data thus collected from sample respondents through interview schedule were coded, tabulated, analyzed and presented in tables to make the results meaningful and easily understandable. The results emerged out of the data were suitably interpreted, discussed and necessary conclusions and inferences were drawn.

### 3.6. Statistical Tools and Procedures Followed

Entire analysis of data was carried out using Microsoft Office Excel and SPSS software. The following statistical tests and measures were used for the analysis of the data.

#### 3.6.1 Arithmetic mean ( $\bar{X}$ )

#### 3.6.2 Standard deviation ( $\sigma$ )

#### 3.6.3 Frequency and percentage

#### 3.6.4 Correlation coefficient (r)

#### 3.6.5 Multiple linear regression (MLR)

#### 3.6.1 Arithmetic Mean( $\bar{X}$ )

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.

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

where,

$$\bar{x} = \text{Mean}$$

$$\sum x = \text{Sum of scores}$$

$$n = \text{Number of respondents}$$

#### 3.6.2 Standard Deviation ( $\sigma$ )

It is positive square root of the mean of the squared observation taken from arithmetic mean. It was used to find out the variation in the score in the dependent variable and for categorization of respondents.

$$\sigma = \sqrt{\frac{1}{n} \left( \sum x^2 - \frac{(\sum x)^2}{n} \right)}$$

where ,

$\sigma$  = Standard Deviation

$\sum x^2$  = Sum of squares of observations

$[\sum x]^2$  = Square of sum of 'x' values

n = Number of observations

### 3.6.3 Frequency and Percentage

Some of the data were subjected to and interpreted in terms of frequency and percentage wherever necessary to know the distribution pattern of respondents according to variables and for standard deviation by calculating the number of individuals that would be in given category if the number of cases were 100.

### 3.6.4 Correlation Co-efficient (r)

Correlation coefficient was used to know the relationship between the scores of independent variables and dependent variables.

The 'r' calculated value was compared with 'r' table value for n-2 degree 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.

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{\sum x^2 - \frac{(\sum x)^2}{n}} \sqrt{\sum y^2 - \frac{(\sum y)^2}{n}}}$$

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

$\Sigma x^2$  = Sum of squares of variables x

$\Sigma y^2$  = Sum of squares of variables y

$(\Sigma x)^2$  = Squares of sum of variables x

$(\Sigma y)^2$  = Squares of sum of variables y

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.

### 3.6.5 Multiple Linear Regression analysis

Multiple Linear Regression was defined as the average expected change in the dependent variable to a unit change in each independent variable put together. It was used to study the combined effect of selected independent variables over dependent variable. The regression coefficient  $b_x$  may be interpreted as the change in Y corresponding to a unit change 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 independent variables and the observed dependant variable and  $R^2$  is the portion of the variation on the criterion variable.

The regression equation may be written as

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_kX_k$$

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  $x_1$  the remaining independent variables held constant.

$X_k$  =  $k^{th}$  independent variable for  $k=1,2,3\dots k$



### **3.6.7 Preparation of Report**

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



# *Chapter – IV*

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## *Results and Discussion*



## **Chapter IV**

# **RESULTS AND DISCUSSION**

This chapter highlights the findings of the investigation with reference to the objectives of the study. The data collected during the study were coded, analyzed, interpreted and meaningful conclusions were drawn based on the results. The results and discussion of the study were presented based on the objectives under the following heads:

- 4.1 Profile characteristics of users of custom hiring centres.
- 4.2 Performance of custom hiring centres.
- 4.3 Extent of utilization of custom hiring centres by the users.
- 4.4 Relationship between the the performance and the extent of utilization of custom hiring centres by the users with their independent variables.
- 4.5 Constraints faced by the users in the utilization of custom hiring centres and suggestions to overcome the constraints.
- 4.6 Documentation of a few successful and failure cases (low performance) of custom hiring centres and to suggest a suitable strategy for effective functioning of custom hiring centres.
- 4.7 Empirical model of the study.

## 4.1 PROFILE CHARACTERISTICS OF USERS OF CUSTOM HIRING CENTRES

### 4.1.1 Age

It is clear from Table 4.1 and Fig. 4.1 that 65.84 per cent of the respondents belonged to middle age followed by old (18.53%) and young (15.83%) age categories.

**Table 4.1. Distribution of the respondents according to their age**

**n=120**

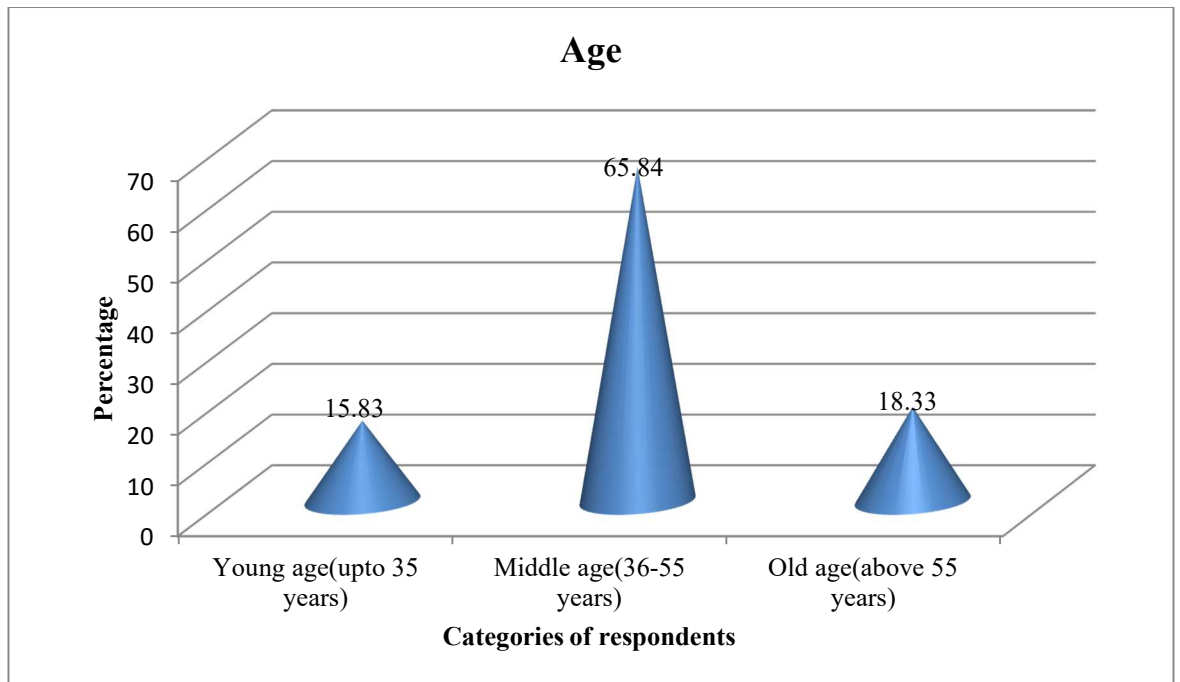
S.No.	Category	Frequency	Percentage
1.	Young age (upto 35 years)	19	15.83
2.	Middle age (36-55 years)	79	65.84
3.	Old age (above 55 years)	22	18.33
	<b>Total</b>	<b>120</b>	<b>100.00</b>

Mean: 47.4 SD: 9.54

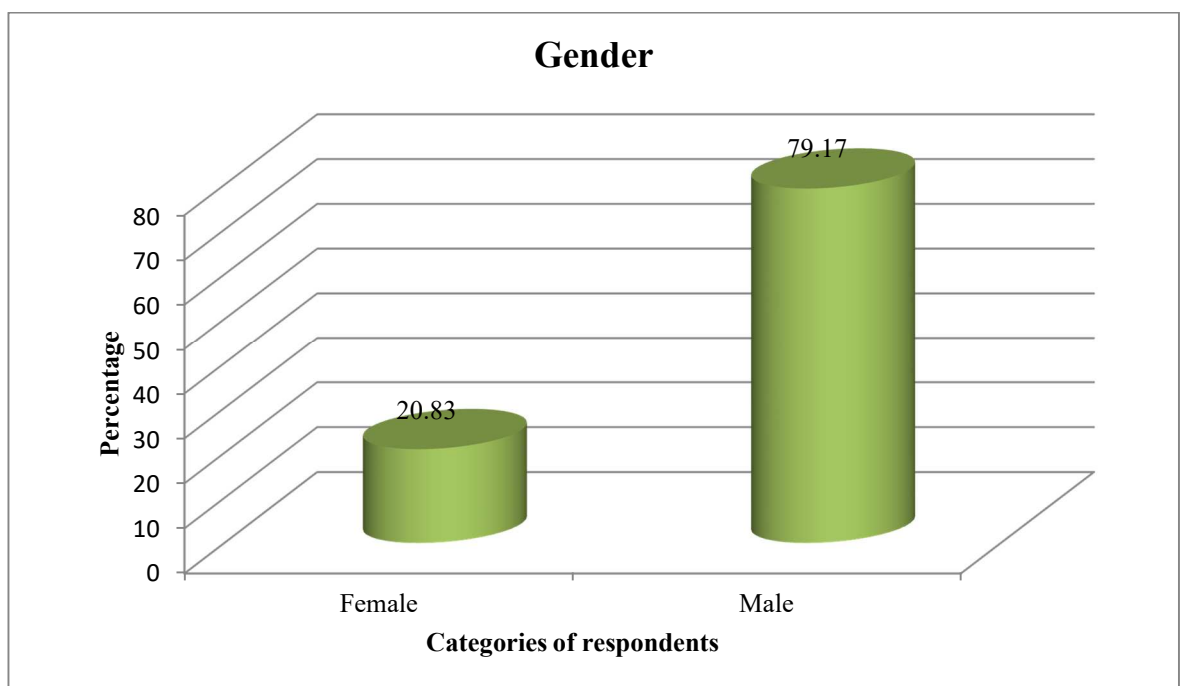
The reason for the above result might be that as income from agriculture is very uncertain, young aged rural people are preferring other jobs than agriculture. Less percentage of farmers in old age category were found utilizing the services of custom hiring centres as it was difficult for them to monitor and supervise hence this kind of result might have appeared in the study where majority of respondents utilizing the services of custom hiring centres were middle aged. This finding was in accordance with the findings of Archana (2012), Kumar (2012), Vanetha and Senthil (2013).

### 4.1.2 Gender

It is clear from Table 4.2 and Fig. 4.2 that 79.17 per cent of the respondents belonged to male where as 20.83 per cent belonged to female categories.



**Fig.4.1 Distribution of respondents according to their age**



**Fig.4.2 Distribution of respondents according to their gender**

**Table 4.2 Distribution of the respondents according to their gender****n=120**

<b>S.No.</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
1.	Female	25	20.83
2.	Male	95	79.17
	<b>Total</b>	<b>120</b>	<b>100.00</b>

The reason for the above trend might be that majority of the users enrolled in the CHC groups were male farmers where the Pattadar pass book was on the name of the male farmers which was one of the criteria for becoming the member of the CHCs. Hence the above trend was observed.

#### **4.1.3 Education**

From the Table 4.3 and Fig 4.3 could be seen that 44.16 per cent of the respondents were educated upto primary school followed by illiterate (22.50%), high school (21.66%), middle school (6.66%), collegiate education (2.53%), graduate (1.66%) and post graduation (0.83%) education.

**Table 4.3. Distribution of respondents according to their education****n=120**

<b>S.No.</b>	<b>Category</b>	<b>Score</b>	<b>Frequency</b>	<b>Percentage</b>
1.	Illiterate	1	27	22.50
2.	Primary school	2	53	44.16
3.	Middle school	3	8	6.66
4.	High school	4	26	21.66
5.	Collegiate education	5	3	2.53
6.	Graduation	6	2	1.66
7.	Post-Graduation	7	1	0.83
	<b>Total</b>		<b>120</b>	<b>100.00</b>

Mean: 2.45 SD:1.28



Therefore from the above results it could be concluded that majority of the users of custom hiring centres were educated upto primary school level. Poor financial status and absence of enough formal education institutions in the vicinity might be the probable reasons for discontinuation of education at primary level. The same result was presented by Lamidi *et al.* (2013) .

#### 4.1.4 Farm Size

It could be indicated from the Table 4.4 and Fig 4.4 that 46.67 per cent of the respondents were small farmers followed by marginal (42.50%) and big farmers (10.83%).

**Table 4.4. Distribution of respondents according to their farm size**

**n=120**

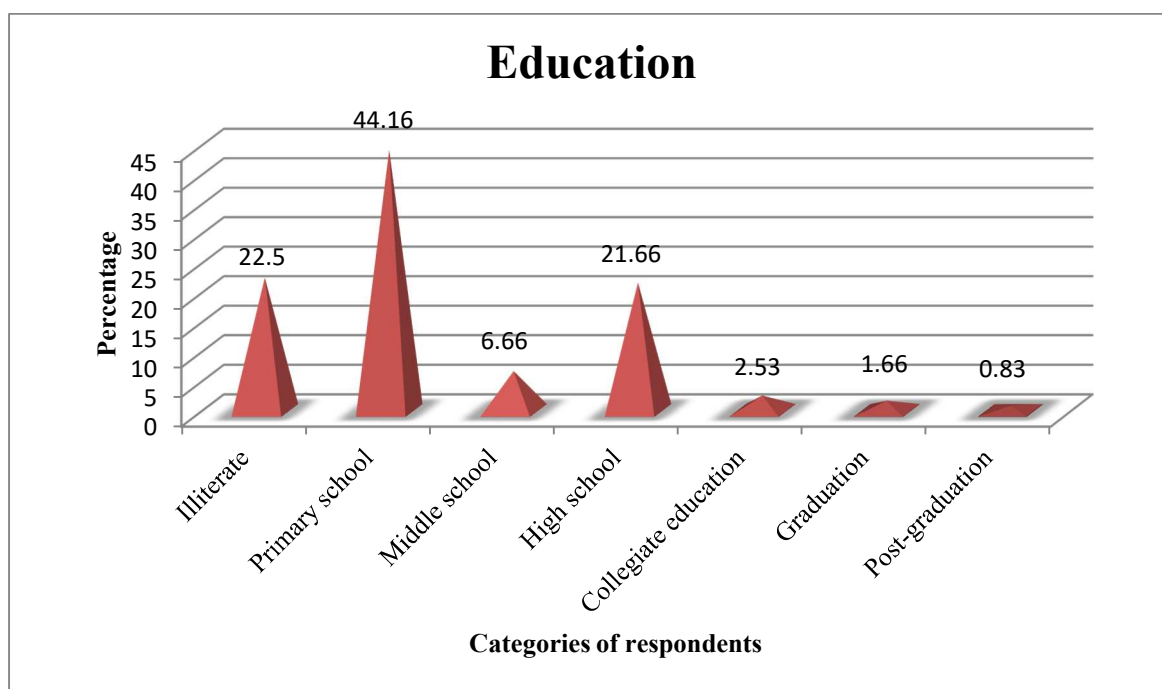
S.No.	Category	Frequency	Percentage
1.	Marginal farmers (below 2.5 acres)	51	42.50
2.	Small farmers (2.5-5.0 acres)	56	46.67
3.	Big farmers (above 5.0 acres)	13	10.83
	<b>Total</b>	<b>120</b>	<b>100.00</b>

Mean: 3.29 SD: 2.91

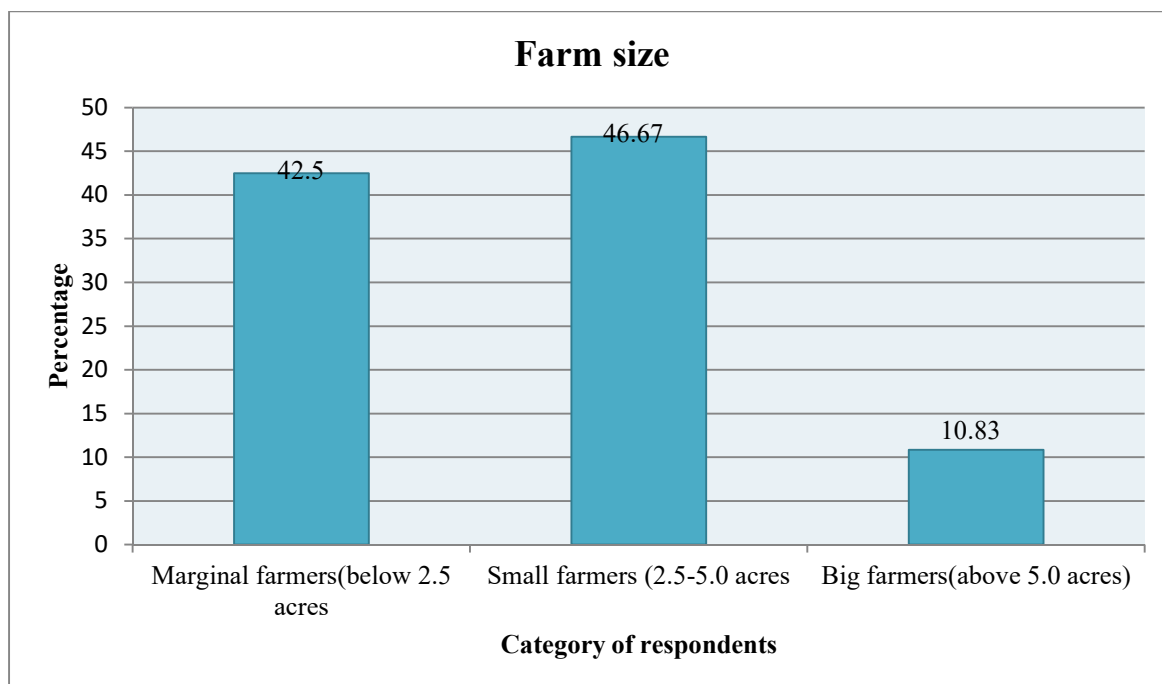
It could be inferred from the results that the sub division and fragmentation of the farm land from one generation to another generation was the main cause for declining the land holding size of each farmer in the rural areas. Hence the present study also depicted the same trend of more small land holders. The same result was generated by Archana (2012) ,Vanitha and Senthil (2013).

#### 4.1.5 Farming Experience

It could be indicated from the Table 4.5 and Fig 4.5 that 57.50 per cent of the respondents were grouped under medium farming experience followed by high (22.50%) and low (20.00%) farming experience.



**Fig.4.3 Distribution of respondents according to their education**



**Fig.4.4 Distribution of respondents according to their farm size**

**Table 4.5. Distribution of respondents according to their farming experience**  
n=120

S.No.	Category	Frequency	Percentage
1.	Low farming experience	24	20.00
2.	Medium farming experience	69	57.50
3.	High farming experience	27	22.50
	<b>Total</b>	<b>120</b>	<b>100.00</b>

Mean: 25.47 SD: 8.68

This might be due to the fact that majority of the respondents belonged to middle and old age categories. Hence most of the respondents were falling under medium to high farming experience. This was in conformity with the results of Archana (2012) and Nagaraj (2012).

#### 4.1.6. Social Participation

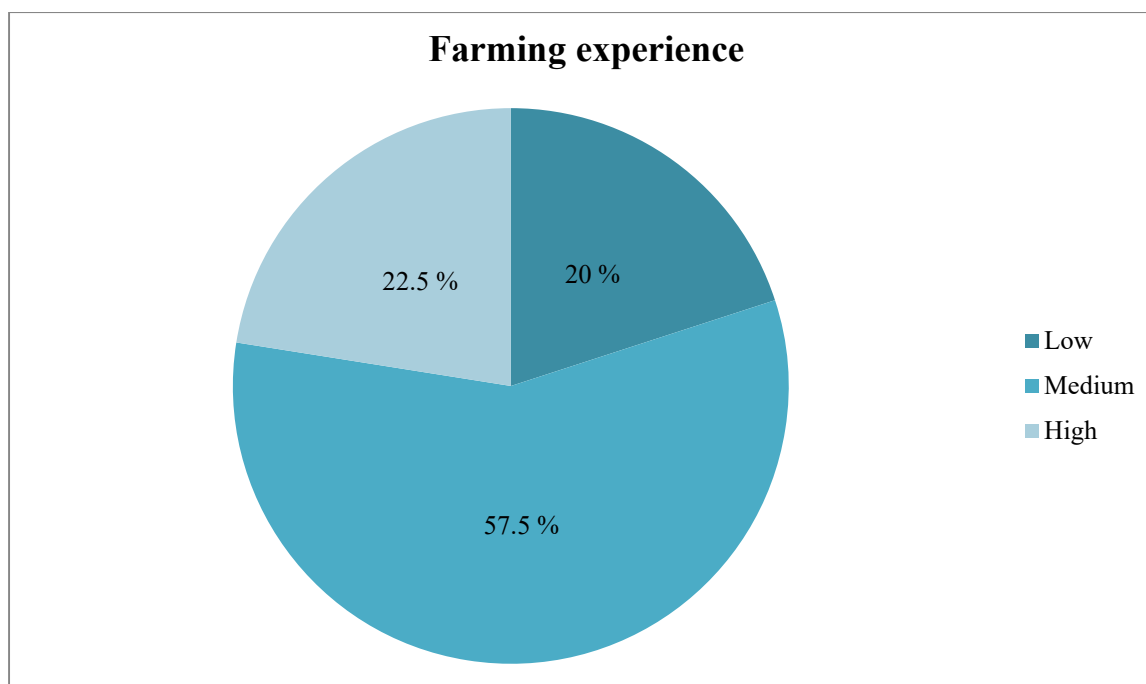
Table 4.6 and Fig 4.6 depict that 66.67 per cent of the respondents had medium level of social participation followed by low (23.33%) and high (10.00%) levels of social participation.

**Table 4.6. Distribution of respondents according to their of social participation**  
n=120

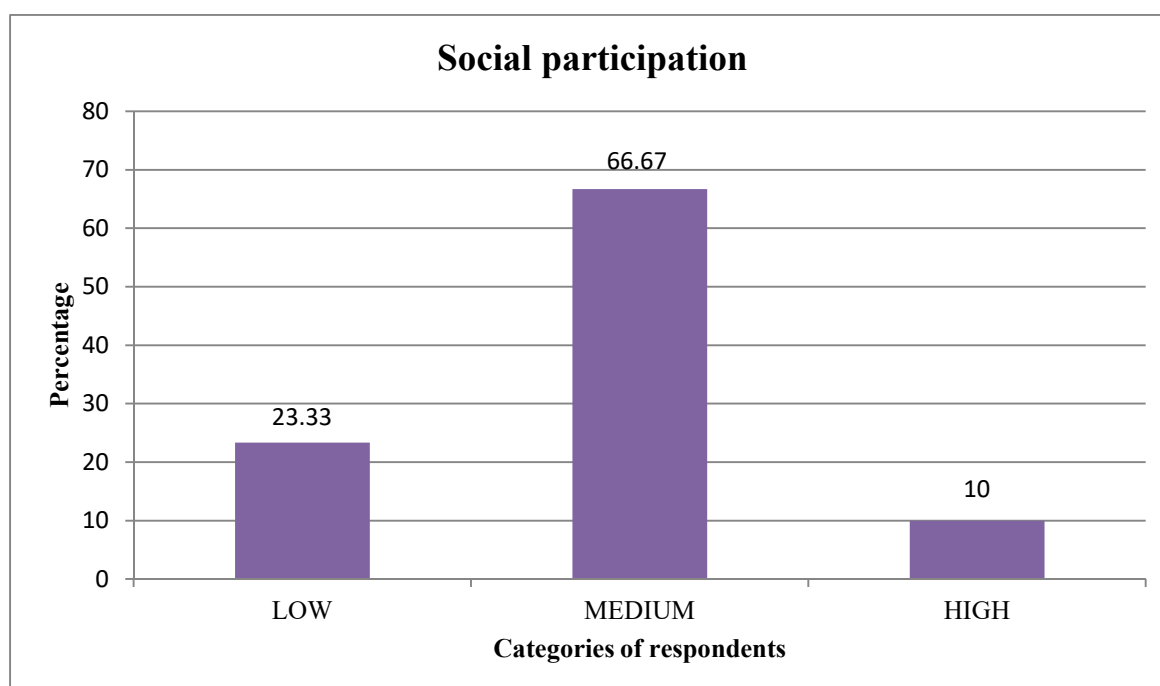
S.No	Category	Frequency	Percentage
1.	Low social participation	28	23.33
2.	Medium social participation	80	66.67
3.	High social participation	12	10.00
	<b>Total</b>	<b>120</b>	<b>100.00</b>

Mean: 0.86 SD: 0.56

The probable reason might be because of their membership in at least one of the social organization. Besides the respondents were not finding much time as they were engaged and devoted most of their time on farming. This



**Fig.4.5 Distribution of respondents according to their farming experience**



**Fig.4.6 Distribution of respondents according to their level of social participation**

might be the probable reason for their medium to low level of social participation.

The social participation of the respondents can be improved through encouraging them to participate in village organizations and become members of the organizations. The same result was generated by Vanetha and Senthil (2013), Sathyanarayana (2014).

#### 4.1.7 Innovativeness

Table 4.7 and Fig 4.7 depict that 65.00 per cent of the respondents had medium level of innovativeness followed by high (20.00%) and low (15.00%) levels of innovativeness.

**Table 4.7. Distribution of respondents according to their level of innovativeness n=120**

S.No	Category	Frequency	Percentage
1.	Low innovativeness	18	15.00
2.	Medium innovativeness	78	65.00
3.	High innovativeness	24	20.00
<b>Total</b>		<b>120</b>	<b>100.00</b>

Mean: 15.6 SD: 1.02

The possible reason for the above trend might be that the farmers with higher education and extension contact were able to update their knowledge and skills time to time and ready to accept the new technologies in their farming. On the other side, illiterate and resource poor farmers might be lacking awareness, risk taking ability to adopt such technologies. It was in conformity with Arathy (2011), Kumar (2012), Nirmala (2012) and Chadrasekhar (2016).

#### 4.1.8 Management Orientation

An overview of Table 4.8 and Fig.4.8 indicated that 60.83 per cent of the respondents had medium level of management orientation followed by low (23.33%) and high (15.84%) levels of management orientation.

**Table 4.8. Distribution of respondents according to their level of management orientation** **n=120**

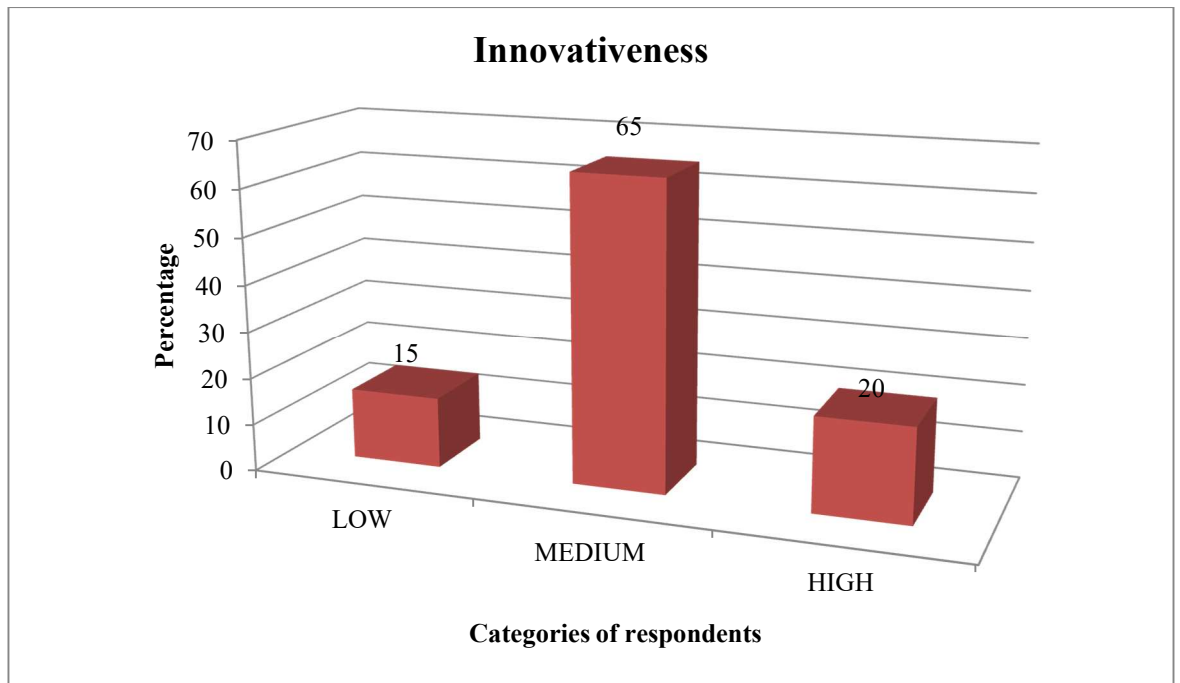
S.No	Category	Frequency	Percentage
1.	Low management orientation	28	23.33
2.	Medium management orientation	73	60.83
3.	High management orientation	19	15.84
<b>Total</b>		<b>120</b>	<b>100.00</b>

Mean: 20.44 SD: 16.65

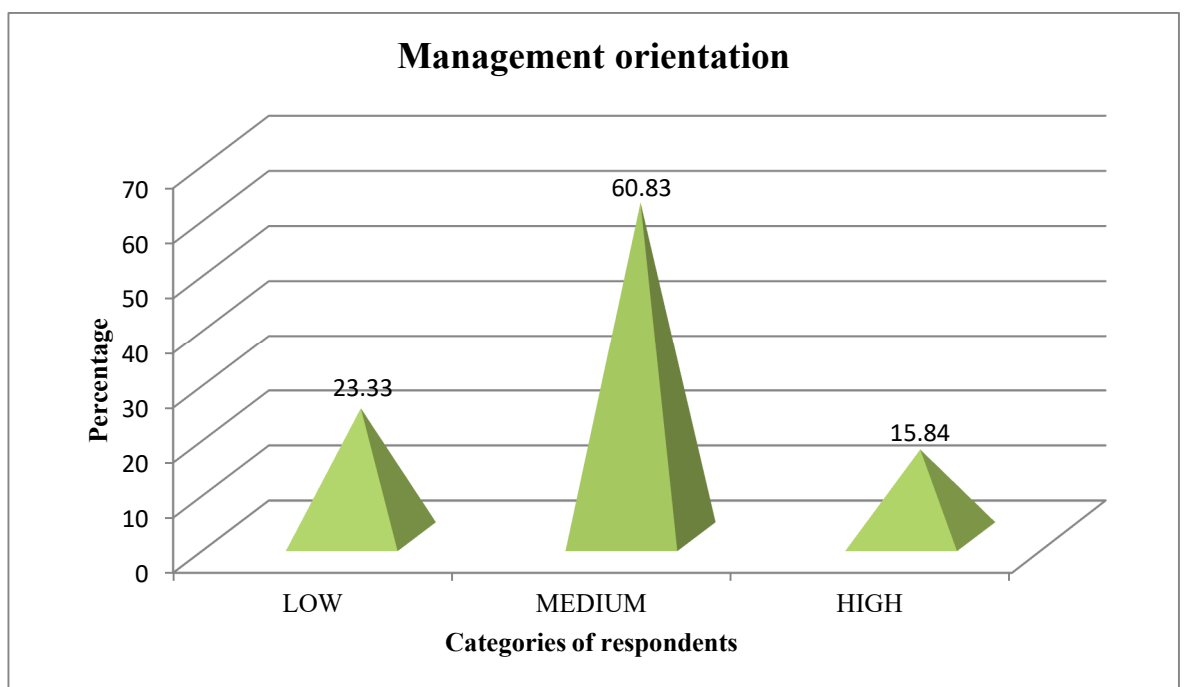
Management orientation is the ability of the farmer in scientific farm management in planning, production and marketing. Majority of the farmers being medium to old aged were having medium to high levels of farming experience. From the medium experience of farming they were moderate in planning and production aspects of farm management. This could be the probable reason for the medium level of management orientation. It was in conformity with Kumar (2012) and Hrudayranjan (2013).

#### 4.1.9 Annual family Income

It could be indicated from the Table 4.9 and Fig 4.9 that 51.66 per cent of the respondents had medium level of annual income followed by low (27.50%) and high (20.84%) levels of annual income.



**Fig.4.7 Distribution of respondents according to their level of innovativeness**



**Fig.4.8 Distribution of respondents according to their management orientation**

**Table 4.9. Distribution of respondents according to their annual income****n=120**

<b>S.No.</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
1.	Low annual income	33	27.50
2.	Medium annual income	62	51.66
3.	High annual income	25	20.84
	<b>Total</b>	<b>120</b>	<b>100.00</b>

Mean: 39.50 SD: 13.29

The above results might be because of the reason that majority of the respondents belonged to small and marginal farm holding categories and were also depending mostly on monsoon for farming. Due to uncertainty in the onset of monsoon the farmers were getting medium levels of annual income. This finding was in line with the results of Sadvi. P. *et al.* (2015).

#### **4.1.10. Accessibility**

An analytical look at the Table 4.10 and Fig 4.10 made it clear that, 66.66 per cent of the respondents had medium level of accessibility followed by low (24.17%) and high (9.17%) levels of accessibility.

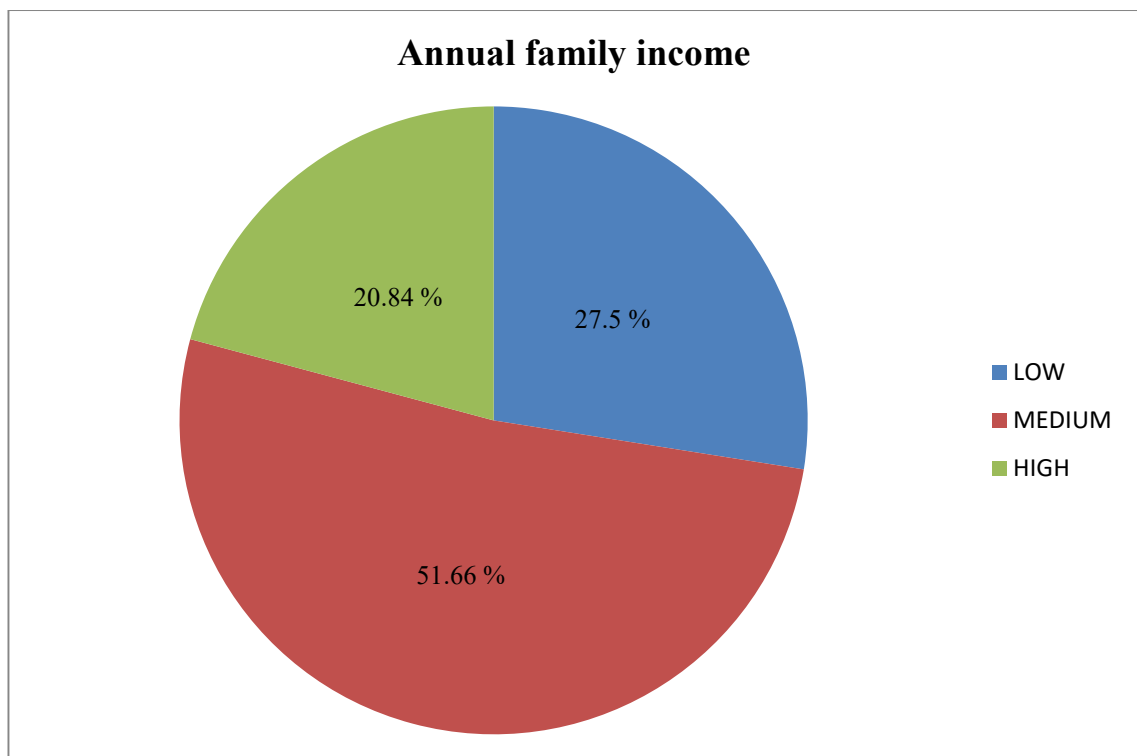
**Table 4.10. Distribution of respondents according to their accessibility.****n=120**

<b>S. No.</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
1.	Low accessibility	29	24.17
2.	Medium accessibility	80	66.66
3.	High accessibility	11	9.17
	<b>Total</b>	<b>120</b>	<b>100.00</b>

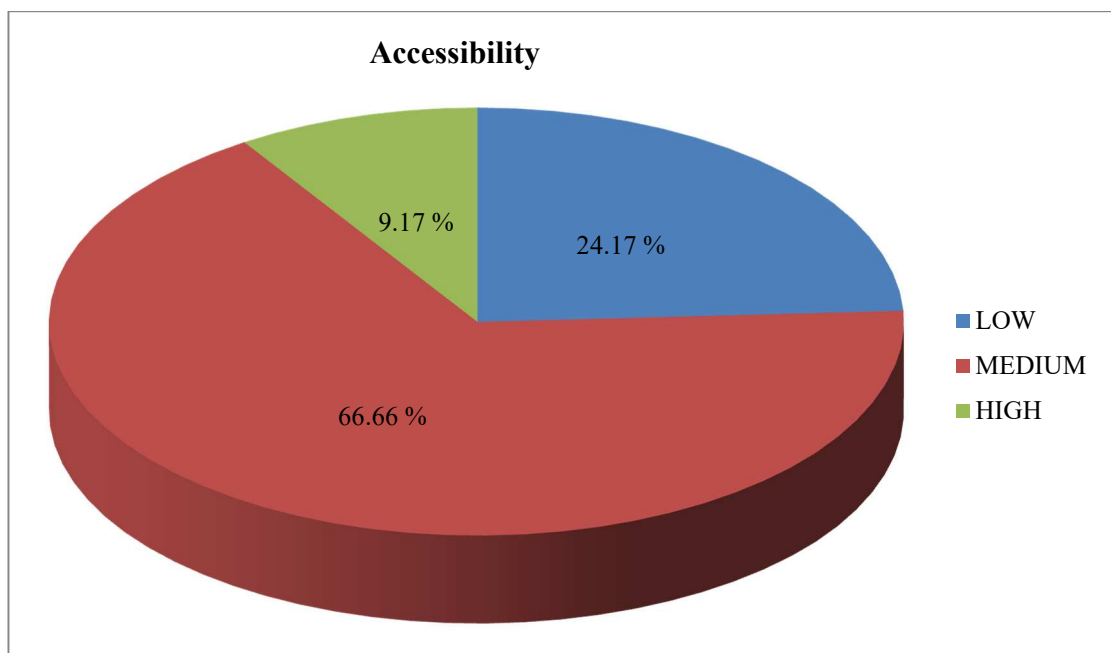
Mean: 12.89 SD: 0.67

The possible reason might be that majority of the respondents had medium accessibility to the custom hiring centres because the custom hiring





**Fig.4.9 Distribution of respondents according to their annual family income**



**Fig.4.10 Distribution of respondents according to their level of accessibility**

centres were catering the needs of the users of surrounding villages within the radius of 5-7 kilometers from their location.

#### 4.1.11 Extension Contact

An analytical look at the Table 4.11 and Fig 4.11 made it clear that, 70.84 per cent of the respondents had medium level of extension contact followed by low (15.00%) and high (14.16%) levels of extension contact.

**Table 4.11. Distribution of respondents according to their extension contact**  
**n=120**

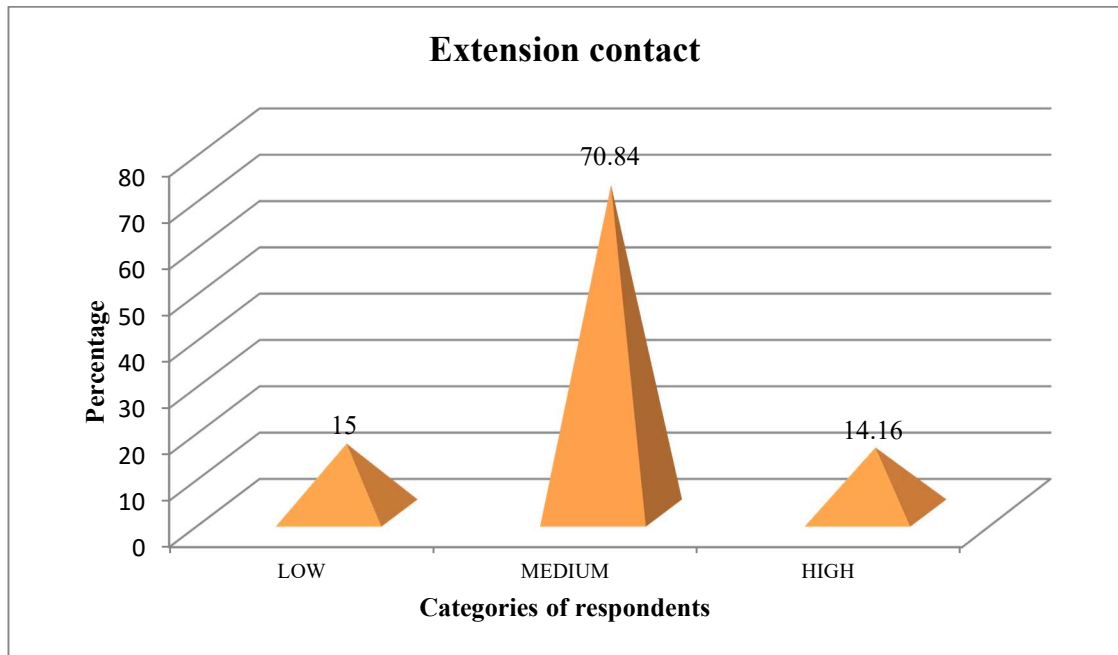
S. No.	Category	Frequency	Percentage
1.	Low extension contact	18	15.00
2.	Medium extension contact	85	70.84
3.	High extension contact	17	14.16
<b>Total</b>		<b>120</b>	<b>100.00</b>

Mean: 10.58 SD:1.33

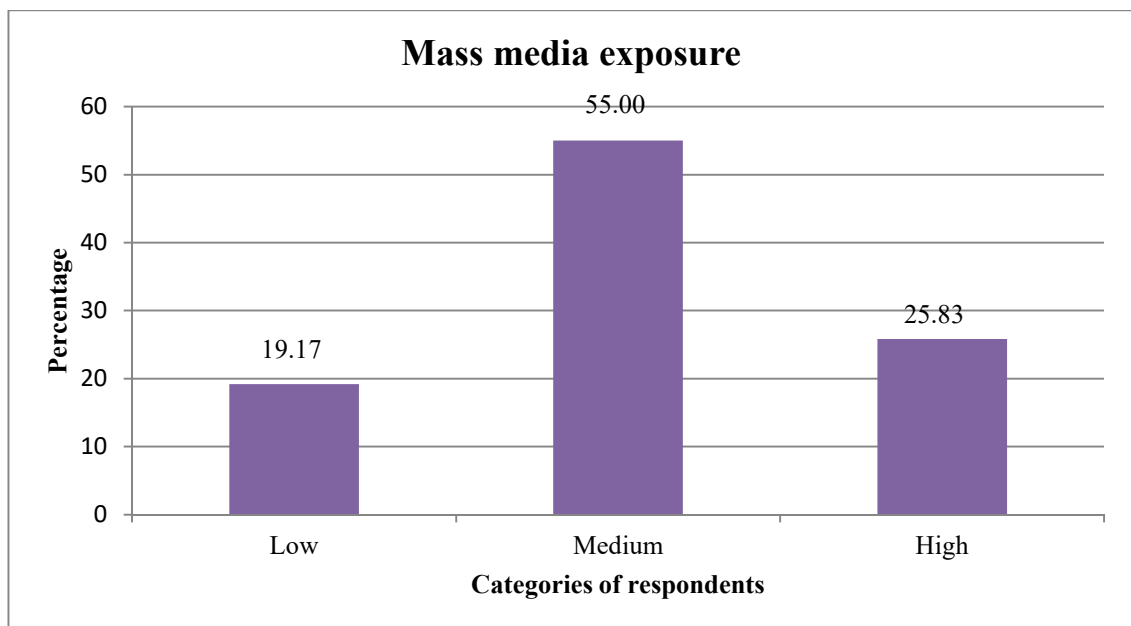
The probable reason for the medium level of extension contact could be that majority of the respondents were lured by the subsidies. A sizable portion of the respondents who lie in first two of the adopter categories were keen in keeping touch with department officials and they had high level of extension contact. In fact the extension personnel played major role in this regard and their work was laudable. This finding was in line with the results of Channamallikarjuna (2013) and Yadavsandeepkumar *et al.* (2016) .

#### 4.1.12 Mass Media Exposure

The findings presented in Table 4.12 and Fig 4.12 clearly indicated that 55.00 per cent of the respondents had medium level of mass media exposure followed by high (25.83%) and low (19.17%) levels of mass media exposure.



**Fig.4.11 Distribution of respondents according to their level of extension contact**



**Fig.4.12 Distribution of respondents according to their level of mass media exposure**

**Table 4.12. Distribution of respondents according to their level of mass media exposure** **n=120**

S. No.	Category	Frequency	Percentage
1.	Low mass media exposure	23	19.17
2.	Medium mass media exposure	66	55.00
3.	High mass media exposure	31	25.83
<b>Total</b>		<b>120</b>	<b>100.00</b>

Mean: 10.2 SD: 1.84

The possible reason for the above results might be that presence of major mass media channels in the area like television telecasting number of agriculture related programmes, All India Radio- broadcasting various programmes related to agriculture and easy availability of news papers and farm magazines. This result was in agreement with Madhuri (2017).

#### 4.1.13 Trainings Received

An overview of Table 4.13 and Fig.4.13 indicated that 65.00 per cent of the respondents received medium level of training followed by low (25.00%) and high (10.00%) levels of training received.

**Table 4.13. Distribution of the respondents according to their level of training received** **n=120**

S.No	Category	Frequency	Percentage
1.	Low	30	25.00
2.	Medium	78	65.00
3.	High	12	10.00
<b>Total</b>		<b>120</b>	<b>100.00</b>

Mean:2.15 SD: 0.19

The probable reason for the above trend might be due to their medium extension contact with extension functionaries working in university, state department of agriculture and NGOs and voluntary organizations. Hence most of the respondents were falling from medium to low trainings undergone categories. The results were in confirmation with the findings reported by Arathy (2011) and Channamallikarjuna (2013).

#### 4.1.14 Achievement Motivation

An overview of Table 4.14 and Fig.4.14 indicated that 74.16 per cent of the respondents had medium level of achievement motivation followed by low (15.83%) and high (10.00%) levels of achievement motivation.

**Table 4.14. Distribution of the respondents according to their level of achievement motivation** **n=120**

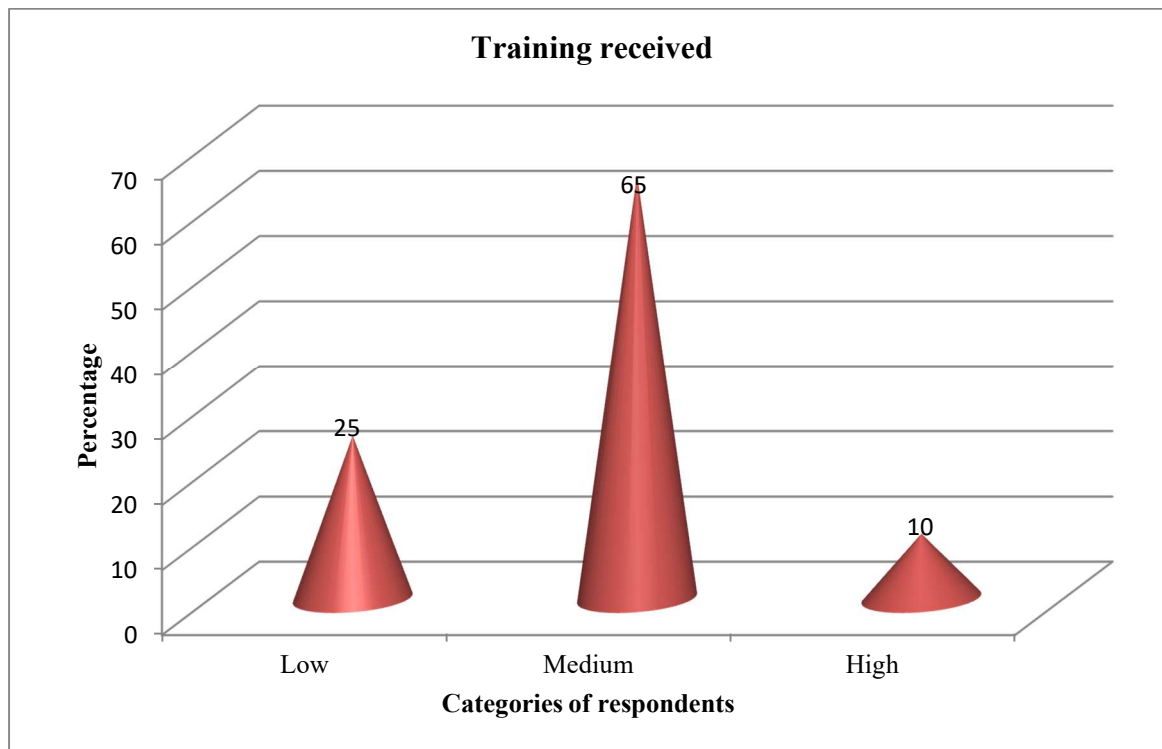
S.No	Category	Frequency	Percentage
1.	Low achievement motivation	19	15.83
2.	Medium achievement motivation	89	74.16
3.	High achievement motivation	12	10.00
<b>Total</b>		<b>120</b>	<b>100.00</b>

Mean:19.09 SD: 2.07

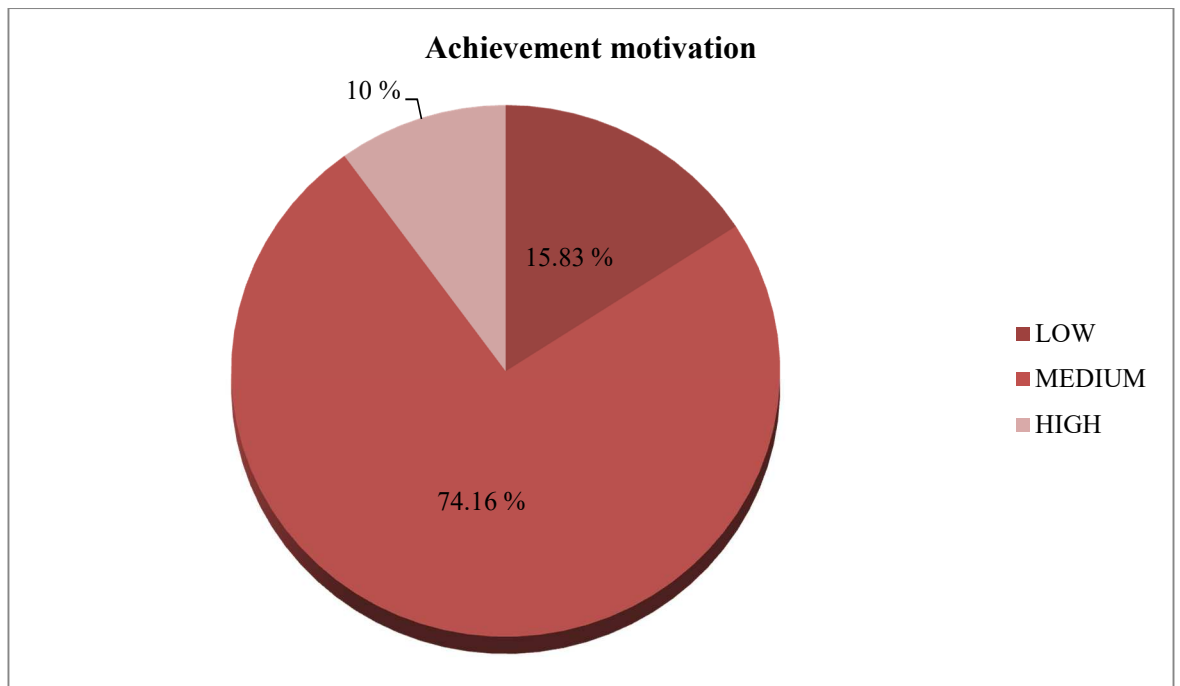
The above results might be because of the reason that most of the respondents had medium profile characteristics and also the farmers in the area of investigation were traditional. This finding was in line with the results of Nagaraj (2012), Hrudayranjan (2013) and Chandrasekhar (2016).

#### 4.1.15. Economic Orientation

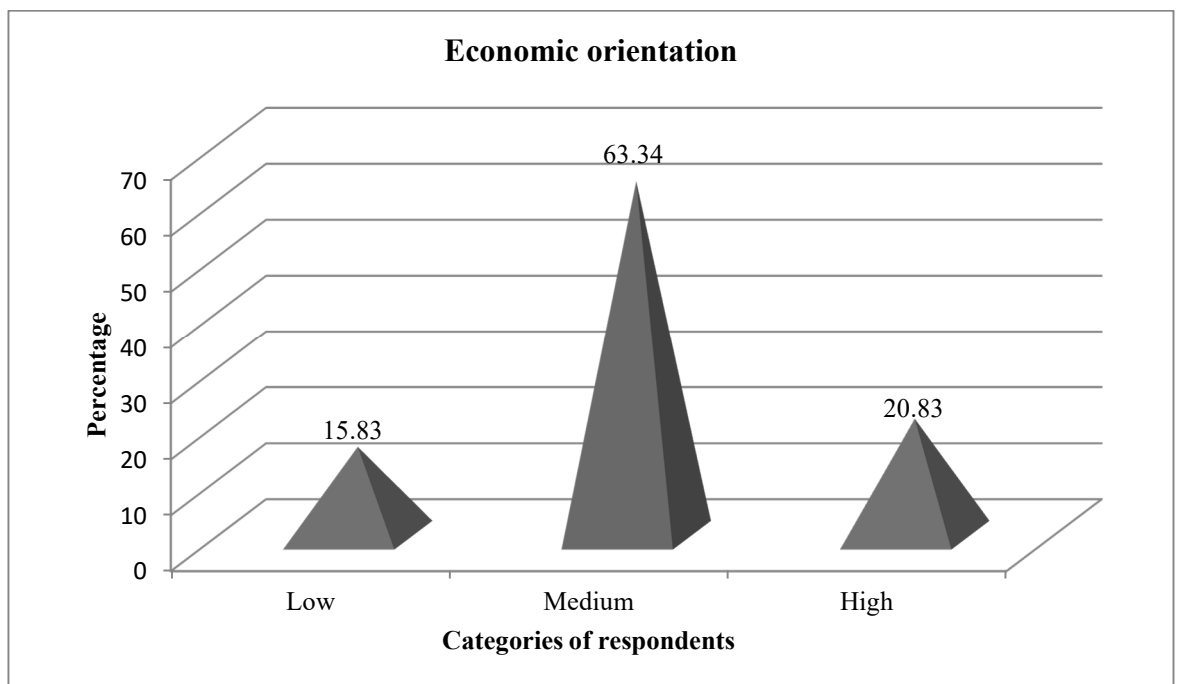
An overview of Table 4.15 and Fig.4.15 indicated that 63.34 per cent of the respondents had medium level of economic orientation followed by high (20.83%) and low (15.83%) levels of economic orientation.



**Fig.4.13 Distribution of respondents according to their level of training received**



**Fig.4.14 Distribution of respondents according to their level of achievement motivation**



**Fig. 4.15 Distribution of respondents according to their level of economic orientation**

**Table 4.15. Distribution of the respondents according to their level of economic orientation** **n=120**

<b>S.No</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
1.	Low economic orientation	19	15.83
2.	Medium economic orientation	76	63.34
3.	High economic orientation	25	20.83
<b>Total</b>		<b>120</b>	<b>100.00</b>

Mean:18.97 SD: 1.97

From the above results it could be inferred that nearly three fourth of the respondents had medium level of economic orientation. This might be due to the common truth that the respondents had the urge for more monetary profit per unit area. This finding was in line with the results of Arathy (2011).

## **4.2 PERFORMANCE OF THE CUSTOM HIRING CENTERS**

The performance of custom hiring centres (CHCs) working in Chittoor district of Andhra Pradesh was assessed based on the net returns obtained by each custom hiring centre. The performance of the CHCs were directly linked with the extent of utilization of services of CHCs. Hence it was necessary to know the performance of CHCs for Ground nut crop which is one of the major crop of the study area.

### **4.2.1 Implements and Machinery Available in CHCs**

The major crop in the study area was ground nut crop which was cultivated under rain fed conditions. Under rainfed conditions all the operations like land preparation, sowing and fertilizer application has to be taken up before soil moisture gets depleted. Hence the Government of Andhra Pradesh has supplied package of machinery for groundnut crop under custom hiring centre.



**Table 4.16 Implements and machinery available in CHCs along with actual costs and subsidy.**

<b>CHC</b>	<b>Village</b>	<b>Implement</b>	<b>Full cost(Rs)</b>	<b>CHC contribution(Rs)</b>	<b>Subsidy amount(Rs)</b>
I	Majjigavandlapalli	Tractor	5,85,000	2,64,400	3,20,600
		Rotavator	98,700	33,010	65,690
		Seed drill	61,020	18,306	42,714
		Thresher	1,70,000	51,000	1,19,000
		<b>Total</b>	<b>9,14,720</b>	<b>3,66,716</b>	<b>5,48,004</b>
II	Jeevanathopu	Tractor	5,65,000	3,36,000	2,29,000
		Rotavator	98,740	54,370	44,370
		Seed drill	61,020	30,510	30,510
		Thresher	1,70,000	85,000	85,000
		<b>Total</b>	<b>8,94,760</b>	<b>5,05,880</b>	<b>3,88,880</b>
III	Mallaiahgaripalli	Tractor	5,48,000	3,19,000	2,29,000
		Rotavator	98,700	55,350	43,350
		Seed drill	61,020	30,510	30,510

Table 4.16 (Contd....)

		Thresher	1,70,000	85,000	85,000
		<b>Total</b>	<b>8,77,720</b>	<b>4,89,860</b>	<b>3,87,860</b>
IV	Kotaguttapalli	Tractor	5,58,000	2,79,000	2,79,000
		Rotavator	98,000	49,000	49,000
		Seed drill	47,995	23,997.50	23,997.50
		Thresher	1,75,000	87,500	87,500
		<b>Total</b>	<b>8,78,995</b>	<b>4,39,497.50</b>	<b>4,39,497.50</b>
V	Sompalli	Tractor	5,48,000	3,19,000	2,29,000
		Rotavator	98,700	55,350	43,350
		Seed drill	61,020	30,510	30,510
		Thresher	1,70,000	85,000	85,000
		<b>Total</b>	<b>8,77,720</b>	<b>4,89,860</b>	<b>3,87,860</b>
VI	Yesuvaripalli	Tractor	5,48,000	3,19,000	2,29,000
		Rotavator	98,700	55,350	43,350
		Seed drill	61,020	30,510	30,510

Table 4.16 (Contd....)

		Thresher	1,70,000	85,000	85,000
		<b>Total</b>	<b>8,77,720</b>	<b>4,89,860</b>	<b>3,87,860</b>
VII	Srinivasapuram	Tractor	5,48,000	2,27,400	3,20,600
		Rotavator	98,700	38010	60690
		Seed drill	61,020	18306	42714
		Thresher	1,70,000	51,000	1,19,000
		<b>Total</b>	<b>8,77,720</b>	<b>3,34,716</b>	<b>5,43,004</b>
VIII	Nadimcherla *	Tractor	5,48,000	3,19,000	2,29,000
		Rotavator	98,700	55,350	43,350
		Seed drill	61,020	30,510	30,510
		<b>Total</b>	<b>7,07,720</b>	<b>4,04,860</b>	<b>3,02,860</b>
IX	Peddathippasamudram	Tractor	5,48,000	3,19,000	2,29,000
		Rotavator	98,700	55,350	43,350
		Seed drill	61,020	30,510	30,510
		Thresher	1,75,000	85,000	85,000

Table 4.16 (Contd...)

		<b>Total</b>	<b>8,77,720</b>	<b>4,89,860</b>	<b>3,87,860</b>
X	T.sodam	Tractor	5,48,000	3,19,000	2,29,000
		Rotavator	98,700	55,350	43,350
		Seed drill	61,020	30,510	30,510
		Thresher	1,75,000	85,000	85,000
		<b>Total</b>	<b>8,77,720</b>	<b>4,89,860</b>	<b>3,87,860</b>
XI	B.Kothakota	Tractor	5,65,000	3,36,000	2,29,000
		Rotavator	1,03,740	59,370	44,370
		Seed drill	61,020	30,510	30,510
		Thresher	1,70,000	85,000	85,000
		<b>Total</b>	<b>8,99,760</b>	<b>5,10,880</b>	<b>3,88,880</b>
XII	Sunkalavaripalli	Tractor	6,57,907	3,37,907	3,20,000
		Rotavator	98,700	38,010	60,690
		Seed drill	61020	18306	42,714

Table 4.16 (Contd....)

		Thresher	1,70,000	51,000	1,19,000
		<b>Total</b>	<b>9,87,627</b>	<b>4,45,223</b>	<b>5,42,404</b>
XIII	Marrikuntlapalli	Tractor	6,30,000	4,80,000	1,50,000
		Rotavator	90,000	45000	45000
		Seed drill	58,000	29000	29000
		Thresher	1,50,000	75000	75000
		<b>Total</b>	<b>9,28,000</b>	<b>6,29,000</b>	<b>2,99,000</b>
XIV	Pallavolu	Tractor	6,30,000	4,80,000	1,50,000
		Rotavator	90,000	45000	45000
		Seed drill	58,000	29000	29000
		Thresher	1,50,000	75000	75000
		<b>Total</b>	<b>9,28,000</b>	<b>6,29,000</b>	<b>2,99,000</b>
XV	Kondakindapalli	Tractor	5,48,000	3,19,000	2,29,000

Table 4.16 (Contd...)

		Rotavator	98,700	55,350	43,350
		Seed drill	61,020	30,510	30,510
		Thresher	1,75,000	85,000	85,000
		<b>Total</b>	<b>8,77,720</b>	<b>4,89,860</b>	<b>3,87,860</b>
XVI	Kondakindapalli Harijanavada	Tractor	5,48,000	3,19,000	2,29,000
		Rotavator	98,700	55,350	43,350
		Seed drill	61,020	30,510	30,510
		Thresher	1,75,000	85,000	85,000
		<b>Total</b>	<b>8,77,720</b>	<b>4,89,860</b>	<b>3,87,860</b>

\*Thresher was not opted by the group.

The details of the actual costs of the implements supplied as a package under CHCs, subsidy amount beared by the government and CHCs contribution in the actual cost of the machinery were furnished below.

From the Table 4.16 it is evident that each custom hiring centre is supplied with tractor, rotovator, groundnut seed drill and groundnut pod thresher on subsidy basis by paying the non subsidy amount as CHCs contribution out of the full cost of the machinery. The full cost of the machinery was taken in to account to calculate the total fixed costs of the machinery.

#### **4.2.2 Rates (Hiring Charges) for Farm Machinery by Private and CHCs Per Hour**

Apart from custom hiring centres, medium to large farmers were also providing the hiring services of farm machinery but which are inadequate, untimely and expensive. The machinery under custom hiring centres were supplied to the group of farmers have further augmented the availability of custom hiring services in the region.

**Table 4.17 Custom hiring rates (average) charged for farm machinery by private and CHCs during the year 2017-18**

S.No	Farm machinery/equipment with tractor	Hiring charges((Rs.per hour)	
		CHCs	Private individuals
1	Rotovator	700	800
2	Ground nut seed drill	850	900
3	Ground nut thresher	850	900

It is evident from the Table 4.17 that hiring rates for the machinery owned by the private owners prevailing in the region were higher (on an average Rs.50 to Rs.100 per hour) compared to the hiring rates charged by the CHCs of the region during 2017-18.

### **4.2.3 Costs Incurred and Returns Earned (Rs/Machine) in Custom Hiring Centres During the Year 2017-18.**

The costs incurred by the CHCs in operating and maintaining the machinery was worked out considering both fixed and variable costs. The variable costs like cost of the fuel, repairs, labour charges and where as the fixed costs like depreciation, interest and insurance covered on the machinery were considered. Gross returns were worked out by multiplying the number of hours worked by each machinery in a year and hiring charges per hour. This analysis facilitated in assessing the performance of CHCs.

Tractor is a power source for all the implements Viz., rotovator, seed drill, thresher.

From the Table.4.18 it is evident that the data pertaining to a total of sixteen CHCs distributed among the eight mandals were analyzed for obtain net returns which was considered as the indication of the performance of the CHCS. The data analyzed revealed that the net returns gained ranging from a maximum of Rs.1,96,381 to a minimum of Rs.26,640.

Further to study the overall performance of the CHCs based on the net returns obtained, all the sixteen custom hiring centres under study were categorized into three groups viz., low, medium and high levels of performance centres by using mean and standard deviation and the results were presented in table 4.18 and Fig.4.18



**Table 4.18 Costs incurred and returns earned (Rs/machine)during the year 2017-18**

CHC	Village	Implement	Total fixed costs(Rs)	Total variable cost s(Rs)	Total costs(Rs)	No of hours engaged	Hiring charge per hour(Rs)	Gross returns(Rs)	Net returns (Rs)
I	Majjigavandlapalli	Tractor	82,125	40,000	1,22,125	0	0	0	-1,22,125
		Rotavator	16,779	57,000	73,779	250	700	1,75,000	1,01,221
		Seed drill	10,373	44,200	54,573	200	1000	2,00,000	1,45,426.60
		Thresher	28,900	0	28,900	0	0	0	-28,900
		<b>Total</b>	<b>1,38,177</b>	<b>1,41,200</b>	<b>2,79,377</b>	<b>450</b>		<b>3,75,000</b>	<b>95,622.60</b>
II	Jeevanathopu	Tractor	79,625	27,000	1,06,625	0	0	0	-1,06,625
		Rotavator	17,636	45,700	63,336	200	750	1,50,000	86,664
		Seed drill	10,373	33,900	44,273	150	1000	1,50,000	1,05,726
		Thresher	28,900	0	28,900	0	0	0	-28,900
		<b>Total</b>	<b>1,36,354</b>	<b>1,06,600</b>	<b>2,43,134</b>	<b>350</b>		<b>3,00,000</b>	<b>56,865</b>
III	Mallaiahgaripalli	Tractor	78,500	57,000	1,35,500	0	0	0	-1,35,500
		Rotavator	16,779	45,700	62,479	200	750	1,50,000	87,521
		Seed drill	10,373	55,500	65,873	250	900	2,25,000	1,59,126.60

Table 4.18 (Contd....)

		Thresher	28,900	32,400	61,300	150	900	1,35,000	73,700
		<b>Total</b>	<b>1,34,552</b>	<b>1,90,600</b>	<b>3,25,152</b>	<b>600</b>		<b>5,10,000</b>	<b>1,84,848</b>
IV	Kotaguttapalli	Tractor	81,750	57,500	1,39,250	0	0	0	-1,39,250
		Rotavator	16,660	67,800	84,460	300	750	225000	1,40,540
		Seed drill	8,159	44,700	52,859	200	800	160000	1,07,140.85
		Thresher	29,750	0	29,750	0	0	0	-29,750
		<b>Total</b>	<b>1,36,319</b>	<b>1,70,000</b>	<b>3,06,319</b>	<b>500</b>		<b>3,85,000</b>	<b>78,680.85</b>
V	Sompalli	Tractor	81350	55,000	1,36350	0	0	0	-1,36,350
		Rotavator	16,600	46,200	62,860	200	600	1,20,000	57,140
		Seed drill	8159	55500	63569	250	900	2,25,000	1,61,341
		Thresher	29,750	56000	85750	250	800	2,00,000	1,14,250
		<b>Total</b>	<b>1,35,919</b>	<b>2,12,700</b>	<b>3,48,619</b>	<b>600</b>		<b>5,45,000</b>	<b>1,96,381</b>
VI	Yesuvaripalli	Tractor	83,500	57,500	1,41,000	0	0	0	-1,41,000
		Rotavator	16,779	46,200	62,979	200	700	1,40,000	77021
		Seed drill	10,373	44,700	55,073	200	900	1,80,000	1,24,926
		Thresher	29,750	23,600	53350	100	800	80,000	26650
		<b>Total</b>	<b>1,40,402</b>	<b>1,72,000</b>	<b>2,90,802</b>	<b>500</b>		<b>4,00,000</b>	<b>87597</b>

Table 4.18 (Contd....)

VII	Srinivasapuram	Tractor	76,500	14,000	90,500	0	0	0	-90,500
		Rotavator	16,779	66,800	83,579	300	800	2,40,000	1,56,421
		Seed drill	10,373	0	10,373	0	0	0	-10,373.40
		Thresher	28,900	0	28,900	0	0	0	-28,900
		<b>Total</b>	<b>1,32,552</b>	<b>80,800</b>	<b>2,13,352</b>			<b>2,40,000</b>	<b>26647.60</b>
VIII	Nadimcherla	Tractor	77,500	27,500	1,05,000	0	0	0	-1,05,000
		Rotavator	16,779	46,200	62,979	200	750	1,50,000	87,021
		Seed drill	10373	23,100	33,473	100	900	90,000	56,526.60
		Thresher	0	0	0	0	0	0	0
		<b>Total</b>	<b>1,04,652</b>	<b>96,800</b>	<b>2,01,452</b>	<b>300</b>		<b>2,40,000</b>	<b>38,547.60</b>
IX	Peddathippasamudram	Tractor	83,500	42,000	1,25,500	0	0	0	-1,25,500
		Rotavator	16,779	46,200	62,979	200	700	1,40,000	77,021
		Seed drill	10,373	22,600	32,973	100	900	90,000	57,026.60
		Thresher	28,900	44,200	73,100	200	800	1,60,000	86,900
		<b>Total</b>	<b>1,39,552</b>	<b>1,55,000</b>	<b>2,94,552</b>	<b>500</b>		<b>3,90,000</b>	<b>95,447.60</b>
X	T.sodam	Tractor	83,500	40,000	1,23,500	0	0	0	-1,23,500
		Rotavator	16,779	46,200	62,979	200	700	1,40,000	77,021

Table 4.18 (Contd....)

		Seed drill	10,373	44,200	54,573	200	900	1,80,000	1,25,426.60
		Thresher	28,900	21,600	50,500	100	750	75,000	24,500
		<b>Total</b>	<b>1,39,552</b>	<b>1,52,000</b>	<b>2,91,552</b>	<b>500</b>		<b>3,95,000</b>	<b>1,03,447.60</b>
XI	B.Kothakota	Tractor	83,500	59,000	1,42,500	0	0	0	-1,42,500
		Rotavator	16,779	57,000	73,779	250	700	1,75,000	1,01,221
		Seed drill	10,373	55,000	65,373	250	900	2,25,000	1,59,626.60
		Thresher	28,900	0	28,900	0	0	0	-28,900
		<b>Total</b>	<b>1,39,552</b>	<b>1,71,000</b>	<b>3,10,552</b>	<b>500</b>		<b>4,00,000</b>	<b>89,447.60</b>
XII	Sunkalavaripalli	Tractor	83,500	40,000	1,23,500	0	0	0	-123500
		Rotavator	16,779	35,400	52,179	150	700	1,05,000	52,821
		Seed drill	10,373	44,200	54,573	200	900	1,80,000	1,25,426.60
		Thresher	28,900	32,400	61,300	150	750	1,12,500	51,200
		<b>Total</b>	<b>1,39,552</b>	<b>1,52,000</b>	<b>2,91,552</b>	<b>500</b>		<b>3,97,500</b>	<b>1,05,947.60</b>
XIII	Marrikuntlapalli	Tractor	83,500	40,000	1,23,500	0	0	0	-1,23,500
		Rotavator	16,779	46,200	62,979	200	700	1,40,000	77,021
		Seed drill	10,373	38,800	49,173	175	900	1,57,500	1,08,326.60
		Thresher	28,900	0	28,900	0	0	0	-28,900

Table 4.18 (Contd....)

			1,33,835	1,26,220	2,60,055	375		2,97,500	32,947.60
XIV	Pallavolu	Tractor	82,125	62,625	1,44,750	0	0	0	-1,44,750
		Rotavator	16,779	56,468	73,247	250	700	1,75,000	1,01,753.50
		Seed drill	10,373	55,099	65,472	200	1000	2,00,000	1,34,527.70
		Thresher	28,900	0	28,900	0	0	0	-28,900
		<b>Total</b>	<b>1,38,177</b>	<b>1,74,191</b>	<b>3,12,369</b>	<b>450</b>		<b>3,75,000</b>	<b>62,631.20</b>
XV	Kondakindapalli	Tractor	80,500	40,000	1,20,500	0	0	0	-1,20,500
		Rotavator	16,779	35,400	52,179	150	700	1,05,000	52,821
		Seed drill	10,373	33,400	43,773	150	900	1,35,000	91,226.60
		Thresher	28,900	32,400	61,300	150	1000	1,50,000	88700
		<b>Total</b>	<b>1,36,552</b>	<b>1,41,200</b>	<b>2,77,752</b>	<b>450</b>		<b>3,90,000</b>	<b>1,12,247.60</b>
XVI	Kondakindapalli Harijanavada	Tractor	80,500	41,000	1,21,500	0	0	0	-1,21,500
		Rotavator	16,779	35,400	52,179	150	700	1,05,000	52,821
		Seed drill	10,373	22,600	32,973	100	900	90,000	57,026.60
		Thresher	28,900	43,200	72,100	200	1000	2,00,000	1,27,900
		<b>Total</b>	<b>1,36,552</b>	<b>1,42,200</b>	<b>2,78,752</b>	<b>450</b>		<b>3,95,000</b>	<b>1,16,247.60</b>

**Table 4.19. Distribution of custom hiring centres according to their overall performance.**

**Number of custom hiring centres=16**

<b>S.No</b>	<b>Performance</b>	<b>Frequency</b>	<b>Percentage</b>
1	Low(net returns < Rs.51,504)	2	12.50
2	Medium(net returns between Rs.51,504 -Rs.1,42,242)	12	75.00
3	High(net returns >Rs.1,42,242)	2	12.50
	<b>Total</b>	16	100.00

Mean; Rs.96873 SD:Rs.45369

A glance at the Table 4.19 it is revealed that 75.00 per cent of the custom hiring centres were having medium level of performance followed by equal numbers of custom hiring centres were grouped under low (12.50%) and high (12.50%) levels of performance. Medium levels of farming experience, social participation, innovativeness, management orientation, annual income, accessibility, extension contact, mass media exposure, training received, achievement motivation and economic orientation of the majority of the respondents might be the factors for medium level of performance of custom hiring centres.

Extension agencies must concentrate on imparting training on the usage of farm machinery and inspiring them to have more extension contact and mass media exposure which will improve the performance of custom hiring centres.

Further it can be explained that in the study area farming mainly depends on occurrence of monsoon. Among rotovator, seed drill and thresher which was a package for groundnut crop, the rotovator has engaged for more number of hours when compared to seed drill and thresher. The reason for more usage of rotovator was that if the onset of monsoon was delayed rotovator can be used for tillage operations for raising crops other than groundnut but in the case of seed drill it was used only for sowing of

groundnut. As the onset of monsoon delayed in the study the area under groundnut crop was decreased hence the number of hours engaged in the operation was also decreased. Whereas in case of thresher it was engaged for least number of hours when compared to rotovator and seed drill because the users were facing the problem of damage to kernels while performing threshing by groundnut dry pod thresher.

### **4.3 EXTENT OF UTILIZATION OF CUSTOM HIRING CENTRES**

#### **4.3.1 Extent of Utilization of Services of Custom Hiring Centres**

In order to know the extent of utilization of services of custom hiring centres by the users the data were collected from the respondents under the following statements and the results were presented in the table 4.20.

A glance at the Table 4.20 revealed that 65.00 per cent of the respondents were members of the custom hiring centres whereas 35.00 percent were non members of custom hiring centres but utilizing the services of custom hiring centres. Among the users of CHCs, 31.66 per cent of the respondents were booking the machinery well in advance the commencement of the season whereas 68.33 per cent were not booking the machinery well in advance. Among the respondents 11.66 per cent of the respondents were paying for pre-booking of the machinery whereas 88.33 per cent were not paying for pre booking of the machinery. None of the user was providing any document for utilizing the services of custom hiring centres. A slightly more than fifty per cent of the users (51.66%) of the custom hiring centres were getting the information about the services of CHCs from fellow farmers whereas 25.00 per cent of the users were getting the information from extension functionaries working in the State Department of Agriculture and 23.33 per cent of the users were having the information as they are the members of the custom hiring centres. Slightly more than half of the users (51.66%) were paying hiring charges in cash whereas 26.66 per cent of the users were paying their dues through credit and 21.66 per cent of the users

**Table 4.20. Extent of utilization of services of custom hiring centres**

**(n=120)**

S. No	Statements	Yes		No	
		Frequency	percentage	Frequency	Percentage
1	Member in the CHC group	78	65.00	42	35.00
2	Pre-booking of the machinery well before the commencement of season	38	31.66	82	68.33
3	Paying any advance for pre-booking	14	11.66	106	88.33
4.	Providing any documents for utilising the services of custom hiring centres	0	0	120	100.00
5	Source of information about the services of CHCs				
	a)State department of Agriculture	30	25.00	-	-
	b)Fellow farmers	62	51.66	-	-
	c)Membership of CHCs	28	23.33	-	-
6.	Paying the hiring charges immediately after availing the services.				
	a)On sale of Agricultural produce	26	21.66	-	-
	b)On credit	32	26.66	-	-
	c)Cash	62	51.66	-	-
7.	Timely availability of the machinery	89	74.20	31	25.80
8.	Satisfaction about the services of CHC	105	87.50	15	12.50



**Table 4.21 Distribution of respondents according to the extent of utilization of farm machineries/equipments in CHC**

**n=120**

S. No	Type of machinery	Frequency of utilization					
		Regularly(2)		Occasionally(1)		Never(0)	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Tractor	111	92.5	9	7.5	0	0
2	Tractor drawn seed drill	104	86.66	16	13.33	0	0
3	*Ground nut digger /shaker cum windower	-	-	-	-	-	-
4	Rotavator	112	93.33	8	6.66	0	0
5	Power operated Ground nut wet pod thresher or Dry pod thresher /Modern Automatic High capacity Multi crop thresher	52	43.33	20	16.66	48	40
6	*4 Row bullock drawn automatic Groundnut planter	-	-	--	-	-	-
7	*Hand operated Groundnut planter	-	-	--	-	-	-
8	*Inter cultivation equipment along with slim tyres	-	-	--	-	-	-

\*Implements not opted by the user members of the CHCs though they were in the package under the guidelines of custom hiring centres.

were paying their hiring charges after the end of the crop season by selling their agricultural produce. Nearly three fourth (74.20%) of the respondents agree with the timely availability of the machinery and 87.50 per cent of the respondents had satisfaction about the services of custom hiring centres.

#### **4.3.2 Extent of Utilization of Farm Machineries/Equipments in CHC by the Farmer Users**

It is evident from the Table 4.21 that 93.33 per cent of the users were utilizing rotovator as tillage equipment regularly where as only 6.66 per cent of the users used rotovator occasionally. With regard to tractor 92.50 per cent of the users were utilizing it regularly whereas only 7.50 per cent of the users used it occasionally. In case of seed drill 86.66 percent of the users were utilizing it for sowing of groundnut seed regularly where as only 13.33 percent of the users used it occasionally. Power operated groundnut pod thresher was used by 43.33 per cent of respondents regularly where as it was used occasionally by 16.66 per cent and the implement was not at all used by 40.00 per cent of the users.

#### **4.3.3 Usage of Equipment in Each Custom Hiring Centre Per Annum**

Average usage of each equipment was calculated by taking the sum of hours engaged by each equipment among the sixteen custom hiring centres considered under the study in one year.

**Table 4.22 Average usage of equipment in each custom hiring centre per annum**

<b>S.No</b>	<b>Machinery</b>	<b>Average Number of hours engaged in a year</b>
1	Tractor+Rotovator	212
2	Tractor+Seed drill	170
3	Tractor+Thresher	81

From the above table 4.22 it is evident that on an average tractor along with rotovator was engaged for hiring of 212 hours in a year for performing tillage operations where as tractor along with seed drill was engaged for 170 hours in a year for sowing and thresher was engaged for only 81 hours to perform threshing operation in ground nut crop. Further the number of hours engaged for hiring of each equipment will be taken for calculation of gross income which is one of the criteria to obtain the net returns for each custom hiring centre under study

#### **4.3.4 Overall Extent of Utilization of Custom Hiring Centres by the Users**

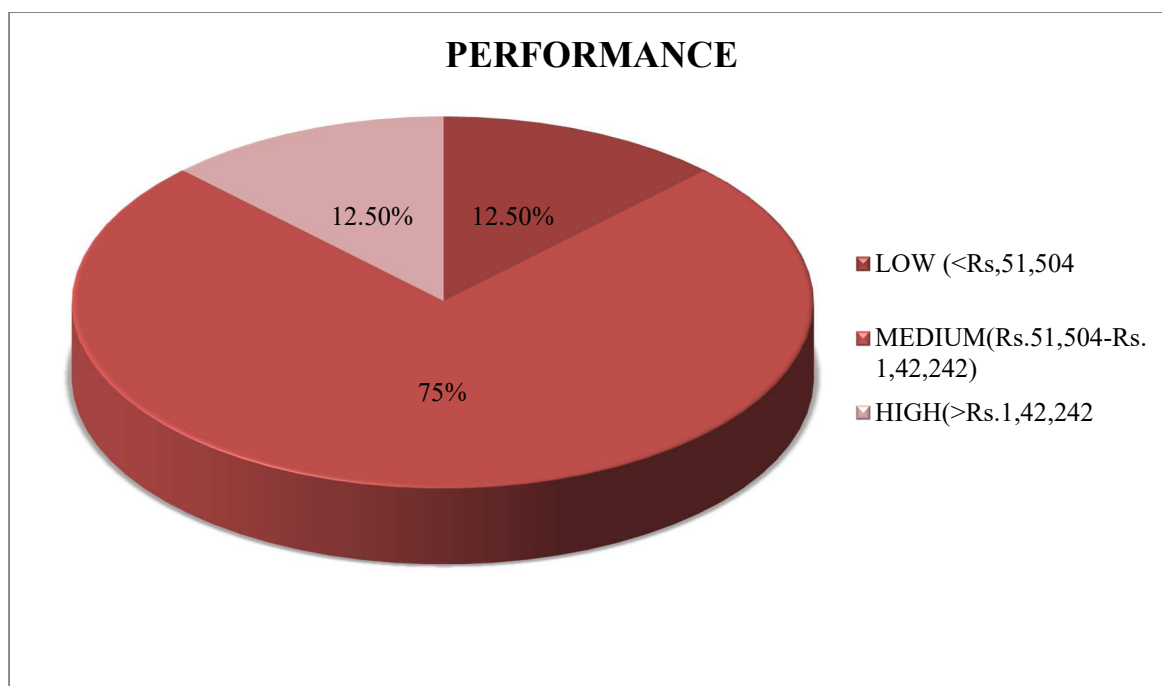
In order to assess the overall extent of utilization of custom hiring centres by the users, necessary data were collected and the respondents were categorized into three groups viz., low, medium and high levels of extent of utilization by using mean and standard deviation and the results were presented in Table 4.19 and Fig.19

It is evident from the Table 4.22 that 72.50 per cent of the respondents were having medium extent of utilization followed by low (19.16%) and high (8.34%) levels of extent of utilization of services of custom hiring centres.

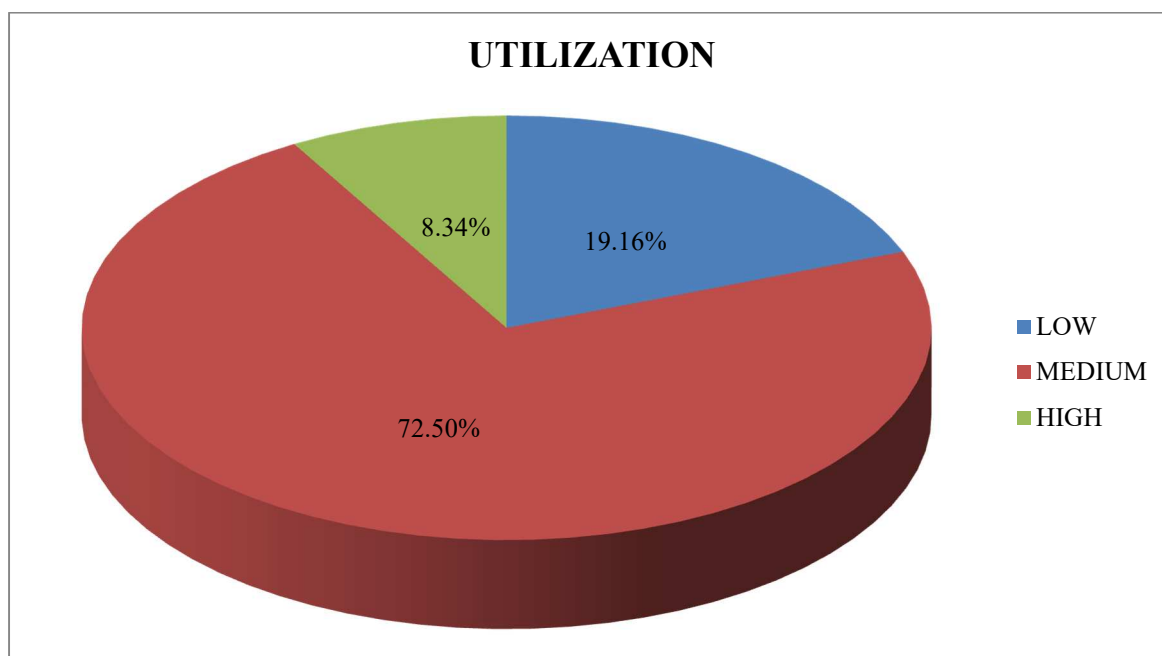
**Table 4.23 Distribution of respondents according to their overall extent of utilization of custom hiring centres n=120**

<b>S.No.</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
1.	Low	23	19.16
2.	Medium	87	72.50
3.	High	10	8.34
	<b>Total</b>	120	100.00

Mean: 24.56 SD:1.48



**Fig.4.16 Distribution of custom hiring centres according to their level of performance**



**Fig.4.17 Distribution of the respondents based on the extent of utilization of services of custom hiring centres**

The reason for the above result might be due to the medium levels of farming experience, social participation, innovativeness, management orientation, annual income, accessibility, extension contact, mass media exposure, training received, achievement motivation and economic orientation of the majority of the respondents might be the factors for medium extent of utilization of custom hiring centres by the users. The competent authorities should focus on imparting trainings to the farmers on utilization of farm machinery there by performing timely farm operations which increases the farmers income, develop good management orientation which may increases the level of extent of utilization to high level from the present medium level.

#### **4.4 RELATIONSHIP BETWEEN THE PERFORMANCE AND THE EXTENT OF UTILIZATION OF CUSTOM HIRING CENTRES BY THE USERS WITH THEIR INDEPENDENT VARIABLES.**

This section analyses the nature of relationship of the selected independent variables with that of dependent variables i.e., performance of the custom hiring centres and the extent of utilization of custom hiring centres by the users.

In order to study the relationship, the data related to the above aspects were subjected to correlation coefficient analysis. The values of correlation coefficients ( $r$ ) were then tested for their statistical significance.

##### **4.4.1 Relationship between the Selected Independent Variables and the Performance of Custom Hiring Centres**

In order to study the nature of relationship between the selected independent variables and the performance of custom hiring centres, correlation coefficients ( $r$ ) were computed and the values are presented in Table 4.24 and Fig; 4.18.

This relationship between the scores of selected independent variables and the performance of the custom hiring centres were tested by null hypothesis and empirical hypothesis.

## **Null hypothesis**

There will be no significant relationship between the selected independent variables viz., age, gender, education, farm size, farming experience, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, trainings received, achievement motivation and economic orientation and the performance of custom hiring centres.

## **Empirical hypothesis**

There will be significant relationship between the selected independent variables viz., age, gender, education, farm size, farming experience, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, training received, achievement motivation and economic orientation and the performance of custom hiring centres.

### **4.4.1.1 Performance Vs age**

The results in Table 4.24 and Fig. 4.18 exhibited that the computed coefficient of correlation ( $r = 0.032$ ) between age and the performance of the custom hiring centres was less than the table value of ' $r$ ' at 0.05 level of significance. Hence, null hypothesis was accepted and empirical hypothesis was rejected. Therefore, it could be inferred that there was a positive and non significant relationship between age and the performance of custom hiring centres.

The results indicated that the performance of the custom hiring centres had no influence on the age of the respondents. The probable reason for the above result might be that irrespective of the age of the respondent, the person learn the technologies related to mechanization and which influence the performance of custom hiring centres.

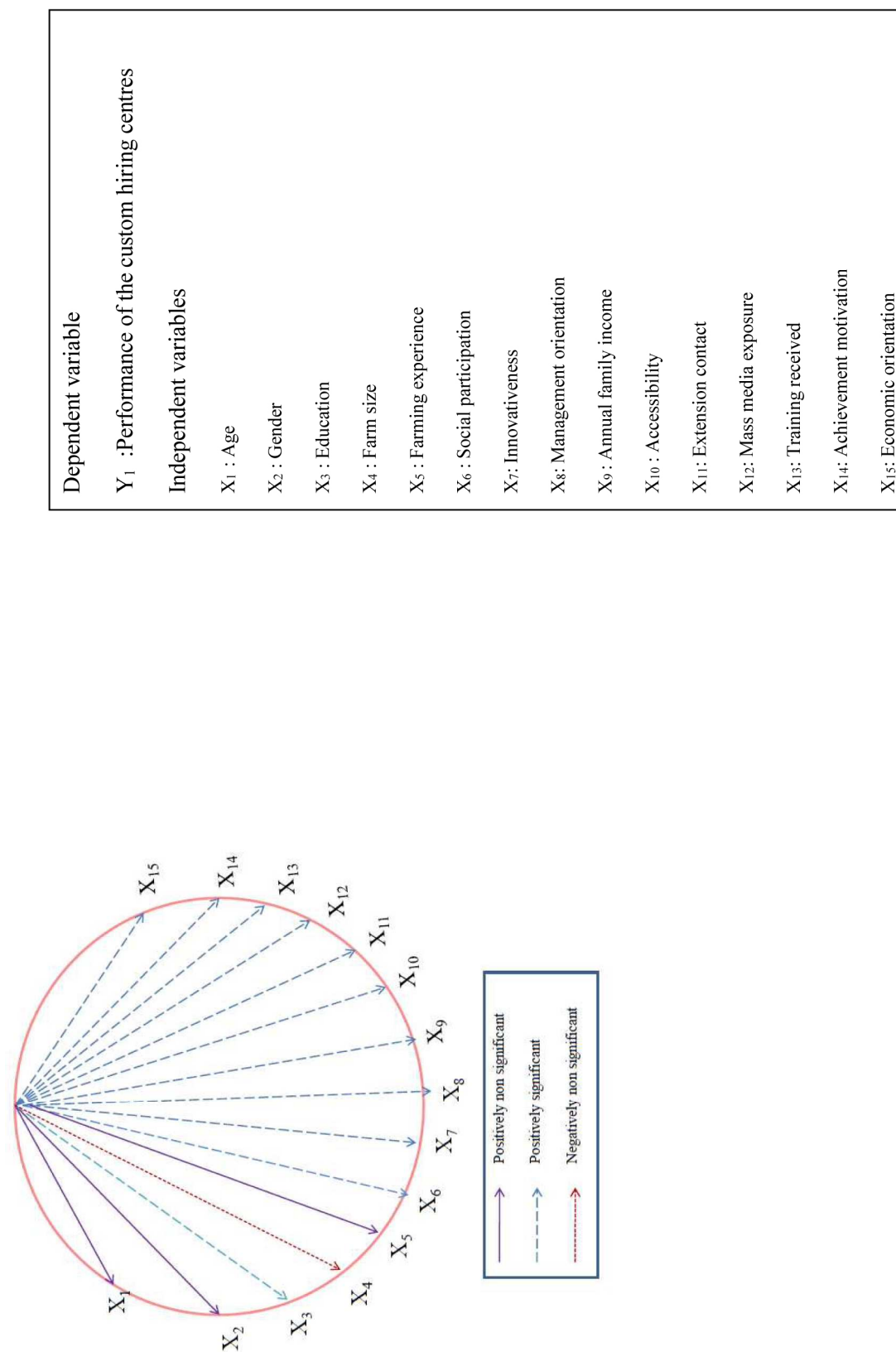
**Table 4.24. Correlation analysis of profile characteristics and the performance of custom hiring centres (n=120)**

<b>Variable no</b>	<b>Independent variables</b>	<b>Correlation coefficients ('r' values)</b>
X <sub>1</sub>	Age	0.032 <sup>NS</sup>
X <sub>2</sub>	Gender	0.063 <sup>NS</sup>
X <sub>3</sub>	Education	0.182 <sup>*</sup>
X <sub>4</sub>	Farm size	-0.162 <sup>NS</sup>
X <sub>5</sub>	Farming experience	0.007 <sup>NS</sup>
X <sub>6</sub>	Social participation	0.201 <sup>**</sup>
X <sub>7</sub>	Innovativeness	0.280 <sup>**</sup>
X <sub>8</sub>	Management orientation	0.252 <sup>*</sup>
X <sub>9</sub>	Annual family income	0.219 <sup>*</sup>
X <sub>10</sub>	Accessibility	0.247 <sup>**</sup>
X <sub>11</sub>	Extension contact	0.298 <sup>**</sup>
X <sub>12</sub>	Mass media exposure	0.259 <sup>**</sup>
X <sub>13</sub>	Training received	0.267 <sup>**</sup>
X <sub>14</sub>	Achievement motivation	0.279 <sup>**</sup>
X <sub>15</sub>	Economic orientation	0.301 <sup>**</sup>

\* : Significant at 0.05 level of probability

\*\* : Significant at 0.01 level of probability

NS : Non-significant



**Fig.4.18 Correlation coefficients between the selected profile characteristics with the performance of the custom hiring centres**



#### **4.4.1.2 Performance Vs gender**

The results in Table 4.24 and Fig. 4.18 exhibited that the coefficient of correlation ( $r = 0.063$ ) between gender and the performance of the custom hiring centres was less than the table value of ' $r$ ' at 0.05 level of significance. Hence, null hypothesis was accepted and empirical hypothesis was rejected. Therefore, it could be inferred that there was a positive and non significant relationship between gender and the performance of custom hiring centres.

The results indicated that the performance of the custom hiring centres had no influence on the gender of the respondents. The probable reason for the above result might be that irrespective of the gender of the respondent, the person learn the technologies related to mechanization and influence the performance of custom hiring centres.

#### **4.4.1.3 Performance Vs education**

From the Table 4.24 and Fig. 4.18 it is evident that computed coefficient of correlation value ( $r = 0.182$ ) between education and performance of custom hiring centres was greater than the table value of ' $r$ ' at 0.05 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between education and performance of custom hiring centres.

The probable reason for this trend might be that education plays a major role to increase their ability of thinking of the respondents. Educated farmers with medium mass media exposure can access to various farm information sources such as farm magazines, farm bulletins, extension publications on agriculture. They can also approach extension agencies, scientists, research stations and KVKs and get the information on farm mechanization which will have effect on the overall performance of custom hiring centres.

#### **4.4.1.4 Performance Vs farm size**

From the Table 4.24 and Fig. 4.18 it is evident that co-efficient of correlation ( $r = -0.162$ ) between farm size and the performance of custom hiring centres was less than the table value of 'r' at 0.05 level of significance. Hence, null hypothesis was accepted and empirical hypothesis was rejected.

Therefore, it could be inferred that there was a negative and non significant relationship between farm size and the performance of custom hiring centres. Small and marginal farmers are having the accessibility to custom hiring centres as the concept of custom hiring centre focusing more on small and marginal farmers.

#### **4.4.1.5 Performance Vs farming experience**

The results in Table 4.24 and Fig. 4.18 exhibited that the computed coefficient of correlation ( $r = 0.007$ ) between farming experience and the performance of the custom hiring centres was less than the table value of 'r' at 0.05 level of significance. Hence, null hypothesis was accepted and empirical hypothesis was rejected. Therefore, it could be inferred that there was a positive and non significant relationship between farming experience and the performance of custom hiring centres.

The results indicated that the performance of the custom hiring centres had no influence on the farming experience of the respondents. The probable reason for the above result might be that with middle age and medium farming experience of the respondents tending towards farm mechanization due to scarcity in labour which influences the performance of custom hiring centres.

#### **4.4.1.6 Performance Vs social participation**

From the Table 4.24 and Fig 4.18, it is evident that co-efficient of correlation ( $r = 0.201$ ) between social participation and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis

was accepted. Therefore, it could be inferred that there was a positive and significant relationship between social participation and the performance of custom hiring centres.

The probable reason might be that those farmers who are having membership in one or more organizations have a scope to interact and exchange ideas on activities related to farm mechanization hence showed the influence on the performance of custom hiring centres.

#### **4.4.1.7 Performance Vs innovativeness**

From the Table 4.24 and Fig 4.18, it is evident that co-efficient of correlation ( $r = 0.280$ ) between innovativeness and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between innovativeness and the performance of custom hiring centres.

An individual with high innovativeness intended to seek new technologies related to farm mechanization which showed the influence on the performance of custom hiring centres.

#### **4.4.1.8 Performance Vs management orientation**

From the Table 4.24 and Fig 4.18, it is evident that co-efficient of correlation ( $r = 0.252$ ) between management orientation and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between management orientation and the performance of custom hiring centres.

Users of custom hiring centres were better in management orientation with regard to planning and crop production technologies involving

mechanization. This showed influence on increased performance of custom hiring centres.

#### **4.4.1.9 Performance Vs annual family income**

From the Table 4.24 and Fig 4.18, it is evident that co-efficient of correlation ( $r = 0.219$ ) between annual income and the performance of custom hiring centres was greater than the table value of 'r' at 0.05 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between annual income and the performance of custom hiring centres.

Due to mechanization in farming activities which enable the farmers to perform timely farming operations and thereby able to realize more profits. Hence increased income showed direct bearing on the performance of custom hiring centres .

#### **4.4.1.10 Performance Vs accessibility**

From the Table 4.24 and Fig 4.18, it is evident that co-efficient of correlation ( $r = 0.247$ ) between accessibility and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between accessibility and the performance of custom hiring centres.

The possible reason might be that majority of the respondents who have better accessibility to the custom hiring centres as the centres were catering the needs of the users of surrounding villages within the radius of 5-7 kilometers from their location. Hence showed the better performance of the CHCs.

#### **4.4.1.11 Performance Vs extension contact**

From the Table 4.24 and Fig 4.18 it is evident that co-efficient of correlation ( $r = 0.298$ ) between extension contact and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between extension contact and performance of custom hiring centres.

Farmers can get the reliable information from extension functionaries. Hence the users of custom hiring centres who have more extension contact showed more influence on the performance of custom hiring centres.

#### **4.4.1.12 Performance Vs mass media exposure**

From the Table 4.24 and Fig 4.18 it is evident that co-efficient of correlation ( $r = 0.259$ ) between mass media exposure and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between mass media exposure and performance of custom hiring centres

The reason for above result might be that constant exposure to mass media pave way to acquire the information on latest technologies with regard to farm mechanization. Hence an improved performance of custom hiring centres was observed.

#### **4.4.1.13 Performance Vs trainings received**

From the Table 4.24 and Fig 4.18 it is evident that co-efficient of correlation ( $r = 0.267$ ) between training received and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis

was accepted. Therefore, it could be inferred that there was a positive and significant relationship between trainings received and the performance of custom hiring centres.

The reason for the above result might be that who have undergone more trainings on farm mechanization and crop production technologies utilize the custom hiring services of farm machinery and which showed direct bearing on performance of custom hiring centres than those who have not undergone any trainings.

#### **4.4.1.14 Performance vs achievement motivation**

From the Table 4.24 and Fig 4.18 it is evident that co-efficient of correlation ( $r = 0.279$ ) between achievement motivation and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between achievement motivation and performance of custom hiring centres.

The reason for above result might be that achievement motivation forces an individual towards reaching a goal which makes him/her to know the latest technologies. Hence showed positive influence on the performance of custom hiring centres.

#### **4.4.1.15 Performance Vs economic orientation**

From the Table 4.24 and Fig 4.18 it is evident that co-efficient of correlation ( $r = 0.301$ ) between economic orientation and performance of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between economic orientation and performance of custom hiring centres.

The reason for the above result might be that the farmer with more economic orientation aims to get good yield and better returns. There by forces the respondents to adopt latest technologies relevant to farm mechanization. Hence showed the positive and significant relationship with the performance of custom hiring centres.

Further, in order to study the combined effect of all the independent variables in explaining variation in the performance of the custom hiring centres, Multiple Linear Regression (MLR) analysis was carried out. The computed co-efficient of determination ( $R^2$ ) value and partial regression co-efficient (b) values with their corresponding values were presented in Table 4.21. The  $R^2$  and 'b' values were tested statistically for their significance.

The ' $R^2$ ' value of 0.653 which depicted that all the fifteen independent variables put together explained about 65.30 per cent of variation in the performance of the custom hiring centres.

The partial regression coefficients presented in Table 4.25 further revealed that the independent variables viz., social participation, management orientation, annual family income, accessibility, extension contact and mass media exposure were found positively significant as evident from their significant 't' values. This implied that social participation, management orientation, annual family income, accessibility, extension contact and mass media exposure have contributed to most of the variation in the performance of the custom hiring centres.

**Table 4.25 Multiple Linear Regression analysis of profile characteristics with performance of custom hiring centres.**

**n=120**

<b>S. No.</b>	<b>Independent variable</b>	<b>‘b’ values</b>	<b>‘t’ values</b>
X <sub>1</sub>	Age	0.251	1.495 <sup>NS</sup>
X <sub>2</sub>	Gender	-0.023	-0.350 <sup>NS</sup>
X <sub>3</sub>	Education	0.098	1.281 <sup>NS</sup>
X <sub>4</sub>	Farm size	-0.084	-1.176 <sup>NS</sup>
X <sub>5</sub>	Farming experience	-0.217	-1.339 <sup>NS</sup>
X <sub>6</sub>	Social participation	0.357	4.905 <sup>**</sup>
X <sub>7</sub>	Innovativeness	-0.500	-5.960 <sup>**</sup>
X <sub>8</sub>	Management orientation	0.134	2.226 <sup>*</sup>
X <sub>9</sub>	Annual Family income	0.140	2.011 <sup>*</sup>
X <sub>10</sub>	Accessibility	0.265	3.431 <sup>**</sup>
X <sub>11</sub>	Extension contact	0.257	2.978 <sup>*</sup>
X <sub>12</sub>	Mass media exposure	0.463	5.713 <sup>**</sup>
X <sub>13</sub>	Training undergone	0.420	-5.126 <sup>**</sup>
X <sub>14</sub>	Achievement motivation	-0.242	-3.022 <sup>*</sup>
X <sub>15</sub>	Economic orientation	-0.399	-5.611 <sup>**</sup>

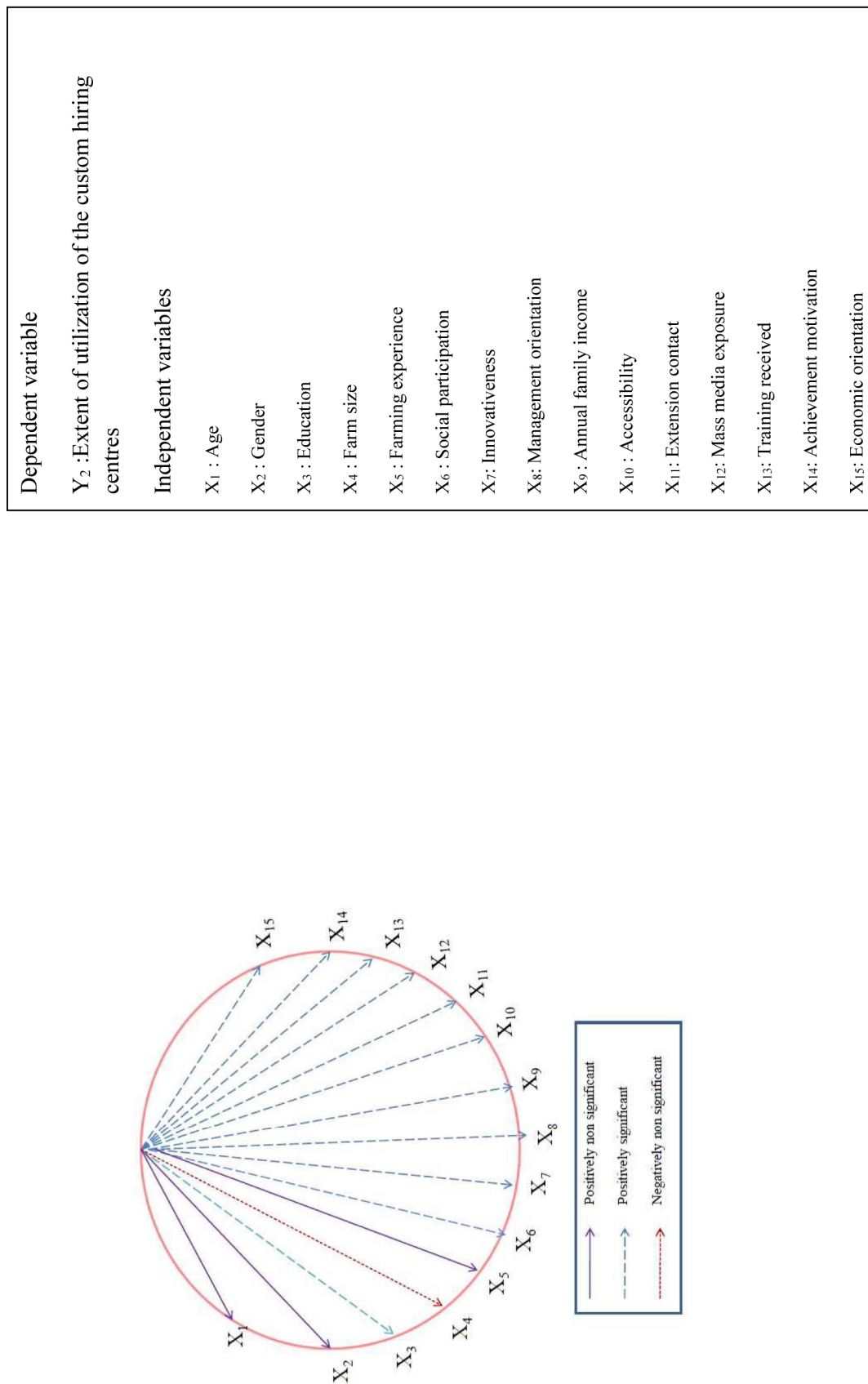
$R^2 = 0.653$

\* : Significant at 0.05 level

\*\* : Significant at 0.01 level

NS: Non significant





**Fig.4.19** Correlation coefficients between the selected profile characteristics with the extent of utilization of the custom hiring centres

#### **4.4.2 Relationship between the Selected Independent Variables and the Extent of Utilization of Custom Hiring Centres**

In order to study the nature of relationship between the selected independent variables and the extent of utilization of custom hiring centres, correlation coefficients ( $r$ ) were computed and the values are presented in Table 4.26 and Fig 4.19.

This relationship between the scores of selected independent variables and the extent of utilization of the custom hiring centres were tested by null hypothesis and empirical hypothesis.

##### **Null hypothesis**

There will be no significant relationship between the selected independent variables viz., Age, gender, education, farm size, farming experience, social participation, innovativeness, management orientation, Annual family income, accessibility, extension contact, mass media exposure, Training received, achievement motivation and economic orientation and the extent of utilization of custom hiring centres.

##### **Empirical hypothesis**

There will be significant relationship between the selected independent variables viz., age, gender, education, farm size, farming experience, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, trainings received, achievement motivation and economic orientation and the extent of utilization of custom hiring centres.

**Table 4.26. Correlation analysis of profile characteristics and the extent of utilization of custom hiring centres** **n=120**

<b>Variable No</b>	<b>Independent variables</b>	<b>Correlation coefficients ('r' values)</b>
X <sub>1</sub>	Age	0.019 <sup>NS</sup>
X <sub>2</sub>	Gender	0.032 <sup>NS</sup>
X <sub>3</sub>	Education	0.197 <sup>*</sup>
X <sub>4</sub>	Farm size	-0.154 <sup>NS</sup>
X <sub>5</sub>	Farming experience	0.003 <sup>NS</sup>
X <sub>6</sub>	Social participation	0.211 <sup>**</sup>
X <sub>7</sub>	Innovativeness	0.268 <sup>**</sup>
X <sub>8</sub>	Management orientation	0.248 <sup>*</sup>
X <sub>9</sub>	Annual family income	0.223 <sup>*</sup>
X <sub>10</sub>	Accessibility	0.238 <sup>**</sup>
X <sub>11</sub>	Extension contact	0.229 <sup>**</sup>
X <sub>12</sub>	Mass media exposure	0.259 <sup>**</sup>
X <sub>13</sub>	Training received	0.370 <sup>**</sup>
X <sub>14</sub>	Achievement motivation	0.257 <sup>**</sup>
X <sub>15</sub>	Economic orientation	0.289 <sup>**</sup>

\* : Significant at 0.05 level

\*\* : Significant at 0.01 level

NS : Non-significant

#### **4.4.2.1 Utilization Vs age**

The results in Table 4.26 and Fig. 4.19 exhibited that the computed coefficient of correlation ( $r = 0.019$ ) between age and the extent of utilization of the custom hiring centres was less than the table value of ' $r$ ' at 0.05 level of significance. Hence, null hypothesis was accepted and empirical hypothesis was rejected. Therefore, it could be inferred that there was a positive and non significant relationship between age and the extent of utilization of custom hiring centres.

The results indicated that the extent of utilization of the custom hiring centres had no influence on the age of the respondents. The probable reason for the above result might be that irrespective of the age of the respondent, the person learn the technologies related to mechanization and utilizes the services of custom hiring centres.

#### **4.4.2.2 Utilization Vs gender**

The results in Table 4.26 and Fig. 4.19 exhibited that the computed coefficient of correlation ( $r = 0.032$ ) between gender and the extent of utilization of the custom hiring centres was less than the table value of ' $r$ ' at 0.05 level of significance. Hence, null hypothesis was accepted and empirical hypothesis was rejected. Therefore, it could be inferred that there was a positive and non significant relationship between gender and the extent of utilization of custom hiring centres.

The results indicated that the utilization of the custom hiring centres had no influence on the gender of the respondents. The probable reason for the above result might be that irrespective of the gender of the respondent, the person learn the technologies related to mechanization and utilizes the services of custom hiring centres.

#### **4.4.2.3 Utilization Vs education**

From the Table 4.26 and Fig. 4.19 it is evident that computed co-efficient of correlation value ( $r = 0.197$ ) between education and the extent of utilization of custom hiring centres was greater than the table value of 'r' at 0.05 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between education and the extent of utilization of custom hiring centres.

The probable reason for this trend might be that education plays a major role in acquiring information on latest technologies. Educated farmers with reasonable mass media exposure can access to various farm information sources such as farm magazines, farm bulletins, extension publications on agriculture. Further they also attend for demonstrations and exhibitions conducted by concerned agencies regarding mechanization of farming. They can approach extension agencies, scientists, research stations and KVKs and get the information on farm mechanization hence better utilization of the services of custom hiring centres.

#### **4.4.2.4 Utilization Vs farm size**

From the Table 4.26 and Fig. 4.19 it is evident that co-efficient of correlation ( $r = -0.154$ ) between farm size and the extent of utilization of custom hiring centres was less than the table value of 'r' at 0.05 level of significance. Hence, null hypothesis was accepted and empirical hypothesis was rejected. Therefore, it could be inferred that there was a negative and non significant relationship between farm size and the extent of utilization of custom hiring centres. Small and marginal farmers are having the accessibility to custom hiring centres as the concept of custom hiring centre focusing more on small and marginal farmers hence better utilization the services of custom hiring centres.

#### **4.4.2.5 Utilization Vs farming experience**

The results in Table 4.26 and Fig. 4.19 exhibited that the computed coefficient of correlation ( $r = 0.003$ ) between farming experience and the extent of utilization of the custom hiring centres was less than the table value of ' $r$ ' at 0.05 level of significance. Hence, null hypothesis was accepted and empirical hypothesis was rejected. Therefore, it could be inferred that there was a positive and non significant relationship between farming experience and the extent of utilization of custom hiring centres.

The results indicated that the utilization of the custom hiring centres had no influence on the farming experience of the respondents. The probable reason for the above result might be that with medium aged and medium farming experience of the respondents tending towards farm mechanization due to scarcity in labour hence better utilization of the services of custom hiring centres.

#### **4.4.2.6 Utilization Vs social participation**

From the Table 4.26 and Fig. 4.19, it is evident that co-efficient of correlation ( $r = 0.211$ ) between social participation and the extent of utilization of custom hiring centres was greater than the table value of ' $r$ ' at 0.05 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between social participation and the extent of utilization of custom hiring centres.

The probable reason might be that those farmers who are having membership in one or more organizations have a scope to interact and exchange the ideas regarding mechanization in farming and thus utilized the services of custom hiring centres.

#### **4.4.2.7 Utilization Vs innovativeness**

From the Table 4.26 and Fig. 4.19, it is evident that co-efficient of correlation ( $r = 0.268$ ) between innovativeness and the extent of utilization of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between innovativeness and the extent of utilization of custom hiring centres.

Innovativeness is associated with the individual's earliness in the use of new practices. An individual with high innovativeness intended to seek new technologies in the area of farm mechanization hence effectively utilized the services of custom hiring centres.

#### **4.4.2.8 Utilization Vs management orientation**

From the Table 4.26 and Fig. 4.19, it is evident that co-efficient of correlation ( $r = 0.248$ ) between management orientation and the extent of utilization of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between management orientation and extent of utilization of custom hiring centres.

Management orientation is the ability of the farmer in scientific farm management in planning and production. Users of custom hiring centres better in management orientation with regard to farm planning and crop production technologies involving mechanization. Hence better utilization of custom hiring centres was observed.

#### **4.4.2.9 Utilization Vs annual family income**

From the Table 4.26 and Fig. 4.19, it is evident that co-efficient of correlation ( $r = 0.223$ ) between annual income and extent of utilization of

custom hiring centres was greater than the table value of 'r' at 0.05 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between annual income and extent of utilization of custom hiring centres.

Due to mechanization in farming activities farmers could able to perform timely farming operations which in turn helped them in realizing the desired profits. Hence showed better utilization of the services of custom hiring centres.

#### **4.4.2.10 Utilization Vs accessibility**

From the Table 4.26 and Fig. 4.19, it is evident that co-efficient of correlation ( $r = 0.238$ ) between accessibility and extent of utilization of services of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between accessibility and extent of utilization of custom hiring centres.

The possible reason might be that majority of the respondents who have better accessibility to the custom hiring centres as the centres were catterring the needs of the users of surrounding villages within the radius of 5-7 kilometers from their location. Hence showed the better utilization of the CHCs.

#### **4.4.2.11 Utilization vs extension contact**

From the Table 4.26 and Fig. 4.19 it is evident that co-efficient of correlation ( $r = 0.229$ ) between extension contact and extent of utilization of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and



significant relationship between extension contact and performance of custom hiring centres.

Farmers can get the reliable information from extension functionaries. Hence the users of custom hiring centres who have better extension contact showed effective utilization of the services of custom hiring centres.

#### **4.4.2.12 Utilization Vs mass media exposure**

From the Table 4.26 and Fig. 4.19 it is evident that co-efficient of correlation ( $r = 0.259$ ) between mass media exposure and extent of utilization of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between mass media exposure and utilization of services of custom hiring centres

The reason for above result might be that regular exposure to various mass media channels pave way to acquire the information on latest technologies regarding farm mechanization. Hence showed better utilization of the services of custom hiring centres.

#### **4.4.2.13 Utilization Vs trainings received**

From the Table 4.26 and Fig. 4.19, it is evident that co-efficient of correlation ( $r = 0.370$ ) between training received and extent of utilization of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between training received and extent of utilization of custom hiring centres.

The reason for the above result might be that who have undergone more trainings on farm mechanization aspects and crop production technologies utilized the services of custom hiring centres in a better manner.

#### **4.4.2.14 Utilization Vs achievement motivation**

From the Table 4.26 and Fig. 4.19 it is evident that co-efficient of correlation ( $r = 0.257$ ) between achievement motivation and extent of utilization of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between achievement motivation and extent of utilization of custom hiring centres.

The reason for above result might be that achievement motivation forces an individual towards reaching a goal which makes him to know the latest technologies. Hence the users with medium achievement motivation utilizes the services of custom hiring centres in an effective manner.

#### **4.4.2.15 Utilization Vs economic orientation**

From the Table 4.26 and Fig. 4.19 it is evident that co-efficient of correlation ( $r = 0.289$ ) between economic orientation and extent of utilization of custom hiring centres was greater than the table value of 'r' at 0.01 level of significance. Hence, null hypothesis was rejected and empirical hypothesis was accepted. Therefore, it could be inferred that there was a positive and significant relationship between economic orientation and extent of utilization of custom hiring centres.

The reason for the above result might be that the farmer with more economic orientation aims to get good yields and better returns. There by forces them to adopt latest technologies hence showed positive and significant relationship with the utilization of services of custom hiring centres.

Further, in order to study the combined effect of all the independent variables in explaining variation in extent of utilization of the custom hiring centres, Multiple Linear Regression (MLR) analysis was carried out. The

computed co-efficient of determination ( $R^2$ ) value and partial regression co-efficient (b) values with their corresponding values were presented in Table 4.27. The  $R^2$  and 'b' values were tested statistically for their significance.

**Table 4.27. Multiple Linear Regression analysis of profile characteristics with extent of utilization of custom hiring centres.** **n=120**

Variable no	Independent variable	'b' values	't' values
X <sub>1</sub>	Age	0.084	0.494 <sup>NS</sup>
X <sub>2</sub>	Gender	0.176	2.062 <sup>NS</sup>
X <sub>3</sub>	Education	0.045	0.435 <sup>NS</sup>
X <sub>4</sub>	Farm size	-0.151	-1.700 <sup>NS</sup>
X <sub>5</sub>	Farming experience	-0.063	-0.374 <sup>NS</sup>
X <sub>6</sub>	Social participation	0.148	1.348 <sup>NS</sup>
X <sub>7</sub>	Innovativeness	0.180	1.966 <sup>**</sup>
X <sub>8</sub>	Management orientation	0.005	0.060 <sup>NS</sup>
X <sub>9</sub>	Annual Family income	0.084	0.923 <sup>*</sup>
X <sub>10</sub>	Accessibility	0.208	1.903 <sup>*</sup>
X <sub>11</sub>	Extension contact	-0.040	-0.447 <sup>NS</sup>
X <sub>12</sub>	Mass media exposure	0.219	2.218 <sup>*</sup>
X <sub>13</sub>	Training undergone	0.401	4.339 <sup>**</sup>
X <sub>14</sub>	Achievement motivation	-0.174	-1.829 <sup>NS</sup>
X <sub>15</sub>	Economic orientation	0.098	0.996 <sup>NS</sup>

$R^2 = 0.632$

\* : Significant at 0.05 level

\*\* : Significant at 0.01 level

NS :Non-significant

The 'R<sup>2</sup>' value of 0.632 which depicted that all the fifteen independent variables put together explained about 63.20 per cent variation in the utilization of the custom hiring centres.

The partial regression coefficients presented in Table 4.27 further revealed that the independent variables viz., innovativeness, annual family income, accessibility, mass media exposure and training undergone were found positively significant as evident from their significant t' values. This implied that innovativeness, annual family income, accessibility, mass media exposure and training undergone have contributed to most of the variation in the utilization of services of custom hiring centres by the users.

#### **4.5. CONSTRAINTS FACED BY THE USERS IN THE UTILIZATION OF CUSTOM HIRING CENTRES AND SUGGESTIONS FOR EFFECTIVE UTILIZATION OF CUSTOM HIRING CENTRES.**

##### **4.5.1 Constraints Faced by the Users in the Utilization of Custom Hiring Centres**

The number of respondents who expressed various constraints in the utilization of the services of custom hiring centres were obtained and corresponding percentages were calculated and ranking was given for each constraint expressed.

**Table 4.28 Constraints faced by the users in the utilization of custom hiring centres .** **n=120**

S.No	Constraints	Frequency	Percentage	Rank
1.	Lack of timely availability of farm machinery	79	65.83	II
2.	Non availability of farm machinery during peak season	87	72.50	I
3.	Non availability of skilled farm machinery operator	73	60.83	IV
4.	Overlapping farming operations	68	56.66	V
5.	Lack of awareness about type of machinery available at CHC	37	30.83	VII
6.	Location of the field	22	18.33	VIII
7.	Non availability of service centres for repairing the machinery in the vicinity of CHCs	41	34.16	VI
8.	Damage of the kernal due to the use of machinery i.e Ground nut dry pod thresher.	77	64.16	III
9.	Lack of shelter for keeping the machinery at CHCs	18	15.00	IX

From the Table.4.28 it is evident that nearly three fourth of the respondents (72.50%) expressed non availability of farm machinery during peak season as a major constraint which was ranked first by the respondents.

Lack of timely availability of farm machinery was reported as another major constraint by 65.83 per cent of the respondents. The finding is in line with the findings of Sidhu and Kamal Vatta (2012), Singh *et al.*(2013), Gajpal *et al.*(2015) and Parashunath *et al.*(2016).

Damage of the kernal due to the use of machinery i.e groundnut dry pod thresher was reported as another constraint by 64.16 per cent of the respondents.

Non availability of skilled farm machinery operator for operating improved farm implements and machineries was ranked fourth constraint by more than half (60.83%) of the respondents. The finding is in accordance with the findings of Patil *et al.*(2001), Singh *et al.*(2013) and Selvam *et al.*(2018).

Overlapping of farm operations was reported by 56.66 per cent of respondents as fifth constraint. The finding is in agreement with the findings of Parashunath *et al.*(2016).

Non availability of service centres for repairing the machinery in the vicinity of CHCs was reported as a constraint by 34.16 per cent of the respondents which was ranked sixth. This finding is supported by the findings of Patil *et al.* (2001), Panghal *et al.*(2006), Singh *et al.*(2013) and Selvam *et al.*(2018)

Lack of awareness about type of machinery available at CHC was reported as a minor constraint by 30.83 percent of respondents. The finding is in agreement with the findings of Parashunath *et al.*(2016)

Location of the field was reported as another minor constraint by 18.33 per cent of respondents. The finding is in agreement with the findings of Gajpal *et al.* (2015)

Lack of shelter for keeping the machinery was reported as constraint by 15.00 percent of respondents .The finding is in conformity with the findings of Singh *et al.* (2015).

#### 4.5.2. Suggestions for Effective Utilization of Custom Hiring Centres

A list of suggestions given by the respondents for efficient utilization of the services of custom hiring centres were given in their rank order based on the frequencies and percentages.

**Table 4.29. Suggestions for effective utilization of custom hiring centres** **n=120**

S.No.	Suggestion	F	%	Rank
1.	Expansion of custom hiring centres each at panchayat where ever necessary so that small and marginal farmers can access the services of custom hiring centres.	102	85.00	I
2.	Training of man power for efficient handling of the farm machinery.	94	78.33	II
3.	Need to strengthen the Custom hiring centres by increasing the number of farm machinery which overcomes the problem of non availability particularly during the peak season, especially to the small and marginal farmers.	81	67.50	III
4.	Strengthen the subsidy component for custom hiring centres by the government.	68	56.66	IV
5.	Creating awareness for hiring of machinery in CHCs	61	50.83	V
6.	Fixed hiring charges for the machinery by the district monitoring team	53	44.16	VI
7.	Provision of subsidy for construction of shelter for keeping the machinery for CHCs	46	38.33	VII

The suggestions given by the respondents were in the following rank order, expansion of custom hiring centres each at panchayat level where ever necessary so that small and marginal farmers can access the services of custom hiring centres (85.00%); training of man power for efficient handling of the farm machinery (78.33%); need to strengthen the custom hiring centres by increasing the number of farm machinery. It will overcome the problem of timely non availability particularly during the peak season, especially to the small and marginal farmers (67.50%); strengthen the subsidy component for these custom hiring centres by the government (56.66%); creating awareness for hiring of machinery in CHC (50.83%); fixing the custom hiring charges (44.16%) and provision of subsidy for construction of shed for keeping the machinery (38.33%).

Majority of the farmers belonged to marginal and small category, so owning a agricultural machinery as a owner based was difficult, custom hiring center should be established at each panchayat level. Hence small and marginal farmers can access the services of custom hiring centres easily.

Training relating to farm machinery and equipment should be imparted to the farmers for its efficient utilization. Technical know-how should be provided to the farmers with respect to appropriateness of farm machinery for the situation and for its proper use.

There is a need to strengthen the custom hiring centres by increasing the number of farm machinery. It will solve the problem of non-availability of machinery to the farmers, particularly during the peak season, especially to the small and marginal farmers.

Keeping in view a large expanse of benefits emanating from the success of these CHCs, there is a need to strengthen the subsidy component for these centres by the government.



As the custom hiring services of farm machinery and implements play important role in reducing the fixed costs of farming and thus increasing the profitability especially on smaller farms, these need to be further strengthened and extended throughout the district.

#### **4.6. DOCUMENTATION OF A FEW SUCCESSFUL AND FAILURE (LOW PERFORMANCE) CASES OF CUSTOM HIRING CENTRES**

In order to study the performance and utilization of custom hiring centres, a total of sixteen custom hiring centres were selected for study. The performance and utilization were calculated by analyzing the data. Further, to have an in depth insight about the performance and utilization of each custom hiring centre, a case study analysis was carried out. For this purpose two CHCs which are being run successfully by getting high returns were taken as successful cases and two CHCs which are being running with low returns were taken as failure/low performance cases. The detailed information was collected with regard to each successful case and each low performance case and the details were furnished.

#### 4.6.1 Successful Cases of Custom Hiring Centres

##### CASE-1

Name of the Custom hiring centre:Sri Lakshmi Rythu Mitra group

Village : Sompalle  
Mandal : Molakalacheruvu  
Division : Madanapalle  
District : Chittoor  
Scheme : RKVY (2015-16)  
Inputs supplied : Tractor, Rotavator, Seed drill, Thresher  
Subsidy pattern : 50 % subsidy.

**Table 4.30. Package of machinery supplied under CHC Groundnut**

S.No	Name of the implement	Total cost (Rs)	Subsidy (Rs)	Farmer's share( Rs)
1.	Tractor	5,58,000	2,79,000	2,79,000
2.	Rotovator	98,000	49,000	49,000
3.	Seed drill	47995	23997.50	23997.50
4.	Thresher	1,75,000	87,500	87,500
	Total	<b>8,78,995</b>	<b>4,39,497.50</b>	<b>4,39,497.50</b>

**Table 4.31 Group members of custom hiring centre in Sompalli village**

S.No.	Name of the farmer	Village
1.	D.Venkata Ramana	Sompalli
2.	Ramanjaneyulu	Sompalli
3.	S.Chandrasekhara	Sompalli
4.	M. Reddy Rani	Sompalli
5	G.Narasimhulu	Sompalli

A Rythu mitra group was formed and named as Sri Lakshmi Rythu mithra group in Sompalli village of Molakalacheruvu mandal. The farmers were supplied with package of machinery for groundnut crop i.e tractor, rotovator, seed drill and thresher on 50 % subsidy. The machinery was supplied during the year 2015-16. The users were utilized the custom hiring centre in the Sompalli village in Molakalacheruvu mandal of Madanapalli Division of Chittoor district and net returns obtained per year by the users were presented.

From the above table.4.32 it is evident that the group has maintained the machinery and lent for hiring. During the year 2017-18 among the machinery existing in the centre, tractor along with rotovator were utilized for 200 hours, the hiring charges per hour was Rs.600 and thereby generated a gross income of Rs.1,20,000 where as tractor along with seed drill were used for 250 hours, the hiring charges per hour was Rs.900 and the gross income obtained was Rs.2,25,000 and where as in the case of thresher the gross income generated was Rs. 2,00,000 which was utilized for 250 hours at the rate of Rs.800 per hour as hiring charges. The total gross income generated was about Rs.5,45,000 during the study year. Total cost incurred in the maintenance of the machinery amounts to Rs.3,48,619 which includes both fixed costs and variable costs. The net income was calculated by deducting the total cost incurred from total gross income which amounts to Rs. 1,96,381.

Thus the custom hiring centre gained a profit of Rs. 1,96,381 per one year through hiring the machinery among the ground nut farmers.

Table 4.32 Working particulars of the machinery

S.No	Name of the implement	Total working hours	Hiring charge per hour(Rs)	Gross Income(Rs)	Fixed cost(Rs)	Variable cost (Rs)	Total cost(Rs)	Net returns(Rs)
1	Tractor + Rotavator	200	600	1,20,000	43,776	64,533	1,08,309	11,691
2	Tractor + Seed drill	250	900	2,25,000	35,277	73,834	1,09,111	1,15,889
3	Thresher	250	800	2,00,000	56,866	74,333	1,31,199	68,801
	<b>Total</b>			<b>5,45,000</b>	<b>1,35,919</b>	<b>2,12,700</b>	<b>3,48,619</b>	<b>1,96,381</b>

## CASE-II

Name of the Custom hiring centre: Jyothi Mahi Rythu Mitra Group

Village : Mallaiahgaripalle  
Mandal : Peddamandyam  
Division : Valmikipuram  
District : Chittoor  
Scheme : RKVY (2016-17)  
Inputs supplied : Tractor, Rotovator, Seed drill, Thresher  
Subsidy pattern : 50 % subsidy

**4.33. Table Package of machinery supplied under CHC Groundnut**

S.No	Name of the implement	Total cost (Rs)	Subsidy (Rs)	Farmer's share( Rs)
1.	Tractor	5,48,000	2,29,000	3,19,000
2.	Rotovator	98,700	43,350	55,350
3.	Seed drill	61,020	30,510	30,510
4.	Thresher	1,70,000	85,000	85,000
	Total	<b>8,77,720</b>	<b>3,87,860</b>	<b>4,89,860</b>

**Table 4.34 Group members of custom hiring centre**

S.No.	Name of the farmer	Village
1	Saraswathamma	Mallaiahgaripalle
2	Santhamma	Mallaiahgaripalle
3	Mallikarjuna	Mallaiahgaripalle
4	S. Reddappa	Mallaiahgaripalle
5	Nadipi Reddappa	Mallaiahgaripalle

A rythu mitra group was formed and named as Jyothi Mahi Rythu mithra group in Siddavaram village of Peddamandyam mandal. The farmers were supplied with package of machinery for groundnut crop i.e tractor, rotavator, seed drill, thresher on 50 % subsidy. The machinery was supplied during the year 2016-17. The farmers were utilized the custom hiring centre in the Siddavaram village and other surrounding villages in Peddamandyam mandal of Valmikipuram Division of Chittoor district.

From the table 4.35 it is evident that the group has maintained the machinery and lent for hiring. During the year 2017-18 among the machinery existing in the centre, tractor along with rotovator were utilized for 200 hours, the hiring charges per hour was Rs.750 and thereby generated a gross income of Rs.1,50,000 where as tractor along with seed drill were used for 250 hours, the hiring charges per hour was Rs.900 and the gross income obtained was Rs.2,25,000 and where as in the case of thresher the gross income generated was Rs. 1,35,000 which was utilized for 150 hours at the rate of Rs.900 per hour as hiring charges. The total gross income generated was about Rs.5,10,000 during the study year. Total cost incurred in the maintenance of the machinery amounts to Rs.3,25,152 which includes both fixed costs and variable costs. The net income was calculated by deducting the total cost incurred from total gross income which amounts to Rs. 1,84,848.

Thus the custom hiring centre gained a profit of Rs. 1,84,848 per one year through hiring the machinery among the ground nut farmers.

**Table 4.35 Working particulars of the machinery**

<b>S.No</b>	<b>Name of the implement</b>	<b>Total working hours</b>	<b>Hiring charge per hour(Rs)</b>	<b>Gross Income(Rs)</b>	<b>Fixed cost(Rs)</b>	<b>Variable cost (Rs)</b>	<b>Total cost(Rs)</b>	<b>Net returns(Rs)</b>
1	Tractor+Rotavator	200	750	1,50,000	42,948	64,700	1,07,648	42,352
2	Tractor+Seed drill	250	900	2,25,000	43,080	79,250	1,22,330	1,02,670
3	Thresher	150	900	1,35,000	48,524	46,650	95,174	39,826
	<b>Total</b>			<b>510000</b>	<b>134552</b>	<b>190600</b>	<b>325152</b>	<b>184848</b>

#### 4.6.2 Failure Cases (Low Performance) of Custom Hiring Centres

##### CASE-I

Name of the Custom hiring centre: Sri Lakshmi Vinayaka RMG

Village : Marrikuntlapalle  
Mandal : Kalikiri  
Division : Valmikipuram  
District : Chittoor  
Scheme : RKVY (2013-14)  
Inputs supplied : Tractor, Rotovator, Seed drill, Thresher  
Subsidy pattern : 50 % subsidy

**Table 4.36 Package of machinery supplied under CHC Groundnut**

S.No	Name of the implement	Total cost (Rs)	Subsidy (Rs)	Farmer's share( Rs)
1.	Tractor	5,59,000	1,50,000	4,09,000
2.	Rotovator	90,000	45,000	45,000
3.	Seed drill	48,000	24,000	24,000
4.	Thresher	1,50,000	75,000	75,000
	Total	8,47,000	2,94,000	5,53,000

**Table 4.37 Group members of custom hiring centre**

S.No.	Name of the farmer	Village
1	Y.Mallikarjuna Reddy	Marrikuntlapalli
2	B. Reddappa Reddy	Marrikuntlapalli
3	Chandra Reddy	Marrikuntlapalli
4	Venkataramana	Marrikuntlapalli
5	Manikanta	Marrikuntlapalli



A Rythu Mitra group was formed and named as Sri Lakshmi Vinayaka Rythu Mithra group in Marrikuntlapalli village of Kalikiri mandal. The farmers were supplied with the package of machinery for groundnut crop i.e tractor, rotovator, seed drill and thresher on 50 % subsidy. The farmers were utilized the custom hiring centre in the Marrikuntlapalli village in Kalikiri mandal of Valmikipuram Division of Chittoor district.

From table 4.38 it is evident that the group has maintained the machinery and lent for hiring .During the year 2017-18 among the machinery existing in the centre, tractor along with rotovator were utilized for 200 hours, the hiring charges per hour was Rs.700 and thereby generated a gross income of Rs.1,40,000 where as tractor along with seed drill were used for 170 hours, the hiring charges per hour was Rs.900 and the gross income obtained was Rs.1,53,000 and the thresher was never used. The total gross income generated was about Rs.2,93,000 during the study year. Total cost incurred in the maintenance of the machinery amounts to Rs.2,60,055 which includes both fixed costs and variable costs. The net income was calculated by deducting the total cost incurred from total gross income which amounts to Rs.32,945. Thus the custom hiring centre gained a profit of Rs.32,945 per one year through hiring the machinery among the ground nut farmers.

**Table 4.38. Working particulars of the machinery**

<b>S.No</b>	<b>Name of the implement</b>	<b>Total working hours</b>	<b>Hiring charge per hour(Rs)</b>	<b>Gross Income(Rs)</b>	<b>Fixed cost(Rs)</b>	<b>Variable cost (Rs)</b>	<b>Total cost(Rs)</b>	<b>Net returns(Rs)</b>
1	Tractor + Rotavator	200	700	1,40,000	61,245	69,200	1,30,445	9,555
2	Tractor + Seed drill	170	900	1,53,000	47,090	57,020	1,04,110	48,890
3	Thresher	0	0	0	25,500	0	25,500	-25,500
	<b>Total</b>			<b>2,93,000</b>	<b>1,33,835</b>	<b>1,26,220</b>	<b>2,60,055</b>	<b>32,945</b>

## CASE-II

Name of the Custom hiring centre: Muthyalamma RMG

Village : Srinivasapuram

Mandal : Kalakada

Division : Valmikipuram

District : Chittoor

Scheme : RKVY (2016-17)

Inputs supplied : Tractor, Rotavator,  
Seed drill, Thresher

Subsidy pattern : 70 % subsidy

**Table. 4.39 Package of machinery supplied under CHC Groundnut**

S.No	Name of the implement	Total cost (Rs)	Subsidy (Rs)	Farmer's share( Rs)
1.	Tractor	5,48,000	3,20,600	2,27,400
2.	Rotavator	98,700	60,690	38,010
3.	Seed drill	61,020	42,714	18,306
4.	Thresher	1,70,000	1,19,000	51,000
	Total	<b>8,77,720</b>	<b>5,43,004</b>	<b>3,34,716</b>

**Table 4.40 Group members of custom hiring centre**

S.No.	Name of the farmer	Village
1	M.Sudarshan	Srinivasapuram
2	B.Chandraiah	Srinivasapuram
3	M.Krishnaiah	Srinivasapuram
4	P.surendra	Srinivasapuram
5	E.Thirumalamma	Srinivasapuram

**Table 4.41 Working particulars of the machinery**

<b>S.No</b>	<b>Name of the implement</b>	<b>Total working hours</b>	<b>Hiring charge per hour(Rs)</b>	<b>Gross Income(Rs)</b>	<b>Fixed cost(Rs)</b>	<b>Variable cost (Rs)</b>	<b>Total cost(Rs)</b>	<b>Net returns(Rs)</b>
1.	Tractor + Rotavator	300	800	2,40,000	93,279	80,800	1,74,079	65921
2.	Tractor + Seed drill	0	0	0	10,373	0	10,373	-10,373
3.	Ground nut wet pod thresher and dry pod thresher	0	0	0	28,900	0	28,900	-28,900
	<b>Total</b>			<b>2,40,000</b>	<b>1,32,552</b>	<b>80,800</b>	<b>2,13,352</b>	<b>26,648</b>

A rythu mitra group was formed and named as Muthyalamma rythu mithra group in Srinivasapuram village of Kalakada mandal. The farmers were supplied with package of machinery for groundnut crop i.e tractor, rotovator, seed drill and thresher on 70 % subsidy. The machinery was supplied during the year 2016-17. The farmers were utilized the custom hiring centre in the Srinivasapuram village and villages in Kalakada mandal of Chittoor district.

From the table 4.41 it is evident that the group has maintained the machinery and lent for hiring .During the year 2017-18 among the machinery existing in the centre, tractor along with rotovator were utilized for 300 hours, the hiring charges per hour was Rs.800 and thereby generated a gross income of Rs.2,40,000 where as tractor along with seed drill and the thresher was never used. The total gross income generated was about Rs.2,40,000 during the study year. Total cost incurred in the maintenance of the machinery amounts to Rs.2,13,352 which includes both fixed costs and variable costs. The net income was calculated by deducting the total cost incurred from total gross income which amounts to Rs.26,648. Thus the custom hiring centre gained a profit of Rs.26,648 per one year through hiring the machinery among the ground nut farmers.

#### **4.6.3 Strategy for Effective Functioning of Custom Hiring Centres**

Mechanization in agriculture placing a major role in now a days due to scarcity of labour. Mechanizing the farm operations able to perform the farm operations in time which increases the productivity of crop. Government is also providing machinery to the farmers under various schemes. Custom hiring centre is one of the concept to make farm machinery accessible to the small and marginal farmers. Hence there is a necessity to have a suitable strategy for effective functioning of custom hiring centres and their sustainability.

#### **4.6.3.1 Strengthening of custom hiring service providers**

### **I. Factors effecting custom hiring service providers**

#### **A. Technical factors**

1. Availability of after-sales services for the operation and maintenance of agricultural mechanization technologies
2. Capability of local agricultural manufacturing to provide machinery for custom hiring
3. Skilled operators for the machinery
4. Availability of research and development extensions (RDE) technical support for the operation of custom services

#### **B. Socio cultural factors**

1. Social arrangements for scheduling of custom services for farm operations in adjacent farm areas.
2. Capability of the custom service provider to operate and manage of the enterprise.

#### **C. Economical factors**

1. Availability of capitalization to operate custom hiring enterprise.
2. Availability of credit facilities.
3. Optimum service areas for profitable operation.

### **II. Factors effecting farmer users**

#### **A. Technical factors**

1. Technical suitability of for environmental conditions, i.e. matching of available technologies to field conditions

## **B. Socio cultural factors**

1. Farmers' willingness to mechanize/avail of custom services.
2. Farmers' perception on using of agricultural mechanization technologies.
3. Farmers' traditional practices.
4. Labour availability .

## **C. Economical factors**

1. Cost of traditional practices versus cost of custom hiring (mechanized systems).
2. Economic benefits of custom hiring.

### **4.6.3.2 Success factors for effective functioning of custom hiring centres**

#### **Government support services and policies :**

1. Partnership is crucial for any company to enter into custom hiring space. Concept of custom hiring holds good potential provided there is an integration of all the operations viz., provision of agri inputs like seeds, fertilizers, implements etc through partnerships with various companies.
2. There is a need for incentives and policy support for the adoption, development and promotion of farm mechanization technologies particularly suitable for dry land farming, horticulture and orchards, hill agriculture, sugarcane harvesting, cotton picking, rice production etc.
3. Measures should be undertaken to provide relevant stakeholders with concrete and specific information on the benefits of custom hiring to stimulate the diffusion of this practice.
4. Promotion of the formation of farm cooperatives including FPOs which eventually increases the scope of use of bigger farm machinery and result in minimum wastage of resources.
5. Suitable regulatory framework, and support policies to attract private sector investment

6. Government commitment with a clear sustainable agricultural mechanization strategy.
7. Extension services to advise the suitability of various makes, models and horse powers for different size of operational holdings.

**Extension interventions:**

1. With increased participation of stakeholders across the agri supply chain and handholding farmers by supplying all equipments for entire life cycle of a crop sequentially, the Custom Hiring concept can be made successful.
2. Training and farmer workshops to show and identify the benefits of new technologies as well as intensive communication with the value chain is the key.
3. KVKs and extension wings of universities need to play a very key role in sensitizing the farmers on Custom Hiring adoption. In fact, recently keeping the high skills required by the farming community in handling the modern farm equipment, intensive efforts are required by the extension functionaries
4. Improvement in irrigation facilities will enable the farmer to go for multiple cropping and hence there will be need of more mechanization of farming activities.
5. Creating awareness on the economic benefits of custom hiring services among the farming community.
6. Infrastructural support base from the extension functionaries to facilitate the use of machinery under the services of custom hiring centres. .
7. Appropriate communication along the value chain including dissemination of information on the performance of various machines for corresponding agricultural operations should be promoted.
8. Appropriate training modules designed, and frequent training sessions organized to train the personnel involved in machine operations and



those who are involved in repair and maintenance services. Training can also serve as a tool to increase awareness amongst various stakeholders.

9. The farm machinery suitable for different types of soil and operations for important crops should be developed and manufactured.

**Infrastructure:**

1. Infrastructure in the form of farm roads, electricity, repair and maintenance facilities, service centres and training schools should be strengthened in the region to support custom-hiring services.
2. Increased investment in roads, rural electrification, rural microfinance and banking can provide the necessary impetus to custom hiring, as well as to agricultural mechanization in general.
3. A government custom hiring centre should require in panchayat level, so the price of custom hiring of agricultural machinery is fixed and low as compared to offers by private owner of machinery.

**Technical intervention:**

1. Technical requirements and guidelines for agricultural machinery tailored to local field conditions, based on standardized evaluations, are also needed to avoid problems during use under field and crop conditions.
2. Technical suitability of machineries for environmental conditions, i.e. matching of available technologies to field conditions.
3. Availability of research and development extensions technical support for the operation of custom services.
4. There is a need to innovate custom hiring model by institutionalization for high cost farm machinery.

**Financial assistance:**

1. Commercial banks and financial institutions need to develop hassle free loan origination and disbursement process for tractors and farm machinery on individual ownership basis or custom hiring basis. A higher rate of refinance needs to be extended to loans lent by banks in regions with low mechanization so as to increase the interest of banks to lend to this sector.
2. Specific financial instruments should be devised to bring small farmers into the circle of beneficiaries of financial assistance.
3. Financial mechanisms and incentives for both the users and service providers.
4. Manufacturing units that are set-up in areas with lower mechanization needs to be supported by extending tax and duty sops. This would result in easier reach of the equipment to farmers in those areas. Simultaneously, the government needs to design easier financing schemes for such farmers.

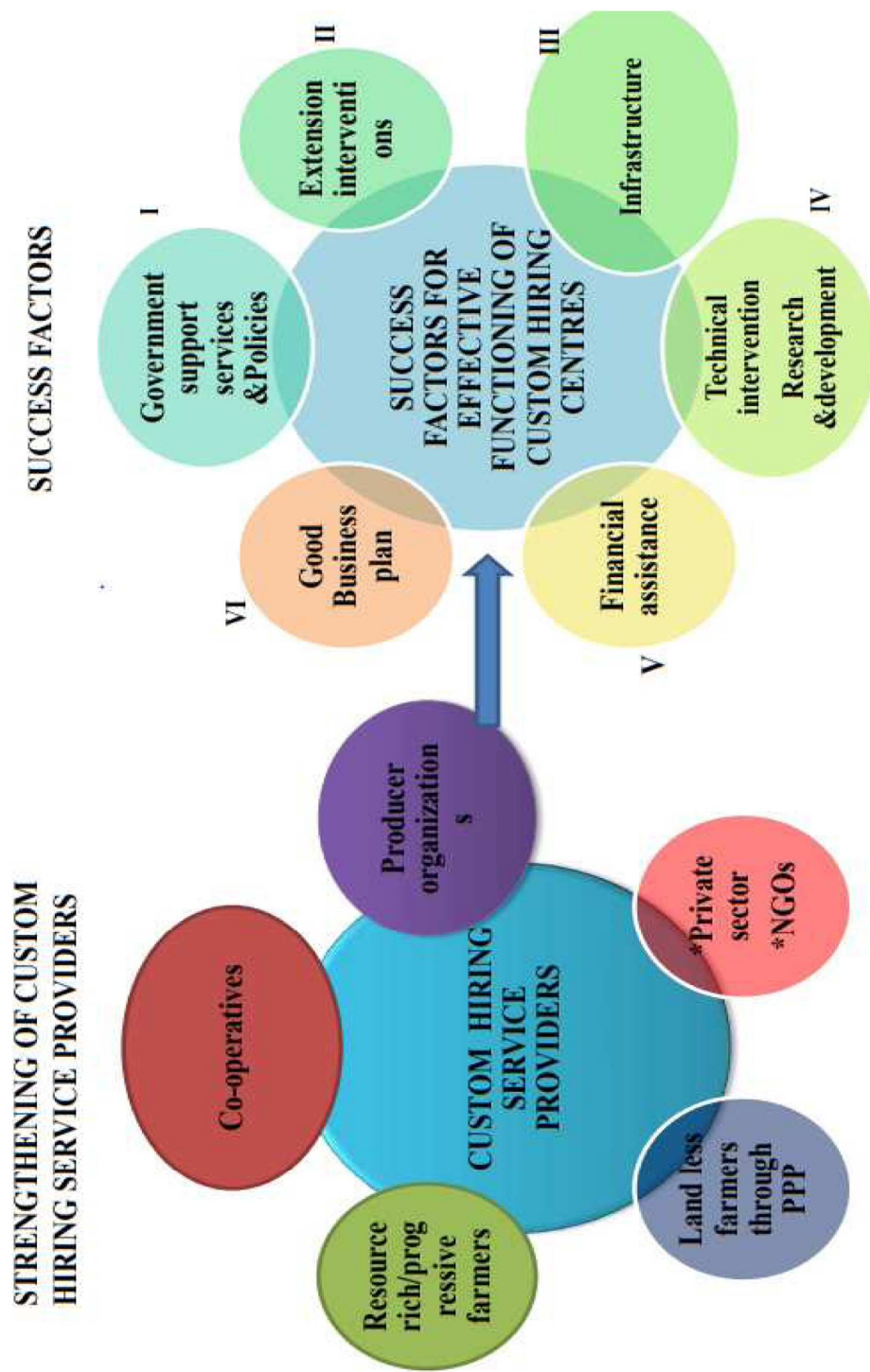
**Good business plan**

For the hire services of custom hiring centres, business plan is required which means working out what to do in the future to improve the business. Business plans may be simple or complex and are an important tool in the decision-making process. It is recommended to draw up plans when starting or expanding a business. But annual plans can also be useful.

Once the business plan is prepared, verification should be done whether necessary machinery are ready, whether any additional equipment required and skilled staff available or not.

**a. Marketing plan.**

The marketing plan should consider the target customers, the current and projected demand for services, the range of services offered to customers, and an estimate of the costs associated with promoting demand.



**Fig.4.20 Strategy for effective functioning of custom hiring centres**

#### **b. Assessment of profitability**

The core of the business plan is an assessment of profitability.

#### **c. Cash flow analysis.**

Even if the hire service business is profitable, the income is likely to come at different times during the year. It is important to know if there will be enough cash to carry out business activities throughout the year. If cash is insufficient, there is a need to decide what to do. Conduct a cash flow analysis to assess cash availability.

#### **d. Risk assessment**

The final stage of business planning is to examine the risks that could occur, i.e. things that could happen causing harm to the business. The potential risks need to be considered ahead of time and included as part of the narrative description in the business plan,

### **4.7. EMPIRICAL MODEL OF THE STUDY**

The conceptual model developed for the purpose of this investigation was tested based on the results and empirical model was developed and presented in Fig. 4.20.

This model was hopefully conceived to give an objective assessment of performance and utilization of services of custom hiring centres.

#### **4.7.1 Relationship between the Performance and the Extent of Utilization of Custom Hiring Centres by the Users with their Independent Variables.**

##### **4.7.1.1 Relationship between the selected independent variables and the performance of custom hiring centres**

Correlation analysis revealed that age, gender, farm size and farming experience has no significant relationship whereas education, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, training received, achievement motivation, economic orientation had positively significant relationship with the performance of custom hiring centres.

Multiple Linear Regression analysis revealed that out of the 15 selected independent variables viz., social participation, management orientation, annual family income, accessibility, extension contact and mass media exposure were found positively significant and significantly contributed to the most of the variation in the performance of the custom hiring centres.

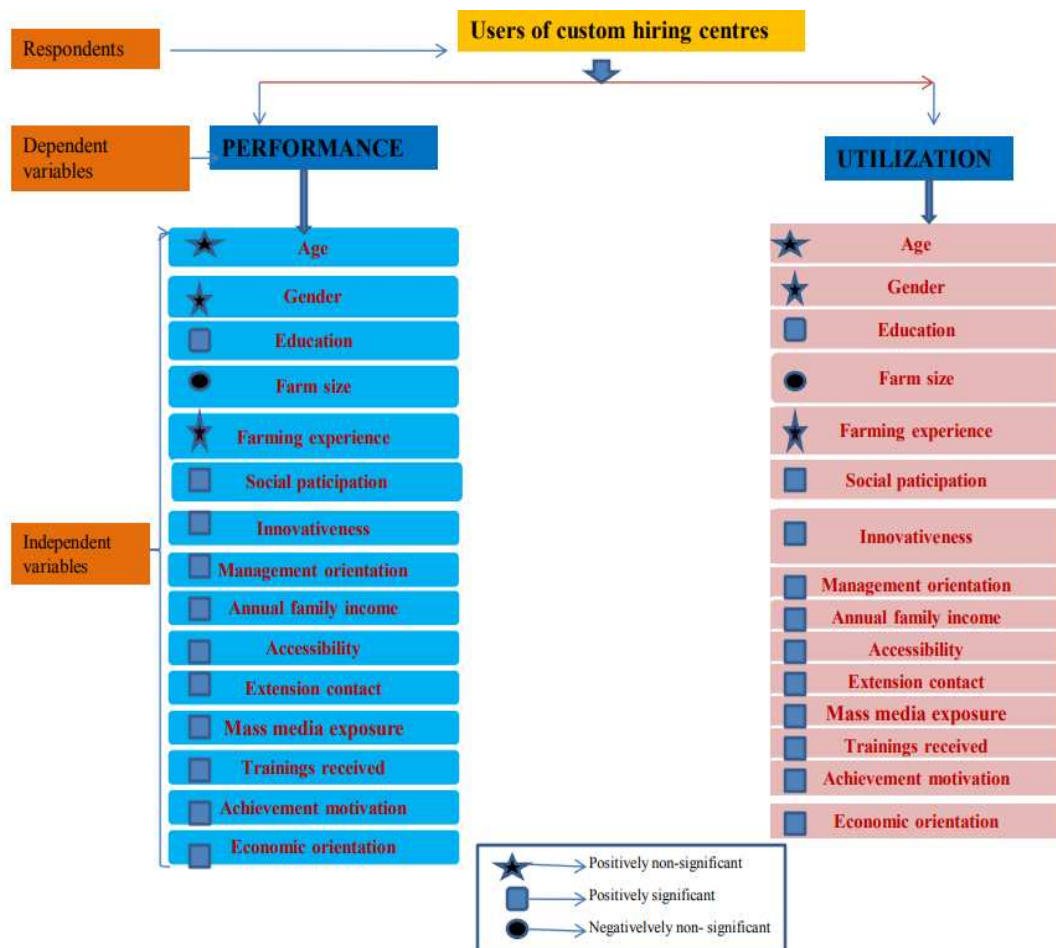
These findings can help the researchers, extension personnel to concentrate more on the variables which were significantly correlated with the performance of custom hiring centres to enhance the performance of custom hiring centres.

##### **4.7.1.2 Relationship between the selected independent variables and the extent of utilization of custom hiring centres**

Correlation analysis revealed that age, gender, farm size and farming experience has no significant relationship whereas education, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, training received, achievement motivation, economic orientation had positively significant relationship with the utilization of custom hiring centres.

Multiple Linear Regression analysis revealed that out of the 15 selected independent variables viz., social participation, management orientation, annual family income, accessibility, extension contact and mass media exposure were found positively significant and significantly contributed to the most of the variation in the utilization of the custom hiring centres.

These findings can help the researchers, extension personnel to concentrate more on the variables which were significantly correlated with the utilization of custom hiring centres to enhance the utilization of custom hiring centres.



**Fig.4.21 Empirical model of the study**





# *Chapter – V*

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*Summary and Conclusions*



## **Chapter-V**

### **SUMMARY AND CONCLUSIONS**

Agriculture is the backbone of Indian economy. It has a critical role to play in the country's economic development. With ever increasing human population, there is an increasing demand to raise the production. There are two basic ways of augmenting the production, first enlarging the area cultivated by expanding agriculture operation to virgin areas and secondly to increase the productivity of land already under cultivation. As there is almost no scope to expand the cultivated area because the average size of operational holding is decreasing day by day due to pressure of population, the ultimate way of increasing production is to raise the productivity level. Among the all measures like use of high yielding varieties, fertilizer application and plant protection measures to raise the productivity level, farm mechanization is one of the important aspect.

Agriculture is an extremely labour intensive occupation, which is now facing a challenge of labour shortage. Increasing urbanization and industrialization will further aggravate the shortage of labour. The new work opportunities in off-farm occupation will also add to the pressure to raise efficiency of use of labour on the farm. Hence Indian agriculture is undergoing a gradual shift from dependence on human power and animal power to mechanical power because increasing cost for upkeep of animal and growing scarcity of human labour.

Mechanical power is largely consumed in big land holdings and is still beyond the reach of small and marginal holdings which constitutes around 80 per cent of the total land holdings. This is due to the fact that the small and marginal farmers, by virtue of their economic condition are unable to own the machinery on their own or through institutional credit. Therefore in order to bring farm machinery available within the reach of small and marginal land holdings collective ownership or Custom Hiring Centres (CHCs) need to be promoted in a big way.

Government of India, in recognition of this potential has envisaged increase of farm power availability from the present level (0.93 kw/ha) to 2kw/ha during the 12th plan period.

In Andhra Pradesh, Department of agriculture is providing implements on subsidy to the individual farmers/group of farmers under different schemes viz., State Development Plan (SDP), Rastriya Krishi Vikas Yojana (RKVY), Sub-Mission on Agriculture Mechanization (SMAM).

Hence, there is every need to study the performance and utilization of services of custom hiring centres that are issued to the group of farmers by the government of Andhra Pradesh under 50 per cent subsidy in Chittoor district of Andhra Pradesh state. Hence the present study entitled as “A study on performance of custom hiring centres in Chittoor district of Andhra Pradesh” was undertaken with the following objectives.

## **5.1 OBJECTIVES OF THE STUDY**

1. To study the profile characteristics of users of custom hiring centres.
2. To analyse the performance of custom hiring centres.
3. To study the extent of utilization of custom hiring centres by the users.
4. To find out the relationship between the performance and the extent of utilization of custom hiring centres by the users with their independent variables.
5. To identify the constraints faced by the users in the utilization of custom hiring centres and to elicit suggestions to overcome the constraints .
6. To document a few successful and failure cases of custom hiring centres and to suggest a suitable strategy for effective functioning of custom hiring centres.

## **5.2 RESEARCH DESIGN**

*Ex-post- facto* research design was used for conducting the study.

### **5.3 SELECTION OF THE STATE**

Andhra Pradesh state was chosen as the locale of the study, since the researcher belongs to the state and was familiar with local language and culture. Hence, building up rapport with the respondents would become easier.

### **5.4 SELECTION OF THE DISTRICT**

The study was conducted in Chittoor district of Andhra Pradesh. Chittoor district was purposively selected as groundnut is major crop in the district and considerably a good number of custom hiring centres were functioning in the district for hiring machinery to carry out various operations in groundnut cultivation. Further the researcher is an In-service candidate working as an Agricultural Officer (A.O) in the same district and no similar research work has been carried out in this district.

### **5.5 SELECTION OF MANDALS**

Out of 66 mandals of Chittoor district, eight mandals viz., Peddamandyam, B.kothakota, Peddathippasamudram (P.T.M), Molakalacheruvu, Kalikiri, Kalakada, Kambhamvaripalli and Gurramkonda were purposively selected where maximum number of custom hiring centres were present.

### **5.6 SELECTION OF VILLAGES**

From each of the eight selected mandals, two villages were selected purposively for the study viz. Mallaiahgaripalli, Kotaguttapalli from Peddamandyam mandal; B.Kothakota, Sunkalavaripalli from B.Kothakota mandal; Peddathippasamudram, T.sodam from Peddathippasamudram mandal; Sompalli, Yesuvaripalli from Molakalacheruvu mandal; Marrikuntlapalli, Pallavolu from Kalikiri mandal; Srinivasapuram, Nadimcherla from Kalakada mandal; Kondakindapalli, Kondakindapalli harijanawada from Kambham-

varipalli mandal; Majjigavandlapalli, Jeevanathopu from Gurramkonda mandal

## **5.7 SELECTION OF RESPONDENTS**

Among the sixteen selected custom hiring centres, the respondents were selected based on the proportionate random sampling procedure from each selected custom hiring centre thus making a total of 120 respondents.

## **5.8 VARIABLES SELECTED FOR THE STUDY**

### **Dependent Variables:**

1. Performance of custom hiring centres.
2. Extent of utilisation of custom hiring centres.

### **Independent Variables**

Age, gender, education, farm size, farming experience, social participation, innovativeness, management orientation, annual family income, accessibility, extension contact, mass media exposure, trainings received, achievement motivation and economic orientation are the selected independent variables.

## **5.9 COLLECTION OF DATA**

The data were collected by personal interview method through a structured interview schedule. The data thus collected was coded, classified, tested statistically, tabulated and were suitably interpreted.

## **5.3 PROFILE CHARACTERISTICS OF USERS OF CUSTOM HIRING CENTRES**

### **5.3.1 Age:**

More than half of the (65.84%) of the respondents were middle aged, followed by old (18.33%) and young (15.83%) age categories.

### **5.3.2 Gender:**

It is revealed that 79.17 per cent of the respondents belonged to male and female (20.83%) categories.

### **5.3.3 Education:**

It is vivid that 44.16 per cent of the respondents were educated upto primary school followed by illiterate (22.50%), high school (21.66%), middle school (6.66%), collegiate education (2.53%) , graduate (1.66%) and post graduation (0.83%) education.

### **5.3.4 Farm size:**

It is clear that 46.67 per cent of the respondents were small farmers followed by marginal (42.50%) and big farmers (10.83%).

### **5.3.5 Farming Experience:**

It is depicted that 57.50 per cent of the respondents were grouped under medium farming experience followed by high (22.50%) and low (20.00%) farming experience.

### **5.3.6 Social Participation;**

It is revealed that 66.67 per cent of the respondents had medium level of social participation followed by low (23.33%) and high (10.00%) levels of social participation.

### **5.3.7 Innovativeness:**

It is found that 65.00 per cent of the respondents had medium level of innovativeness followed by high (20.00%) and low (15.00%) levels of innovativeness.

### **5.3.8 Management Orientation:**

It is revealed that 60.83 per cent of the respondents had medium level of management orientation followed by low (23.33%) and high (15.84%) levels of management orientation.

### **5.3.9 Annual Family Income:**

It is clear that 51.66 per cent of the respondents had medium level of annual income followed by low (27.50%) and high (20.84%) annual income levels.

### **5.3.10 Accessibility:**

It is found that 66.66 per cent of the respondents had medium level of accessibility followed by low (24.17%) and high (9.17%) levels of accessibility.

### **5.3.11 Extension Contact:**

It is revealed that 70.84 per cent of the respondents had medium level of extension contact followed by low (15.00%) and high (14.16%) levels of extension contact.

### **5.3.12 Mass Media Exposure:**

It is found that 55.00 per cent of the respondents had medium level of mass media exposure followed by high (25.83%) and low (19.17%) levels of mass media exposure.

### **5.3.13 Trainings Received:**

It is clear that 65.00 per cent of the respondents received medium level of training followed by low (25.00%) and high (10.00%) levels of training received.



#### **5.3.14 Achievement Motivation:**

It is depicted that 74.16 per cent of the respondents had medium level of achievement motivation followed by low (15.83%) and high (10.00%) levels of achievement motivation.

#### **5.3.15 Economic Orientation:**

It is clear that 63.34 per cent of the respondents had medium level of economic orientation followed by high (20.83%) and low (15.83%) levels of economic orientation.

### **5.4 PERFORMANCE OF THE CUSTOM HIRING CENTRES:**

It is evident that 75.00 per cent of the custom hiring centres were having medium level of performance followed by equal numbers of custom hiring centres grouped under low (12.50%) and high (12.50%) levels of performance.

### **5.5 EXTENT OF UTILIZATION OF OF CUSTOM HIRING CENTRES**

About 72.50 per cent of the respondents were having medium extent of utilization followed by low (19.16%) and high (8.34%) extent of utilization of services of custom hiring centres.

## **5.6 RELATIONSHIP BETWEEN THE PERFORMANCE AND THE EXTENT OF UTILIZATION OF CUSTOM HIRING CENTRES BY THE USERS WITH THEIR INDEPENDENT VARIABLES.**

In the case of the relationship between independent variables and performance of custom hiring centres, there was a positive and significant relationship of performance of custom hiring centres with independent variables namely education, social participation, management orientation, annual family income, accessibility, extension contact, mass media exposure, training received, achievement motivation and economic orientation. Whereas no significant relationship was observed between the performance of custom hiring centres with the variables namely age, gender, farm size and farming experience.

All the selected 15 independent variables put together explained about 65.30 per cent variation in the performance of the custom hiring centres. The partial regression coefficients implied that social participation, management orientation, annual family income, accessibility, extension contact and mass media exposure were the most important variables that contributed to most of the variation in the performance of the custom hiring centres.

In the case of the relationship between independent variables and the extent of utilization of services of custom hiring centres, there was a positive and significant relationship of extent of utilization of custom hiring centres with independent variables namely education, social participation, management orientation, annual family income, accessibility, extension contact, mass media exposure, training received, achievement motivation and economic orientation. Whereas no significant relationship between the extent of utilization of services of custom hiring centres with the variables viz., age, gender, farm size and farming experience.

All the selected 15 independent variables put together explained about 63.20 per cent variation in the extent of utilization of services of custom hiring centres. The partial regression coefficients implied that innovativeness, annual family income, accessibility, mass media exposure and training undergone were the most important variables that contributed to most of the variation in the extent of utilization of services custom hiring centres by the users.

## **5.7 CONSTRAINTS FACED BY THE USERS IN THE UTILIZATION OF CUSTOM HIRING CENTRES AND SUGGESTIONS FOR EFFECTIVE UTILIZATION OF CUSTOM HIRING CENTRES.**

### **5.7.1 Constraints Faced by the Users for Utilization of Custom Hiring Centres**

The most important constraints in the utilization of services of custom hiring centres based on rank as indicated by farmers were:

Non availability of farm machinery during peak season; lack of timely availability of farm machinery; damage of the kernels due to use of ground nut dry pod thresher; non availability of skilled farm machinery operator; overlapping farming operations; non availability of service centres for repairing the machinery in the vicinity of CHCs; lack of awareness about type of machinery available at CHCs; location of the field; lack of shelter for keeping the machinery.

### **5.7.2 Suggestions for Effective Use of Custom Hiring Centres**

The most important suggestions for efficient utilization of services of custom hiring centres based on rank as indicated by the farmers were:

Expansion of custom hiring centres each at panchayat where ever necessary so that small and marginal farmers can access the services of custom hiring centres; training of man power for efficient handling of the

farm machinery; need to strengthen the custom hiring centres by increasing the number of farm machinery which overcome the problem of non availability particularly during the peak season, especially to the small and marginal farmers; strengthen the subsidy component for these custom hiring centres by the government; creating awareness for hiring of machinery in CHCs; fixed hiring charges for the machinery by the district monitoring team and provision of subsidy for construction of shed for keeping the machinery .

## **5.7 IMPLICATIONS OF THE STUDY**

Certain implications of the study can be derived from the findings presented in the fourth chapter. The implications of the study were presented as follows.

1. It could be noted from the study that majority of the respondents were middle aged and had only primary school level of education. Opportunities may be created to get higher level of formal schooling. This can be achieved by strictly enforcing the law of right to education for all the people in rural areas.
2. The social participation of farmers was medium. Socio participation of the farmers could be improved by creating awareness and establishing more number of social organizations at village level like farmers cooperatives, Rythu Mithra Groups (RMGs), farmer producer groups etc. and inter link these associations to national level and encourage the farmers to participate in other activities.
3. Accessibility of custom hiring centres to the users were medium. Hence it is necessary to establish one CHC at each panchayat level. There by users can easily access the services of custom hiring centres.
4. Majority of the farmers participation in extension activities was medium. It could be improved by encouraging the farmers to participate in extension activities by local key communicators, mandal

agriculture officer and other officials under the Department of agriculture.

5. Technical know-how should be provided to the farmers with respect to appropriateness of farm machinery for the situation and for its proper use.
6. Creating awareness on economic benefits on utilization of custom hiring services.
7. Training of farmers on utilization of services of custom hiring centres by the extension functionaries working in the state department of agriculture.

## **5.8 POINTS SUGGESTED FOR FUTURE RESEARCH**

1. A study may be taken up on study on performance of custom hiring centres in other regions of Andhra Pradesh state.
2. Case studies may be taken up to critically analyse the performance and utilization of services of custom hiring centres in Andhra Pradesh.
3. A study may be taken up to understand the need of custom hiring centres in Andhra Pradesh state.
4. An exclusive study may be focused on strengthening of custom hiring centres in Andhra Pradesh state.
5. A constraint analysis in utilization of services of custom hiring centres may be studied as an exclusive research project.



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## *Literature Cited*

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## LITERATURE CITED

- Agrawal, S., Khare, N.K and Nitin Soni .2016. A study on the effect of watershed on socio-psychological profile of the beneficiaries *.International Journal of Agriculture Sciences*. 8 (40) :1817-1820.
- Ahire, R.D and Kapse, P. S. 2017. Socio-economic impact of National Initiative on Climate Resilient Agriculture (NICRA) project on its beneficiaries. AGRESO 2016-2017.
- Ansari, M.A. and Pandey, N. (2011) Assessing the potential and use of mobile phones by the farmers in Uttarakhand (India): *A special project report*. G.B. Pant University of Agriculture and Technology, Pantnagar, India.
- Anup upadhaya, Tarique Ahmed and Singh, A. K. 2010. Evaluation of Farmers Field School on All India Radio about Organic Farming. *Journal of communication studies*. 27: 377-421.
- Arathy, B. 2011. Constraint analysis of rice farmers of Trissur district of Kerala. *M.Sc. (Ag.) Thesis*. ANGRAU, Hyderabad.
- Archana, P. 2012. A study on farmers adaptability to climate variability in castor in Mahaboobnagar district of Andhra Pradesh. *M.Sc. (Ag.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Badrinarayana, S.P and Kenneth K.E.1997. The nature and implications of contextual influences on transformational leadership: a conceptual examination. *Academy of Management Review*.
- Bawajir, S.M and Nandapurkar, C.G.1985.Development and standardization of the Socio-Economic status.*Maharashtra Journal of Extension Education*.
- Braimah, M.M., Yintil, B.B and Akampirige, A.O.M.2017. Assessing the impact of agricultural mechanization centers on agriculture production and rural livelihoods in the Upper East Region, Ghana. *International Journal of Current Research and Academic Review*.5(8):112-125

- Chahal, H.S. and Malhi, V. 2005. Analysis of custom hiring/ rental services of farm machinery through cooperative societies. *Dissertation Report*. Department of Farm Power & Machinery, College of Agricultural Engineering, P.A.U., Ludhiana.
- Chahal, S.S., Kataria, P., Abbott, S., and Gill, B.S. 2014. Role of cooperatives in institutionalization of custom hiring services in Punjab. *Agricultural Economics Research Review*.27:103-110.
- Chandrasekhar, G. 2016. Perceived need of custom hiring of farm machinery and implements in Hassan district of Karnataka. *M. Sc. (Agri.) Thesis*, UAS, Bengaluru.
- Channamallikarjuna. 2013. Adoption of SRI method of Paddy cultivation by farmers .*Msc.(Ag.) Thesis*. University of Agricultural Sciences, Dharwad, Karnataka.
- Chaudhari, R.P. 2011. Technological gap in rice-wheat production system.*Indian Research Journal of Extension Education*. 10 (1): 95-98.
- Deshmukh, P.R., Bhosale, P.B. and Wattamwar, V.T. 2011. Technological Gap in Soybean Production Practices. *Indian Journal of Social Research*. 52 (3): 257- 264.
- Devesh Tewari. 2014. Impact Assessment Study of Assistance to Individuals for Establishing Custom Hiring Centres. Project report submitted to ICAR-NAARM, Hyderabad.
- Dhillon, D.S., Pradeep Kumar and Saini, S.K. 2011. Problems faced by tomato growers and suggestions to overcome them. *Indian Journal of Social Research*. 52 (1): 109-117.
- Divaker, S. A study on attitude and utilization of crop loan by the farmers of Bihar state.2013. *M.Sc. (Ag.) Thesis*. Acharya N G Ranga Agricultural University, Hyderabad, India.
- Ferris, S., Engoru, P. and Kaganzi, E. 2008. Making market information services work better for the poor in Uganda. CAPRI Working Paper No. 77: CGIAR

- Gajpal, Gauraha, A.K. Banafar, K.N.S. 2015. Utilization pattern and constraint in use of custom hiring of agricultural machinery in paddy crops in Raipur District of Chhattisgarh. *Trends in Biosciences* 8(17):4577-4580.
- Gajpal, Gauraha, A.K. Banafar, K.N.S. 2015. Comparative economics of custom hiring in different operation of paddy cultivation in Raipur District of Chhattisgarh, *Trends in Biosciences*. 8(17):4581-4584.
- Gangadhar, J. 2009. Marketing behavior of cotton farmers in Warangal district of Andhra Pradesh. *M.Sc. (Ag.) Thesis*. Acharya N G Ranga Agricultural University, Hyderabad.
- Ghintala, A. and Singh, K. 2013. Knowledge and adoption of sprinkler irrigation system by the farmers of Banaskantha district of North Gujarat. *Indian Journal of Extension Education & Rural Development*. 21: 26-29.
- Gopinath, M. 2005. Knowledge and adoption of bengalgram farmers in Kurnool district of Andhra Pradesh. *M.Sc. (Ag.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Gudadur, K. 2017. A study on adoption level of farm mechanization on paddy grower in Uttarkannada, Karnataka. *International journal of Pure and applied Biosciences*.5(6):1644-1644(2017)
- Gungadi, S. 2011. A study on knowledge and adoption of recommended production practices of paddy by the farmers of Tungabhadra project area, Karnataka. *M. Sc. (Agri.) Thesis*.UAS, Raichur, Karnataka (India).
- Hassan, M.S., Hassan, M.A., Samah, B.A., Ismail, N. and Shafrill, H.A.M. 2008. Use of Information and Communication Technologies among agri-based entrepreneurs in Malayasia.Paper presentation in World conference on Agriculture and Information Technology.
- Hiremath, G.M., Lokesh, G.B., Maraddi, G.N and Patil, S.S. 2015. Accessibility of farm machinery services - CHSC for small and marginal farmers. *International Journal in Management and Social Science*.3(2): 897-907.

- Hrudayranjan, C. 2013. An exploratory study on scope and importance of farm mechanization in groundnut in chittoor district of Andhra Pradesh. *M.Sc. (Ag.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Jyothi, N.G. 2012. Farm mechanization expectations of cotton growers. *Msc.(Ag.)Thesis*. University of Agricultural Sciences, Dharwad, Karnataka.
- Kalyan, N. V. 2011 Impact analysis of groundnut production technologies in Chittoor district of Andhra Pradesh. *M.Sc. (Ag.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Kamboj, P., Khurana, R. and Dixit, A. 2012. Farm machinery services provided by selected cooperative societies. *Agric Eng Int: CIGR Journal* Vol.14. Page no;120
- Kavad, S.D., Bhoi,D.B and Desai,V.K. 2015. Awareness among farmers about KVK working as knowledge resource centre in Dang district of South Gujarat. *Gujarat Journal of Extension Education*. 26 (2):100-105.
- Kerlinger, F.N. 1973. Foundations of Behavioural Research. Surgeeth Publications, New Delhi.
- Kharumnuid, P. 2011. A study on perception and adaptation of potato growers to climate change in East Khasi hills district of Meghalaya. *M.Sc. (Ag.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Kharmudai, A., Sumi, D and Jyothi, S.S.P.2018. Attitude of Tribal Farmers of Meghalaya towards ICT-Based Extension Services. *Indian Journal of Hill Farming*. Special Issue, Page 71-75.
- Kiran,S and Shenoy, S. N. 2010. Constraints in adoption of System of Rice (*Oryza sativa*. L) Intensification in Warangal district of Andhra Pradesh. *Journal of Research*. ANGRAU. 38(1&2): 77-85.
- Kumar, A., Tulasiram, B., Maraddi, G.N and Hulagur, B.2015. Knowledge level of recommended cultivation practices of Blackgram growers in North eastern Karnataka. *Karnataka J. Agric. Sci.*, 28(4): (554-557).

- Kumar, A.G. 2012. Knowledge and adoption of System of Rice Intensification (SRI) technology among farmers in Nagapattinam district of Tamil Nadu. *M.Sc. (Ag.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Kumar, R. 1994 An elevation of capital investment pattern in a developed village economy in Punjab. *Unpublished M.Sc. Economics Thesis*, P.A.U., Ludhiana.
- Kumar, S. 2014. A study on the agricultural mechanization in Karimnagar district of Andhra Pradesh. *M.Sc. (Ag.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Lamidi, Wasiu Agunbiade, Akande and Lamidi Olawale. 2013. A Study of Status, Challenges and Prospects of Agricultural Mechanization in Osun State. *Journal of Education*. 1:1-8.
- Lavanya, K., 2014. Study on mechanization of farm operations in Bengalgram in Prakasam district of Andhra Pradesh. *M.Sc.(Ag)Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Madhuri, K. 2017. SWOC analysis of tomato cultivation in Chittoor district of Andhra Pradesh, *M. Sc. (Agri.) Thesis*. Acharya N.G. Ranga Agricultural University, Lam, Guntur.
- Mandlik, S.P. 2012. Knowledge and adoption of Integrated Pest Management technology in pigeonpea. *M. Sc. (Agri.) Thesis*. Marathwada Krishi Vidyapeeth, Parbhani.
- Manjunath, T. 2010. A study on knowledge and adoption of plant protection measures by paddy growers of Raichur district, *M. Sc. (Agri.) Thesis*, Univ. Agric. Sci., Dharwad.
- Meena, M. S. 2010. Socio- economic study of organic farming in irrigated north western plain zone of Rajasthan. *Agricultural Science Digest*. 30: 94-97.
- Mehra, P. K. 2007. Studies on farm machinery services in Punjab. *M.Sc. Thesis*, Punjab Agricultural University, Ludhiana, India.

- Nagaraj, 2012. Study on knowledge and adoption of farm mechanization by paddy growers in Tungabhadra project area. *M.Sc. (Ag.) Thesis*. UAS, Raichur, Karnataka.
- Nagaraj, P.S. Dhananjaya Swamy, A. Madhushree and B. Vidyadhara. 2013. A Study on Knowledge and Adoption of Farm Mechanization by Paddy Grower in Tungabhadra Project Area, Karnataka. *International Journal of Agriculture and Food Science Technology*. Volume 4, Number 4 (2013), pp. 385-390.
- Naidu, C.D. 2012. Study on farming performance and entrepreneurial behavior of sugarcane farmers in north coastal zone of Andhra Pradesh. *Ph.D. Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Nandapurkar, C.G. 1980 revised 1981. A study on entrepreneurial behavior of small farmers. Metropln, New Delhi.
- Nayak, R. A. 2010. A study on the Agricultural Technology Management Agency (ATMA) in Prakasam district of Andhra Pradesh. *M. Sc. (Ag.) Thesis*. Acharya N G Ranga Agricultural University, Hyderabad, India.
- Nirmala, K. 2012. A study on Diffusion status and adoption of System of Rice Intensification (SRI) in Mahaboob Nagar district of Andhra Pradesh. *M.Sc.(Ag) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Panghal, B. S. & Deep, P. 2006. Emerging problems of farm mechanization in Karnal district of Haryana State. *Agricultural Science Digest*. 26(4): 253-256.
- Parashunath, G.M., Hiremath & Prashanth. 2016. Constraints of Farmers in utilizing Custom Hiring Service (CHS) of tractor based farm machineries - An Analysis. *International Journal of Agricultural Science and Research*. Vol.6(1):217-220.
- Patil, V. G., Chorge, K. V. & Desai, A. N. 2001. Constraints in the use of improved farm implements. Maharashtra. *Journal of Extension Education*. Vol.20.

- Pise, G.K., Ahire, R.D and Kale, N.D. 2018. Impact of National Innovations of Climate Resilient Agriculture project on its beneficiaries. *International Journal of Current Microbiology and Applied Sciences*. special issue-6 : 2928 – 2935
- Prashanth, P. 2011. A study on adoption of organic farming in cotton in Karimnagar district of Andhra Pradesh. *M.Sc. (Ag.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Praveen, B. 2012. A study on knowledge and adoption Levels of paddy farmers in East godavari district of Andhra Pradesh. *M.Sc.(Ag)Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Ramalakshmi Devi,S.2012. Impact Analysis of Sugarcane Production Technologies in Chittoor District of Andhra Pradesh. *M.Sc.(Ag)Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Rao, V. N., Ratnakar, R and Jain, P. K. 2012. Impact of farmer field schools in KVK adopted villages on level of knowledge and extent of adoption of improved practices of paddy .*The Andhra Agricultural Journal* 40(1) : 35-41.
- Sabharwal, K. and Panwar, R.D. 2015. Impact of trainings of fruits and vegetable preservation on the knowledge and attitude of rural women. *Journal of Krishi Vygan* , 3(Special Issue) : 59-61
- Sadvi, P., Jagan Mohan Reddy, M. and Sreenivasa Rao, I. 2015. A study on profile characteristics of hybrid rice seed growers. *Research Journal of Agricultural Sciences*.6 : 1768-1771
- Sahana, S. 2013. A study on contract farming in Karnataka. *Ph.D. (Agri.) Thesis*. UAS, Bengaluru.
- Salini R Chandran. 2018. Impact of agro machinery service centres on labour cost in Paddy cultivation. *International Journal of Research in Humanities, Arts and Literature* . 6: 265-268.
- Samanta, R.K. 1977. A study of some agro- economic,socio-psychological and communication variables associated with repayment behaviour of agricultural credit users of nationalized bank. *Ph.D. Thesis*.

Department of agricultural extension, Bidhan, Chandra Krishi Viswavidyalaya, West Bengal.

- Sangeetha, S., Ganesan, R., Karun Jeba Mary, M.V. and Indumathy, K. 2013. Profile of the tomato beneficiaries under precision farming. *Journal of Extension Education*.25(4) : 5165-5167
- Sarthakchowdhury and Prabuddharay. 2010. Knowledge level and adoption of the integrated pest management techniques: A study among the vegetable growers of katwa sub –division, Bardhaman district. *Indian Journal of Agricultural Research*. 44: 168-176.
- Satish, S. H. 2010. Farmers perceptions, preferences and utilization of SRI and traditional paddy straw for livestock. *M. Sc. (Agri.) Thesis*, UAS, Dharwad.
- Sathyanarayana, S.2014. Information source utilization pattern of Rice farmers of SPSR Nellore district of Andhra Pradesh. *M. Sc. (Agri.) Thesis*. Acharya N.G. Ranga Agricultural University, Hyderabad, India.
- Savita, Vermani, Deep and Punia. 2014. Impact of sprinkler irrigation on farming communities of Haryana. *Indian Journal of Social Research*. 55 (1): 165- 173.
- Selvam, P and Somasundaram. 2018. Benefits and constraints of Rice mechanization in Thamirabarani command area of Tamil Nadu. *International Journal of Trend in Scientific Research and Development*.2(5): 2456-6470.
- Shadrack Kwadwo Amponsah, Patrica Oteng-Darko and Francis Kumi. 2012. Potential and constraints of agricultural mechanization Ghana-a review. *International Agricultural Engineering Journal*.21(2):38-43.
- Shenoy, B. Underutilization of tractors in Punjab agriculture. 2008. One India News, Bangalore Edition, Bangalore. April 4, 2008. p.5.
- Shivaramu, K. and Krishnamurthy, B. 2011. Economics and adoption of SRI Technology by paddy growers. *Mysore J. Agric, Sci*. 45 : 648-654.



- Shyam, K. K . 2016. A Study of present status and future strategies of custom hiring of agricultural machinery In Paddy farm In Bilaspur district of Chhattisgarh. *M.B.A (ABM) Project report*, Department of Agri- Business and Rural Management, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya,Raipur (Chhattisgarh).
- Sidhu H.S. 2005. Custom hiring of farm machinery- problems and prospects. *Unpublished B. Tech (Agril. Engg.) Thesis*.College of Agricultural Engineering, P.A.U,Ludhiana.
- Sidhu, R.S. and Kamalvatta, V.2012. Improving the economic viability of farming, a study of cooperative agro machinery service centres in Punjab. *Agricultural Economics Research Review*. 25: 427-434.
- Singh Dharvinder, Singh Jasdev, Kumar Sanja and Manes, G. S. 2013.Economic impact of custom hiring services of machinery on farm economy in Punjab. *Indian Journal .com*.38 (1).
- Singh, S., Kingra, H. S. and Sangeet. 2013. Custom hiring services of farm machinery in Punjab: Impact and policies, *Indian Research Journal. Extension Education*, 13, 45-50.
- Sriharinarayana, N.2013. Constraint analysis of rice farmers of Nellore district of Andhra Pradesh. *M.Sc. (Ag.) Thesis*. Acharya N. G. Ranga Agricultural University, Hyderabad.
- Supe, S.V. 2007. Measurement techniques in social sciences. Agrotech publishing Academy, Udaipur.
- Taskeen, M. D. 2012. Mechanization needs of sugarcane growers in Belgam district. *M.Sc. (Ag.) Thesis*,UAS,Dharwad.
- Thiyagarajan, M. 2011. Impact analysis of System of Rice Intensification (SRI) among the paddy farmers of Coimbatore District. *M.Sc. (Ag.) Thesis*, Tamil Nadu Agricultural University,Coimbatore.
- Vaja K.G., Dobariya U.D. and Yadav Rajvir. 2016. Exploration of custom hiring services of farm machines in junagadh. *International Journal of Agriculture Sciences*.Vol 8 (47)-1946-1948

- Vanetha, K.P. and Senthil A.2013. A Study on Profile of farmers in utilization of farm equipments in Tamil Nadu. *International Journal of Advanced Research*.1(5): 284-288.
- Venkataramaiah,P.1983.Revised 1991.Development of socio-economic status scale for farm families in North Karnataka. *Ph.D. Thesis*. UAS, Bangalore.
- Vinod P., Singh, H.C and Tripathi, M.N. 2011. Knowledge level of farmers in use of farm machinery, Implements / Equipment, Krishi Vigyan Kendra, Etawah. *New Agriculturist*. 22 (2): 217-219.
- Yadavsandeepkumar, Prajapati, R.R., Prajapathi, M.R. and Patel, V.T. 2016. Training needs and relative suitability for training programmes of tomato growers in jaipur district of rajasthan state. *International Journal of Agricultural Sciences*.8(13) : 1206-1209
- Yashashwini, M.A.2013. Effectiveness of Front Line Demonstrations of Krishi Vigyana Kendra on FLD Farmers of Mandya District. *M. Sc. (Agri.) Thesis. (Unpub.)*,Univ. Agri. Sci., Bengaluru
- Yassing, M., Barman, S., Barua, P and Bordoloi, N.2016.Mechanization of farm operations in selected crops of Assam ,*Progressive research-An International Journal*.Volume 11(3):309-312.

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# *Appendices*

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**APPENDIX – I**  
**ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY**  
**S.V. AGRICULTURAL COLLEGE, TIRUPATI**  
**DEPARTMENT OF AGRICULTURAL EXTENSION**

**A STUDY ON PERFORMANCE OF CUSTOM HIRING CENTRES IN**  
**CHITTOOR**  
**DISTRICT OF ANDHRA PRADESH**

**INTERVIEW SCHEDULE**

**GENERAL INFORMATION**

Date:

Respondent No:

Name of the respondent:

Name of the village:

Name of the mandal:

Mobile No:

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**PART- A**

**PROFILE CHARACTERISTICS OF THE USERS OF CUSTOM HIRING**  
**CENTRES.**

**I. Age (completed years):-----**

**II. Gender:**

**III. Education:**

Please state your educational level on the following items applicable to you.

<b>S.No.</b>	<b>Category</b>	<b>Score</b>
1.	Illiterate	1
2.	Primary School	2
3.	Middle school	3
4.	High school	4
5.	Collegiate education	5
6.	Graduate	6
7.	Post-Graduate	7

**IV.Farm Size:**

A)Wet land\_\_\_\_\_ acres.

B)Dry land\_\_\_\_\_ acres.

Total ----- acres

**V. Farming experience:** \_\_\_\_\_ years

#### **VI. Social participation:**

Please state your involvement in different formal social organisations on the following items applicable to you

Sl.No	Category	Score
1.	Member of one organization	1
2.	Member of more than one organization	2
3.	Office Holder	3
4.	Wider Public Leader	4

#### **VII Innovativeness:**

Please state your degree of agreement as strongly agree (SA), agree (A), Undecided (UD) , Disagree (DA) and strongly disagree (SD) for the following statements

S. No	Statement	Response categories				
		SA	A	UD	DA	SD
1.	Do you want to mechanize all operations in your farm?	5	4	3	2	1
2.	If the Agricultural Extension worker gives a talk on farm mechanization/CHCs will you attend it?	5	4	3	2	1
3.	If the government helps you in establishing a CHC will you accept the deal?	5	4	3	2	1
4.	Do you want a change in your life?	5	4	3	2	1
5.	A farmer should try to do farming, the way his parents did (-)	1	2	3	4	5
6.	Do you want your children to become farmers? (-)	1	2	3	4	5
7.	I am optimistic in adopting the innovations even in the event of failure?(-)	1	2	3	4	5

#### **VIII. Management orientation;**

Please indicate your agreement or disagreement for the following statements.

S.No	Statement	Response	
		Agree	Disagree
1.Planning orientation			
1	Every year one should think afresh about the crops to be cultivated in each type of land		
2	It is not necessary to make prior decisions about the farm mechanization		

3	It is possible to increase the profit by farm mechanization		
4	The amount of inputs such as seeds, fertilizers and plant protection chemical, farm implements and machines needed for raising a crop should be assessed before cultivation		
5	It is not necessary to think ahead of the cost involved in raising a crop		
6	It is possible to increase the yield through farm production plan		
<b>2. Production orientation</b>			
1	Timely planning of a crop ensures good yield		
2	One should use as much manures/fertilizers as he can		
3	Determining fertilizer dose by soil testing saves money		
4	Seed rate should be given as recommended by specialists		
5	It is not necessary to consult a specialist during crop growing		
6	For timely weed control one should use suitable herbicides		

### IX. Annual family income (in rupees)

Please indicate your income from different sources

S.No	Source	INCOME
1	Agriculture	
2	Horticulture	
3	Sericulture	
4	Dairy	
5	Poultry	
6	Farm labour	
7	Any other (specify)	
	Total	

### X. Accessibility:

Please indicate your opinion towards accessibility of services from CHCs:

S.No	Particulars	Strongly Agree	Agree	Disagree
1	Timely availability of farm machinery from CHC	3	2	1
2	CHC is located at strategic location (with in the radius of 5-7 kms)	3	2	1
3	Farm machinery available at reasonable rates in CHC	3	2	1
4	No need for long term investment by farmers to own farm machinery	3	2	1
5	CHC machinery are in good condition	3	2	1
6	Flexibility in use of farm machinery (less or extend time period)	3	2	1

**XI. Extension contact:**

Please state your frequency of contact with different extension workers.

S. No.	Extension personnel	Frequency of contact		
		Regularly	Occasionally	Never
1.	Village Secretary/ MPEO/AEO	2	1	0
2.	Agricultural officers	2	1	0
3.	A.D.A / D.D.A / J.D.A	2	1	0
4.	ANGRAU scientists	2	1	0
5.	N.G.O Personnel	2	1	0
6.	Private company officials	2	1	0
7.	Input dealers	2	1	0
8.	Bank officials	2	1	0
9.	Fellow farmers/Progressive farmers	2	1	0
10.	Any other/s (specify)	2	1	0

**XII. Mass media exposure:**

Please state the frequency of your exposure to the different mass media sources in terms of Regularly, Occasionally or Never.

S. No.	Item	Frequency of exposure		
		Regularly	Occasionally	Never
1.	Listening to farm radio broadcast	2	1	0
2.	Viewing television	2	1	0
3.	Reading newspaper	2	1	0
4.	Reading farm magazines/ periodicals	2	1	0
5.	Attending Kisan Melas	2	1	0
6.	Attending Exhibitions	2	1	0
7.	Attending Field trips	2	1	0
8.	Viewing C.D.s/DVDs on Agriculture and allied sector	2	1	0
9.	Browsing Internet/Mobile Apps	2	1	0
10.	Any other/s (specify)	2	1	0



**XIII. Training received:**

S. No	Title of the training programme	Agency			
		State department of Agriculture	ANGRAU	NGO	Others
1	Number of Trainings received on farm mechanization				
2	Number of trainings received on crop technologies				
3	Others				

**XIV. Achievement motivation:**

Please indicate whether you strongly agree (SA), Agree (A), Undecided (UD), Disagree (DA) or Strongly Disagree (DS) to each of the following statements pertaining to scientific orientation

S. No	Statement	Response categories				
		SA	A	UD	DA	SDA
1.	Work should come first even if one cannot get proper rest in order to achieve ones goals	5	4	3	2	1
2.	It is better to be content with whatever little one has, than to be always struggling for more.(N)	1	2	3	4	5
3.	No matter what I have done I always want to do more.	5	4	3	2	1
4.	I would like to try hard at something which is really difficult even if it proves that I cannot do it.	5	4	3	2	1
5.	The way things are now-a-days, discourage one to work hard. (N)	1	2	3	4	5
6.	One should succeed in occupation even if one has to neglect his family	1	2	3	4	5

**XV. Economic orientation:**

Please state the degree of your agreement with each of the following statements pertaining to economic motivation, on the five point continuum viz., Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA) and Strongly Disagree (SDA)

S. No.	Statement	Response categories				
		SA	A	UD	DA	SDA
1.	A farmer should work for higher yields and profits	5	4	3	2	1
2.	The most successful farmer is one who makes the most profit	5	4	3	2	1
3.	A farmer should try the new farming ideas which may earn him more returns	5	4	3	2	1
4.	A farmer should grow cash crops to increase monetary profits in comparison to growing of food crops for home consumption	5	4	3	2	1
5.	It is difficult for the farmer's children to make good start unless he provides them with economic assistance	5	4	3	2	1
6.	A farmer must earn for his living but the most important thing in life cannot be defined in economic terms (-)	1	2	3	4	5

## PART-B

### 1.PERFORMANCE OF CUSTOM HIRING CENTRES:

#### I.General Information of CHC's Village/s

Sl. No.	Crops	Area (Acres)	Average yield (q/ha)
<b><i>Kharif</i></b>			
<b>Rabi</b>			
<b>Summer</b>			

## II Implement and machinery available in CHC's for hire

Sl. No.	Type of Machinery	No. of equip.	Yr of pur.	Purchase value (Rs.)	CHCS contribution (Rs.)	Subsidy amt (Rs.)
1	Tractor					
2	Tractor drawn Multi Crop Planter/Seed drill					
3	Ground nut digger /shaker cum windower					
4	Rotavator					
5	Power operated Ground nut wet pod Thresher or Dry pod thresher (power operated)/Modern Automatic High Capacity Multi Crop Thresher					
6	4 Row bullock drawn automatic Groundnut planter					
7	Hand operated Groundnut planter					
8	Inter cultivation equipment along with slim tyres					

## III.Rates (hiring charges) for farm machineries by Private and CHC per hour

Sl. No.	Type of Machinery	Hiring charges	
		Private individuals	CHC
1	Tractor		
2	Tractor drawn Multi Crop Planter		
3	Ground nut digger /shaker cum windower		
4	Rotavator		
5	Power operated Ground nut wet pod Thresher or Dry pod thresher (power operated)/Modern Automatic High Capacity Multi Crop Thresher		
6	4 Row bullock drawn automatic Groundnut planter		
7	Hand operated Groundnut planter		
8	Inter cultivation equipment along with slim tyres		

**IV) Costs incurred and returns earned (Rs/Machine or equipment during 2017-18 :**

S.NO	Type of Machinery	Variable costs (Rs)			Fixed costs (Rs)			Total cost (Rs)	Returns earned (Rs)			
		Maintenance/Repair cost	Fuel/Lubrication cost	Wages for worker/operator	Insurance coverage	Interest	Depreciation		Hiring charge per hour	Number of hours engaged	Gross income	Net income
1	Tractor											
2	Tractor drawn Multi Crop Planter											
3	Ground nut digger /shaker cum windower											
4	Rotavator											
5	Power operated Ground nut wet pod Thresher or Dry pod thresher (power operated)/Modern Automatic High Capacity Multi Crop Thresher											
6	4 Row bullock drawn automatic Groundnut planter											
7	Hand operated Groundnut planter											
8	Inter cultivation equipment along with slim tyres											

## 2. Extent of utilization of custom hiring centres

### 2.1. Extent of utilization of services of custom hiring centre

S.NO	Statement	Yes/No
1.	Are you a member in the CHC group	
2.	Are you going for pre-booking of the machinery	
3.	Are you paying any advance for pre-booking	
4.	Are you providing any document	
5.	Are you getting the information about the services of CHC? If yes from whom you are getting?	
	a) State Department of Agriculture	
	b) Fellow farmers	
	c) Members of CHC	
6.	Are you paying the hiring charges immediately after availing the services. If not how	
	a) On sale of the Agricultural produce	
	b) On credit	
	c) Cash	
7.	Are you getting the machinery timely	
8.	Are you satisfied with the services of CHC	

### 2.2 Extent of utilization of farm machineries / equipments in CHC by the farmers:

Sl.No	Type of Machinery	Frequency of utilisation		
		Regularly(20)	Occasionally(1)	Never(0)
1	Tractor			
2	Tractor drawn Multi Crop Planter			
3	Ground nut digger / shaker cum windower			
4	Rotavator			
5	Power operated Ground nut wet pod Thresher or Dry pod thresher (power operated)/Modern Automatic High Capacity Multi Crop Thresher			
6	4 Row bullock drawn automatic Groundnut planter			
7	Hand operated Groundnut planter			
8	Inter cultivation equipment along with slim tyres			

### PART-C

#### CONSTRAINTS FACED BY THE USERS IN AVAILING THE SERVICES OF CHC

Sl.no	Constraints	Yes/No
1.	Non- availability of farm machinery during peak season.	
2.	Timely availability of farm machinery not available.	
3.	Lack of shelter for keeping the machinery at CHCs	
4.	Non –availability of skilled farm machinery operator	
5.	Lack of awareness about type of machinery available at CHC.	
6.	Overlapping of farm machinery	
7.	Field location	
8.	Non availability of service centres for repairing the machinery in the vicinity of CHC”s	
9.	Losses due to use of machinery.	
10.	Others	

**SUGGESTIONS FROM FARMERS TO IMPROVE THE  
SERVICES FROM CHC.**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.



## GLIMPSES OF DATA COLLECTION





## GLIMPSES OF DATA COLLECTION

