Original Research Article

A Study on Groundnut cultivation methods adopted in Central Dry Zone regions in Karnataka

ABSTRACT

In the current days, cost of cultivation for groundnut operation is increased due to high wages paid to labors, during cultivation season and also due to labor scarcity in the villages. The large numberof farmers aremigrating to urban places for better economic growth. Groundnut cultivation is a labor intensive crop and availability of mechanized machineries is very less.As a part of research work the sample data was collected and analyzed using chi-square method.Karl Pearson chi-square test method was used topredict the relative values that was either accepted or rejected based on standard hypothesis values.Based on the assumptions of statistical analysis and experimental data, Chi-square value is calculated using traditional tools. The probability values obtained are observed for expected frequency. The degrees of freedom and level of significancefrom chi square value table is found to be $\alpha > 0.05$.Modern tools and equipment's used by different levels of farmers were analyzed. Likert--?? scale is used to evaluate the facilities, like labor availability,machinery and wages paid during cultivation season is analyzed.

Keywords:Chi-square statistics, Groundnut cultivation, Mechanization, Agricultural mechanization, Farm mechanization

INTRODUCTION

Groundnut is one of the most important cash cropand also provides edible oil. India stands in second position next to china in production of groundnut. These seeds contain 47-53% of oil and 25-36% protein.India exports the peanut to more than 75 countries. This crop is grown in all the seasons' i.e Kharif, rabi and summer. But maximum yield is obtained during Kharif season i.e., between June to October.

Many rural places in India are ~~rain dependent~~ rainfed and are facing huge problems due to irregularity of rain. Some farmers depend on labours for groundnut cultivation like seed plantation, weed removal, harvesting from ground and post harvesting (removal of pod from the plant). This had created lower productivity and it is leading to decrease in the profitability.In recent days many machines are developed for agricultural activity, but they are not suitable for groundnut production. Since the machinery cost is higher low income farmers are not able to afford such huge machineries. Small and marginal farmers are increasing day by day due to defragmentation and land developers are converting agricultural land into residential plots.

Lower income in the agricultural field is drawing the attention of the youth farmers to move towards urban areas for better economic growth, this has led to the scarcity of farmer labours. But, Youths in the farmer's family are not interested in agricultural work due to lower income. If low cost automated machineries'are developed, then it would be beneficial for small and marginal farmers.

MATERIAL AND METHODS

Study Area and Collection of Data:

In dry zones the amount of rain fall received will be less and the more amount low income farmers will be available. In this regard, the data are collectedinChitradurga and Tumkur districts which are located in central dryzone of Karnataka.which is located between 760 34'49.86"E to 760 51' 32.13"E and 140 14'13.63"N to 140 30'28.30" The average temperature in these areas are 17^0C to 43^0C and the rain fall ranges between 453.5 to 717.7 mm. It rains maximum during Kharif season. The soil is sandy loam and red in major areas and remaining areas are deep black. The main crops grown in these areas are Groundnut, Ragi, Jowar and vegetables.

Statistical Analysis of Data

The research data collected is analysed and evaluated using Chi-square method. In1900,Karl Pearsondeveloped chi square test and applied it to the goodness fit for frequency curve (Stigler1999). Hypothesis test results werepredicted using chi-square method: Data's were collected through field survey. The relative values were either accepted or rejected based on the standard values of hypothesis. The relative value commonly used in research was α > 0.05 i.e., probability of deviation derived from observed and expected values. If α > 0.05 then the deviation in probability value would be found to have more than 5% error.

The chi square value can be calculated using the equation (1)

$$(x)^2 = \sum \frac{(O_i - E_i)^2}{E_i} \quad \text{....(1)}$$

x^2 = Chi squared value

O_i = Observed Value
E_i= Expected value

The values obtained are analysed

RESULTS AND DISCUSSION

Groundnut is the most suitable crops for the central dry zone of Karnataka in terms of soil and water source,which is grown maximum during kharif season. As a part of the research work set of questionaries were prepared and during field visitabout 300 sample data were colletced, in different parts of central dry zone of Karnataka.
As per the government guidelines, the research data was categorized into five categories such as marginal, small, semi medium, medium and large farmers based on land holding.

Table 1.Percentage of category of farmers

Sl. No.	Name of the category	Frequency (N=300)	Percentage (%)
1	Marginal	107	36
2	Small	104	35
3	Semi Medium	45	15
4	Medium	37	12
5	Large	6	2

From the table 1it was observed that about 36% of farmers belongs to marginal and 35% to small farmers group. It is evident that only 2% lies in the large farmer's area.In future, due to not development in the economic structure of low and marginal farmers, even largeand medium farmers would also be turned intosmall farmers.

Land holding Details

The water sources are very less in central dry zone of Karnataka. Due to the climate changes in the monsoon season, yield is very less compared to wet land.

Table 2.Sample data for land holdings of various categories of farmers

Type of farmers	Frequency	% of land	Average Land(in Hectare)
Marginal	108	11.07	0.62
Small	104	23.13	1.35
Semi medium	45	18.23	2.44
Medium	37	34.08	5.55

Large	6	13.50	13.55

The land holdings of various categories of farmers were analysed from the table 2. It was observed that marginal farmers have an average land holdings of 0.62 hectare , small farmers 1.35 hectares, semi medium farmers 2.44 hectares, medium farmers 5.55 hectares and large farmers 13.55 hectare of land. The amount of land holdings among marginal and small farmers very less when compared with the other category of farmers.

CATTLE LIVE STOCK

Cattle live stock were analyzed per head in table 3. Marginal farmers arehaving about 0.86, small farmers 1.32, semi medium 0.82, medium farmers having 1.19 and large farmers having 1.67 of live stock. But for agricultural activities only draught animals like bullock and donkey are used. The other animals are used as a means to improve their economy. It was observed that marginal and other farmers have less cattle and livestock when compared to large farmers due to less resource available in this region.

Table 3. Sample data for of availability of livestock among the farmers

Farmers category	Frequency	Total live stock	Avalability Per- head
Marginal	108	93	0.86
Small	104	137	1.32
Semi medium	45	37	0.82
Medium	37	44	1.19
Large	6	10	1.67

AGRONOMY PRACTICE (TRADITIONAL METHOD)

The data were collected with respect to traditional equipment's used for farming sector. It was observed that farmersstill usestraditional tools.Olden days farmers were dependent on bullock for agricultural activities like ploughing, weed removing and levelling. In the recent days it was identified that traditional method of agro practices is reducing day by day due to huge time consumption and labor scarcity in the rural areas.

Table 4 Sample data of traditional tools and equipments holding
Please provide the number of tools in this table and in running text please elaborate what tools were used in traditional method.

Farmers category	Frequency	Percentage (Tools)/head
Marginal	108	0.88
Small	104	1.19
Semi medium	45	1.27
Medium	37	1.24
Large	6	1.17

Table 4 shows the tools and equipment'sowned by different categories of farmers and it was analysed and calculated for per person. About 0.88 of marginal farmers, 1.19 of small farmers, 1.27 of semi medium, 1.24 medium and 1.17 of large farmersuses traditional tools.From thisit wasobservedthat marginal and small farmers have less number of equipment's or tools when compared to large farmers.

CHI-SQUARE AND PROBABILITY VALUE OF TRADITIONAL TOOLS AND EQUIPMENTS

This study measures the impact of cattle livestockvariations with different category of farmers, like marginal, small, medium, semi medium and large farmers in the dry zone of Karnataka and the comparison is drawn between cattle livestock and category of farmers

1. It was assumed that marginal and small farmers are having less cattle live stock
2. It is assumed that medium and semi medium farmers are having more cattle live stock
3. It is assumed that large farmers do not have cattle live stock

Null hypothesis H_0: There is no significant relation between category of farmers and cattle live stock
Alternative hypothesis H_1: There is a significant relation between category of farmers and cattle live stock
Probability value: The probability value is calculated using CHISQ TEST(total range, expected range). These values are gathered from the observed values and expected values.

Table 5. Chi-square and probability value of traditional tools and equipment's

			Statistical inference at (alpha = 0.05) 5% level of significance(N=300)				
Sl. No	Farmers category	Sample farmers	Significance value-0.05 (α = 0.05)	Chi square value	Critical Value	Degree of freedom	p-value (Probability value)
1	Marginal	108	0.05	45.98	31.42	20	0.03759
2	Small	104					
3	Semi medium	45					
4	Medium	37					
5	Large	6					

Table 5 shows the relation between utilization of traditional tools and equipments. Thecalculated chi sq. was observed to be 45.98 and a critical value is 31.42. when these two values are compared,it was found that chi square values are greater than critical value (45.98 >31.42). so that to reject the null hypothesis and to accept the alternate hypothesis.

In this case P – value is (0.03759) is less than significance alpha value (0.05). alpha values (0.05<0.03759) shows that sample field data collected is sufficient and research work is observed to moving in the right direction, this makes the further work easier.

The relation between category of farmers and traditional tools and equipments used for groundnut production was also gathered. This data supports to develop the new products for groundnut operation.

MODERN METHODS /EQUIPMENTS

The agricultural farm equipments are helpful to farming activities like ploughing, seed plantation, harvesting and post harvesting.
There are a lot of improvement in the technology in current days;many companies are developing very advanced tools for agricultural products. Even though modern tools and equipments are available, but are not affordable by marginal and small farmers.

Percentage of farmers following traditional method and machinery

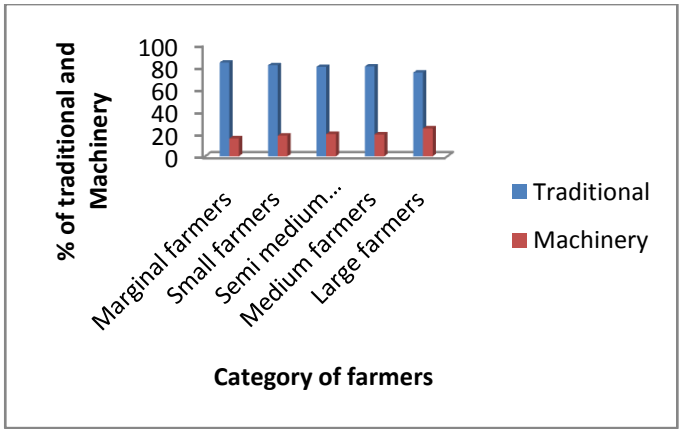

Figure 1. Percentage of farmers following traditional and machinery

For groundnut production, the percentage of farmers is calculated using traditional equipment and modern equipment, 83.89%, 81.46%, 80.00%, 80.40% and 75.00% of marginal, small, semi medium, medium and large farmers are using traditional method , 16.11%, 18.54%, 20% 19.60% and 25% using machinery respectively (please rephrase this line for better readability of farmers). This shows that majority of farmers use traditional method when compared to modern equipment. Percentage of marginal farmers dependent on traditional method is distributed in descending order and modern equipment percentage will be in ascending order. There is a huge scope to develop the new machinery for groundnut production.

It was observed that, for groundnut cultivation there is no specific tools except the tool used for ploughing purpose. In some parts of Karnataka machineries are used for seed plantation and for post harvesting only 5 to 10% of machineries are used.

Availability of Labor during cultivation season

Likert—Please explain this word scales are used to evaluate the ~~facility~~labour availability . The availability of labor is very poor during cultivation season, when compared to normal days. Farmers rated it in the scale of 1 to 5. 43% of the farmers rated very poor and 53% of them rated poor. This shows that labor avalability is very poor during season as shown in figure 2.

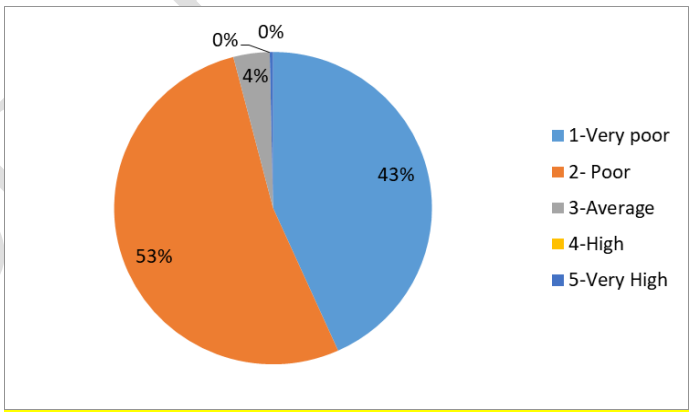

Figure 2. Availability of Labor during cultivation season

Availability of machinery during cultivation season

The availability of machinery during cultivation season is poor when compared to normal days, farmers rated it in the scale of 1 to 5. 37% of the farmers rated very poor, 56% of them rated poor and average as 6%. This shows that machinery avalability is very poor during season as shown in figure 3.

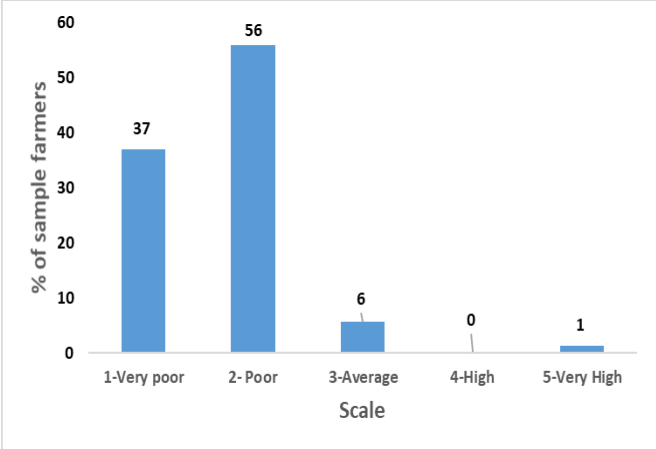

Figure 3.Availability of machinery during cultivation season

Amount of wages paid during cultivation season for labor

The amount paid during season is very high compared to normal days, farmers rated in the scale of 1 to 5. 35% of the farmers rated high, 50% of them rated very high and average as 12%. This shows that amount paid during seaon is very high as shown in figure 4.

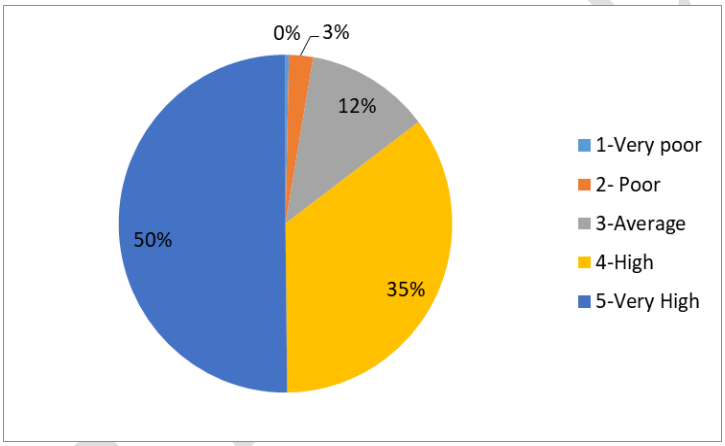

Figure 4. The amount of wages paid during cultivation season for labor

CONCLUSION

Currently populationin India is increasing day by day whereasland for farming is decreasing .If it continues then the average land will come down to less than an hectare. Marginal and small farmers are increasing due to fragmentation and in urban areas agricultural land is converted into real estate. Agricultural tools and equipments are also reducing, large farmers are having more number of traditional tools compared to small farmers. Livestock isalso very less due to less resource. Small farmers are converted to labors due to less income from their land.

Indian agricultural mechanization is very low when compared to advanced countries. In present situation India has achieved only 40 percent of mechanization. Labor cost is increasing due to scarcity of labors, small and marginal farm holders are moving from rural to urban places for the betterment of their financial growth. In village, farmers are losing their interest in agriculture work due to changes in the monsoon. From the above data large farmers are having more number of mechanized tools compared to other category of farmers. Due to high cost in existing machinery marginal, small and medium farmers are not able to afford them. Farmers need to adopt joint machinery ownership models also and along with this custom hiring centres of machinery at village level can make the machinery availability for farmers during cultivation, sowing season and during other operations especially for small and marginal farmers.

Research data shows that availability of labor during cultivation season and machinery availability is very less. For groundnut production, farmers are following traditional method rather than machinery methodand amount paid during cultivation season is very high compared to normal days.

Based on research work it could be recommended that low cost machines are suitable for marginal, small and medium farmers. In near future there is huge scope to use automation equipment for groundnut cultivation. This will help to improve the yield and support for financial stability.

REFERENCES

Dr. (Smt) C.P.S and V S Kulkarni (2016) A Statistical Approach to Study the Socio Demographic Profile of Working Women of Rural and Urban Area of the Three Districts of Karnataka State -A Case Study, International Journal of Advanced Research, Volume 4, Issue 7, 568-574.

P.V. VaraPrasad,VijayaGopalKakani, Hari D. Upadhyaya (January 2010) “growth and production of peanut, Vol.II ,Encyclopedia of Life Support Systems (EOLSS)

Suremanonchiri (August 2013), Conceptutal model on application of chi-square test in education and social sciences, Educational Research and reviews, Vol.8 (15), pp. 1231-1241

Salini R Chandran (October 2017), Determinants of paddy mechanization through agroMachinery service centres, Indian Journal of applied Sciences, Volume-7 | Issue-10 | ISSN - 2249-555X | IF : 4.894 | IC Value : 79.96

Debertin, D., Pagoulatos, A., and Aoun, A. (1982), Determinants of farm mechanization in Kentucky an econometric analysis. North Central J. Agric. Econ. 4(2): 73-80.

Valentina Tudor a, Marius Mihai Micua, RetaCondeia (May 2014) , Vision Analysis on the Type of Agriculture Agricultural Producers Deemed Necessary to be Practiced in the Arges County ProductionGrowth and Yield Return, Procedia Economics and Finance , 526 – 534

Jannette R. Bartlett1, David Nii O. Tackie, Dana Reid, AkuaAdu-Gyamfi,Angela McKenzie-Jakes (2018), An analysis of the characteristics and practices of selectedFlorida small livestock producers: a focus onProduction and processing, Volume 5Number 2, Professional agricultural workers journal (PAWJ)