ESTIMATION OF INCOME, EXPENDITURE AND RESOURCE USE PATTERN OF GROUNDNUT IN THANDRAMPATTU BLOCK OF TIRUVANNAMALAI DISTRICT

ABSTRACT

The core objective of the "estimation of income, expenditure and resource use pattern of groundnut in Thandrampattu block of Tiruvannamalai district" is to analyze the performance of groundnut in terms of cost and returns, resource use efficiency, and employment generation. The sample of 30 farmers growing groundnut were selected at random from the Thandrampet, Veppur, Vanapuram villages. Average and percentage analyses were used to examine cost of cultivation, labour hours used, quantity of materials used and machine hours used by farmers in each crop production. Regression analysis was employed to measure the influence of selected explanatory variables on independent variables. Joint family constitutes about 33 per cent and nuclear family was 67 of the total sample households. Average size of holding of 2.84 acre. Total cost of cultivation for groundnut is Rs.16371.68/acre. Gross income from groundnut is Rs.54000/ac. Benefit Cost Ratio (BCR) of groundnut cultivation is 3.30. Farmers sell the produce at regulated market, mill owners and local traders. The human labors were used for sowing and transplanting, FYM, fertilizer, chemicals, intercultural operations. FYM, chemicals, fertilizer and seed are the major material used in crop production. Harvester, rotavator and bund former are the machine used for crop production. About 69 per cent of variation in dependent variables explained by the selected independent

variables such as labor hours for inter cultural operation, land holding size and quantity of FYM.

INTRODUCTION:

Agriculture in India is one of the most important sectors of the economy. Agriculture is the primary and critical sector of our country giving livelihood and employment opportunities for vast majority of Indian population. At present Indian agriculture is at crossroads and one of the major challenges is to reverse deceleration in agricultural growth. Main reason for deceleration in agricultural growth is declining investment particularly, public investment in agriculture research and development and irrigation, combined with inefficiency of institutions providing inputs and services including rural credit and extension, post-harvest losses of food grains at 10 per cent of the total production or about 20 MT. In Tiruvannamalai, agriculture and silk weaving are the important occupation. Even though there are no perennial rivers in the district, tanks and dug wells are the major sources of irrigation. Groundnut is one of the major crops grown in the district. Tiruvannamalai district is leading producer of Groundnut.

The study attempts to analyze the cost of cultivation, maximum returns, highest resource use efficiency and more employment generation from Groundnut cultivation in Thiruvannamalai district.

Objectives

The core objective of the study is to analyze the performance of groundnut grown in Thiuvannamalai District with the following specific objectives.

- To analyses input utilization pattern, cost and returns in production of groundnut in study area.
- To analyze resource use efficiency in production of groundnut.
- To identify constraints faced by the farmers in production of groundnut.
- To analyses the employment generation capacity of groundnut in Thiruvannamalai district.
- To suggest the alternative crops based on the economic advantage of groundnut

The **hypothesis** are

- Returns are higher than cost in the cultivation of groundnut.
- Farmers are not utilizing the resources efficiently in production of groundnut.
- In cost of cultivation, the material cost would be higher than machine and labor cost.
- Among the inputs, the labor use efficiency would be higher than others.
- In cultivation of crops, women employment would be more than men.
- Farmers who choose the crops based on economic criteria will be more benefited with high benefit.

Review of Literature

A review of past research helps in identifying the conceptual and methodological issues relevant to the present study.

According to Govind Pal et al.(2016) Human labour occupied the major share (27.07%) of total cost of Rs. 33245.0 per ha in seed production and bullock and machine labour occupied the major share (29.38%) of total cost of Rs. 28252.0 per ha in grain production of groundnut. The higher human labour requirement in seed

production was mainly due to activities like rouging, gap filling etc. The other items involved in production of groundnut seed was bullock and machine labour (26.47% of total cost), cost of seed (10.95%), manures and fertilizers (8.42%), and seed certification charges (3.01%). In total cost of cultivation, variable costs took major share of 77.44% in seed production as compared to 73.45% in grain production. The higher share of fixed cost in total cost of cultivation is mainly due to rental value of own land (opportunity cost). The variable cost was comparatively higher in seed production (Rs. 25745.0 per ha) over grain production (Rs. 20752.0 per ha). The total cost of cultivation per ha. of rainfed groundnut crop was Rs. 34638.86 on seed farm and Rs. 26827.0 on commercial farm. The seed and commercial farm realized a gross income of Rs. 48701.0 and 36412.0 per ha respectively. The net income was high on seed farm (Rs. 14062.14) compared to Rs. 9585.0 per ha. on commercial farm.

Rathore(2015) the per hectare cost of cultivation of kharif groundnut i.e. Cost 'C' was Rs.50434.33. Amongst the different items of cost, seed was the major item of cost which accounted for *Rs.*11803.83 (23.40 per cent) followed by rental value of land *Rs.*10,134.02 (20.09 per cent), hired human labour *Rs.*4,875.91 (9.66 per cent), bullock labour *Rs.*3,709.09 (7.35 per cent), machine power *Rs.*2,964.98 (5.88 per cent), depreciation on farm implements *Rs.*921.15 (1.83 per cent), manures *Rs.*1,167.71 (2.32 per cent), interest on fixed capital *Rs.*1,598.94 (3.17 per cent), phosphorus *Rs.*560.55 (1.11 per cent). and nitrogenous fertilizers *Rs.*415.27 (0.82 per cent). Of the total cost of cultivation of kharif groundnut, Cost 'A' was *Rs.*33.825.45 (67.08 per cent) and Cost 'B' was *Rs.*45,558.42 (90.34 percent).

Murlidhar Meena (2018) costs and returns in groundnut cultivation were found to vary from state to state. During the triennial ending (TE) 1998 cost C2 in Tamil Nadu was found higher by `3,057 (21 per cent), `4,372 (33 per cent), `7,136 (70 per cent) and `2,918 (20 per cent) than Andhra Pradesh, Gujarat, Karnataka and Maharashtra, respectively. Higher cost in Tamil Nadu was because 40 per cent of the groundnut was grown under irrigated conditions with higher input use compared to other major producing states. The gross value of groundnut produce (VOP) was found highest in Gujarat followed by Tamil Nadu, Maharashtra, and Andhra Pradesh

and lowest in Karnataka. As a result in TE 1998, the highest net returns over cost C was earned in Gujarat followed by Tamil 2 Nadu and Maharashtra, whereas there was net loss estimated in Andhra Pradesh and Karnataka. Similarly in TE 2015 also, highest cost C was found in Tamil Nadu, 2 found higher by `725 (1 per cent), `10,354 (17 per cent), `26,678 (61per cent) and 10,721 (18 per cent) than Andhra Pradesh, Gujarat, Karnataka and Maharashtra, respectively.

Pawar(2016) the total cost of ultivation, share of cost-A was 44.37 per cent and that of cost-B, it was 66.40 per cent. The maximum cost was worked out to be for total human labour (42.16%). The cost incurred on machine hrs. was 10.18 per cent (Rs. 8738.95) followed by seed 8.46 per cent (Rs. 7259.83) and fertilizers 4.37 per cent (Rs. 3754.39). The share of cost incurred on manures was about 1.92 per cent (Rs. 1650.20). while the cost on bullock labour was 1.83 per cent (Rs. 1568.51). The irrigation charges accounted for 0.88 per cent (Rs. 756.67) to the total cost. The cost on depreciation of implements and machinery was 1.83 per cent (Rs. 1572.93). Interest on working capital accounted for 1.24 per cent (Rs. 1061.88). Interest on fixed capital was 2.09 per cent (Rs. 1791.63). Rental value of owned land was 19.94 per cent (Rs. 17123.83). Supervision charges were worked out to 4.12 per cent (Rs. 3539.60). The cost per quintal was worked out to be Rs. 4152.76.

Mane(2014) Use of hired human labour was high as 100.88 man days on TAG-24 groundnut farm than that of 87.98 man days on SB-11 groundnut farm. Use of bullock labour was 6.22 pairdays on TAG-24 groundnut farm and 7.14 pairdays on SB-11 groundnut farm. Use of machine labour which was 1.64 hours on TAG-24 groundnut farm and 1.23 hours on SB-11 groundnut farm. The use of seed was higher as 105.54 kg in case of TAG-24 groundnut farm as compared to 101.14 kg in case of SB-11 groundnut farm. In regard to manure on TAG-24 farm, the requirement was found to be 11.80 quintals while that was only 3.69 quintals on SB-11 farm. Use of nitrogen, phosphorus, and potash was 49.90 kg, 41.14 kg and 41.44 kg on TAG-24 groundnut farm, respectively. While the same was 51.67 kg, 42.37 kg and 38.19 kg, respectively on SB-11 groundnut farm. The use of plant protection for TAG- 24 groundnut farm was found to be more which was 1.46 litres while in case of SB-11 groundnut farm, it was 1.18 litres. Use of irrigation for TAG-24 groundnut farm was 7180.80 m3 while that was 7274.29 m3 for SB-11 groundnut farm. Use of

family human labour was 23.87 man days for TAG-24 farm followed by 42.67 man days for SB-11 farm. It was also observed that main produce yield of groundnut was higher as 29.23 quintals on TAG-24 groundnut farm while that was 19.95 quintals on SB-11 groundnut farm. The by produce of SB-11 was higher (20.11 quintals) as compared to TAG-24 (18.05 quintals). Cost- C was highest as Rs 84818.47 for TAG-24 followed that of Rs. 83123.46 for SB-11. The share of rental value of land was 26.95 per cent for TAG-24 and that of 19.86 per cent for SB-11 groundnut. Among the various items of expenditure, share of expenditure for TAG-24 groundnut on irrigation was 22.10 per cent followed by hired human labour (20.22 %), seed (13.01 %) and family human labour (4.50 %). In case of SB-11 groundnut, the share of hired human labour was (17.99 %) followed by seed (12.74 %) and family human labour (8.21 %). It is clear from the table that return from main produce of TAG-24 was Rs. 130174.33 followed by Rs. 89384.46 of groundnut. The return from by produce was highest as Rs. 9928.29 from SB-11 followed by Rs. 7237.50 from TAG-24. The results revealed that, gross return was highest as Rs. 137411.83 from TAG-24 groundnut followed by Rs. 99312.74 from SB-11 groundnut. It was clear that, farm business income, family labour income and net profit was Rs. 82098.70, Rs.56369.12 and Rs. 52593.36 from TAG-24 groundnut, respectively. On the contrary farm business income, family labour income and net profit was Rs. 43600.58, Rs. 23015.80 and Rs. 16189.28 from SB-11 groundnut, respectively. It inferred that TAG-24 groundnut production was more profitable than SB-11 groundnut production. It was clear that output-input ratio was higher as 1.62 in case of TAG-24 groundnut than that of 1.19 in case of SB-11 groundnut. It implied that, when one rupee spent on TAG-24 and SB-11 groundnut production, it would lead to give the return of Rs. 1.62 and Rs. 1.19 from groundnut production, respectively. Per quintal cost of groundnut production was higher as Rs.3668.35 in case of SB-11 groundnut, while that was Rs. 2654.57 in case of TAG-24 groundnut. Perumal (2000) evaluated the production and marketing of groundnut in Trichirapalli district of Tamil Nadu. Rajput and Verma (2000) also made investigation on economic analysis of production of groundnut in Khargone district of Madhya Pradesh.

Ashwini Darekar(2017) found that market prices of groundnut in India would be ruling in the range of Rs.3,760 to Rs.5,520 per quintal in *kharif* harvesting season,

2017-18. The prices would be high in the state of Maharashtra (Rs.4,670), Tamil Nadu (Rs.4,550) and Karnataka (Rs.4,260). While in case of Andhra Pradesh and Karnataka the prices would be low i.e. Rs.4,310 and Rs.4,260 respectively.

Ratan Lal Solanki(2020) Average groundnut yield under front line demonstrations was observed as 1690 Kg ha-1 which was higher by 21.11% over the prevailing farmers practice (1394 Kg ha-1). Variety wise location specific recommendation appears to be necessary to minimize the technology gap for yield level in different situations.These finding of studies were in agreement with Singh *et al.,* (2014) Mahadik and Talathi, (2016) and Solanki *et al.,* (2020). Technology index value was 20.35 per cent in year 2016-17 and 10.70 per cent in 2017-18. On the basis of two years study, the overall technology index 15.53 per cent was recorded, whereas highest technology 20.35 per cent was recorded during 2016-17 and lowest (10.70%) during 2017-18. Hence, it can be inferred that awareness and adoption of improved varieties with the recommended scientific package of practices have increased during the advancement of the study period. The mean higher cost of cultivation Rs. 28700 ha-1 involved in FLDs as compared to Rs. 25900 ha-1 under farmers practice (Table 3). The FLDs plots fetched higher mean gross returns (Rs. 73351 ha-1) and net returns Rs. 44651 ha-1 with higher benefit: cost ratio 2.55 as compared to gross returns Rs. 60493.5 ha-1, net returns Rs. 34593.5 ha-1 and benefit: cost ratio 2.33 with farmers practice.

Laxmi N. Tirlapur (2013) agriculture in India is one of the most important sectors of its economy. Though, the share of Indian agriculture in the GDP has been steadily declining over the years. Main reason for deceleration in agricultural growth is declining investment in agriculture research and development and irrigation, inefficiency of rural credit and extension. One more the most important factor is; inefficient use of resources is the reason for declined growth of agriculture sector. So the present study was under taken in Dharwad district to analyse the resource use efficiency of major crops. Major crops grown in the district such as chickpea, cotton, paddy, soybean, maize and chilli were selected for the study. Multistage random sampling was adopted for selection of sample respondents. Cobb-Douglas production technique was employed. Results of the study revealed that seed,

fertilizers, PPC and machine labour were over utilized and human labour and bullock labour were underutilized by the chickpea farmers. Cobb-Douglas production function for cotton under rainfed condition revealed that seed, PPC, human labour and bullock labour were over utilized and FYM, fertilizer and machine labour were underutilized. During production of paddy seed, fertilizers, FYM, bullock labour and machine labour were over utilized and human labour and PPC were underutilized by the farmers. FYM and PPC were underutilized and seed, fertilizers, human labour, bullock labour and machine labour were underutilized by farmers in cultivation of soybean. Resource use efficiency under rainfed chilli production revealed that seed, PPC, bullock labour and machine labour were over utilized and FYM, fertilizer and human labour were under utilized by the farmers.

Pushpa (2017) the cost of production, cost of cultivation, returns and profitability from Sugarcane, Wheat and Paddy crops in order to identify which crop is more profitable and economic for the farmers of Uttar Pradesh. All the major crops viz., paddy, wheat and sugarcane were profitable for the farmers, but sugarcane was the most profitable crop when compared to the rest, because the per quintal cost of production as well as the per hectare return were more economic than wheat and paddy crops.

Design of the Study

Designing a suitable methodology and selection of analytical tools are important for meaningful analysis of any economic problem. Thandrampattu block of Tiruvannamalai district is selected based on purposive sampling method (non-probability) for the present study since Agricultural College and Research Institute, Vazhavachannur is located in this block. Based on the discussion with extension officials the following villages were considered for the study viz., Valavachanur, Perunduraipattu, Vanapuram, Veppur, Tanipadi, Tandrampattu, Keelsirupakkam, Aandapattu. The sample of 30 farmers growing groundnut were selected at random from the Thandrampet, Veppur, Vanapuram villages as follows.

Table: 01 sample size of the respondent

Sl. No,	Crop	Nature of the crop	Sample size	Selected Villages
1	Groundnut	Oilseed	30	1. Thandrampet, 2. Veppur, 3. Thanipadi, 4. Vanapuram

Source: First-hand information.

Groundnut occupies 97.6 percent of total area of Oil seed crops in Tiruvannamalai district. Secondary data were collected from the Department of Economics and Statistics which is used as the base for selection of crops for the study. Primary data for the study is collected by face to face survey method from 30 farmers using pre-prepared interview schedule. The study was undertaken from August 2020 to March 2021.

Tools of Analysis:

The choice of the statistical tool of analysis was decided with reference to the objectives of the study and the nature of the data collected. The collected data were tabulated, analyzed for drawing meaningful inferences. Average and percentage analyses were used to examine the nature of production, income and expenditure for crop production, labour hours used for different crop production activities, materials used; machine hours used by farmers in each crop production.

Regression Analysis

In this study, regression analysis was employed to measure the influence of selected explanatory variables on independent variables.

Factors influencing the yield of the Groundnut:

There are numerous factors, determining the yield of Groundnut in the sample households. The major independent variable influencing yield of Groundnut are irrigation, labor hours for inter cultural operation, quantity of seed in kg, quantity of FYM in kg, quantity of chemicals in lit, land holding size in acre, quantity of fertilizer in kg, . Hence, a linear type of production function was fitted to the data separately for Groundnut.

Groundnut

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + e_t$$

Where,

Y = Yield of Groundnut in kg

X_1 = Labor hours for Inter cultural Operation

X_2 = Quantity of FYM in Kg

X_3 = Land holding size in acre

a = Constant

e_t = Disturbance terms

b_1, b_2 and b_3 are Regression Coefficient

Garette's Ranking

To study the problems faced by farmer at farmers market and factors that attract the consumers to farmer market Garette's ranking technique was used. The order of merit assigned by the respondents were converted into ranks by using the following formula.

$$\text{Per cent position} = \frac{(Rij - 0.5)\ 100}{Nj}$$

Where,

R_{ij} = Rank given for i_{th} factor by j_{th} individual

Nj = Number of factors ranked by j_{th} individuals

By using Garette's score table the percent positions of each rank was converted into scores.[1] Then, for each factor, the score of individual despondence were added together and divided by the total number of respondents for whom scores were added. The mean scores of all the factors were arranged in descending order and ranks were given. The factor having the highest mean value was considered to be the most important.

Result and Discussion

General Characters of Sample farm Households

Table: 02 Family Type of the sample households

Sl. No,	Family Type	Number of Households	% to Total
1	Joint family	10	33.33
2	Nuclear Family	20	66.67
3	Total	30	100.00

It is observed from the table 02 that about 33 per cent of family live together as joint family. In the joint family system availability of family labor is more and they

[1] Henry E. Garette, "Statistics in Psychology and Education (Bombay: Vakils, Feffer and Simons private limited, Eighth Indian print, 1973), pp. 328 -330.

share the farm works. The remaining 67 per cent of the family follow the nuclear type family systems.

Table: 03 Land holding pattern of the sample households

SL. No.	Particulars	Area in ac	% to total
1	Area owned in ac	85.23	95.20
2	Area leased in	4.30	4.80
3	Total area	89.53	100.00
4	Average size of holding	2.84	--

Land holding pattern of Groundnut growing farmers is presented in table 03. The sample farmers owned about 85.23 acre of land with average size of holding of 2.84 acre. Area leased in is about 4.80 per cent of the total area under cultivation.

Cropping pattern

Table: 04 Cropping pattern of the sample households

SL. No.	Particulars	Area in ac	% to total
1	Area under groundnut	48.38	54.04
2	Area under other crop	41.15	45.96
3	Total area under crop	89.53	100.00
4	Irrigated area under groundnut	47.00	--

Cropping pattern of groundnut growing farmers is presented in table 04. The Total under crop is 72.43 acre of which area under groundnut is 52.09 per cent while area under other crop occupies 47.91 per cent. Irrigated area under groundnut is 36.48 acre.

Varieties wise area under groundnut

Table: 05 Varieties wise area under groundnut

Sl. No	Crop	Sl. No	Variety	Area in Acre	Percent to total
3	Groundnut	1	Traditional	23.33	48.22
		2	JLR	2.75	5.68
		3	TMV7	15.00	31.00
		4	TMV13	7.30	15.09
		5	Total	48.38	100.00

Varieties wise area under groundnut is presented in table 05. Traditional variety of groundnut occupies 48.22 percent of total area under groundnut followed by TMV7 with 31.00 per cent of total area under groundnut, TMV13 with 15.09 per cent of total area under groundnut and JLR occupies 5.68 per cent of total area under groundnut.

Cost of cultivation of groundnut

Table: 06 Cost of cultivation of groundnut in the sample households (Rs./ac)

Sl. No.	Particulars	Amount (Rs./ac)	% to total
1	Seed	4568.56	27.91
2	FYM	1576.28	9.63
3	Urea	199.57	1.22
4	DAP	1262.40	7.71
5	MOP	527.00	3.22
6	Complex	470.06	2.87

7	Gypsum	245.90	1.50
8	Growth regulators	0.00	0.00
9	Herbicides	0.00	0.00
10	Fungicides	873.28	5.33
11	Insecticides	864.78	5.28
12	Combine harvester	1400.00	8.55
13	Rotavator	1069.97	6.54
14	Bund former	0.00	0.00
15	Earthling up	0.00	0.00
16	Transplanting	0.00	0.00
17	Weeding	1450.19	8.86
18	Harvesting	870.61	5.32
19	Transport	204.01	1.25
20	Packaging	789.07	4.82
21	Total cost	16371.68	100.00

Cost of cultivation of groundnut in the sample households is furnished in the table06. Total cost of cultivation for groundnut is Rs.16371.68/acre of which seed constitutes 27.91 per cent of total cost of cultivation followed by FYM with 9.63 per cent, weeding with 8.86 per cent, bund former with 8.55 per cent, DAP with 7.71 per cent, rotavator with 6.54 per cent, fungicides with 5.33 per cent, harvesting with 5.32per cent, insecticides with 5.28 per cent, packaging with 4.82 per cent, MOP with 3.22 per cent, complex with 2.87 per cent, gypsum with 1.50 per cent, transport with 1.25 per cent and urea with 1.22 per cent of total cost of cultivation.

Income parameters of groundnut

Table: 07 Income parameters of groundnut in the sample households (Rs./ac)

Sl. No.	Particulars	Amount (Rs./ac)	% to Gross Income
1	Total cost (Rs./ac)	16371.68	30.32
2	Yield (kg/ac)	900.00	--
3	Price (Rs./kg)	60.00	--
4	Gross income (Rs./ac)	54000.00	100.00
5	Net income (Rs./ac)	37628.32	69.68
6	BCR	3.30	--

Income parameters of groundnut in the sample households is presented in the table07. Average yield of groundnut is 900 kg/ac and the price is Rs.60/kg. Gross income from groundnut is Rs.54000/ac of which total cost constitutes 30.32 per cent and net return occupies 69.68 per cent. Benefit Cost Ratio (BCR) of groundnut cultivation is 3.30. Accept the groundnut cultivation since the Benefit Cost Ratio of groundnut cultivation is greater than one.

Place of sale

Table: 08 Place of sale by groundnut growing famers

Sl. No.	Place of Sale	Number of Farmers	% to total
1	Local Traders	4.00	13.33
2	Direct Procurement Centre	0.00	0.00
3	Aggregators	0.00	0.00
4	Regulated Market	20.00	66.67
5	Wholesale Market	0.00	0.00
6	Cooperatives	0.00	0.00
7	Mill Owners	6.00	20.00

8	Total Number of Farmers	30.00	100.00

Place of sale by groundnut growing famers are presented in table08. The marketing place taken into consideration are local traders, Direct Procurement Centre, aggregators, regulated market, cooperatives, and mill owners. There are about 66.67 per cent of groundnut farmers preferred to sell their produce at Regulated Market. The Mill Owners were preferred by 20.00 pec cent of total farmers and the Local Traders were preferred by 13.33 pec cent of total farmers to sell their produce.

Resource use Efficiency

Human labor hour usage pattern

Table: 9 Human labor hours usage pattern in groundnut growing sample households

Sl. No.	Particulars	Hours	% to total
1	Sowing & transplanting	45.58	18.70
2	FYM	3.80	1.56
3	Fertilizer	1.42	0.58
4	Chemicals	3.91	1.60
5	Inter cultural operation	189.05	77.56
6	Total men hours	243.76	100.00

Human labor hour usage pattern in the groundnut growing sample households is presented in the table9. The human labors were evaluated for different farm operations such as sowing and transplanting, FYM, fertilizer, chemicals, intercultural operations. Total human labor hours in groundnut cultivation is 224.40/ac. Inter cultural operation constitutes 77.56 per cent of the total human labor hours followed

by sowing & transplanting, chemicals, FYM and fertilizer constitutes 18.70 per cent, 1.60 per cent, 1.56 per cent and 0.58 per cent respectively.

Material usage patterns

Table: 10 Material usage patterns in the groundnut growing sample households

Sl. No.	Particulars	Quantity	% to Total
1	Seed (Kg/ac)	40.22	3.00
2	FYM (Kg/ac)	717.24	53.49
3	Fertilizer (Kg/ac)	111.51	8.32
4	Chemicals (ml/gm/ac)	471.93	35.20
	Total Material	1340.90	100.00

Material usage patterns in the groundnut growing sample households is presented table10. FYM occupies 53.49 per cent of total material usage followed by chemicals, fertilizer and seed constitutes 35.20 per cent, 8.32 per cent and 3.00 per cent of total material usage respectively.

Machine usage patterns

Table: 11 Machine hour usage patterns in the groundnut growing sample households

Sl. No.	Particulars	Hours	% to total
1	Harvester	0.03	2.59
2	Rotavator	1.13	97.41
3	Bund Former	0.00	0.00
4	Total machine hours	1.16	100.00

Machine usage patterns in the groundnut growing sample households is presented table11. Rotavator constitutes 97.41 per cent of total machine hours followed by harvester occupy 2.59 per cent of total machine hours.

Table: 12 Estimates of regression model for factors influencing the yield of groundnut

Sl. No.	Variables	Notation	Mean	Co-efficient	t Stat
1	Yield of groundnut in Kg	Y	2007.33	-	-
2	Labor hours for inter cultural operation	X_1	304.87	3.12 ***	3.61
3	Quantity of FYM in Kg	X_2	1156.67	0.42 *	1.92
4	Land holding size in acre	X_3	2.84	174.77 **	2.28

Estimates of regression model for factors influencing the yield of groundnut are furnished table12. Yield of groundnut is dependent variable. Labor hours for inter cultural operation, quantity of FYM and land holding size are the independent variables. Co-efficient of multiple regression is 0.69 which implies that 69 per cent of variation in dependent variables explained by the selected independent variables. Labor hours for inter cultural operation is significant at one percent level. Land holding size is significant at five percent level. Quantity of FYM is significant at ten percent level.

Intercept	:	76.93
Co-efficient of multiple regression (R^2)	:	0.69
F- Value	:	19.07
Number of observation	:	30.00
Significant at one percent level	:	***
Significant at five percent level	:	**
Significant at ten percent level	:	*

$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + e$

$Y = 76.93 + 3.12 ***X_1 + 0.42 *X_2 + 174.77 **X_3 + e$

Conclusions

Average size of holding of 2.84 acre. Total cost of cultivation for groundnut is Rs.16371.68/acre. Gross income from groundnut is Rs.54000/ac. Benefit Cost Ratio

(BCR) of groundnut cultivation is 3.30. Farmers sell the produce at regulated market, mill owners and local traders. The human labors were used for sowing and transplanting, FYM, fertilizer, chemicals, intercultural operations. FYM, chemicals, fertilizer and seed are the major material used in crop production. Harvester, rotavator and bund former are the machine used for crop production. About 69 per cent of variation in dependent variables explained by the selected independent variables such as labor hours for inter cultural operation, land holding size and quantity of FYM.

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