ECONOMIC ANALYSIS OF SUGARCANE CULTIVATION IN SULTANPUR DISTRICT OF EASTERN UTTAR PRADESH

THESIS

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BY

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2020

AGRICULTURAL ECONOMICS

DEDICATED

To My

Beloved Parents,

Avinash Mishra....

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CERTIFICATE - I

This is to certify that the thesis entitled **"Economic analysis of Sugarcane cultivation in Sultanpur district of eastern Uttar Pradesh."** submitted for the degree of **"Master of Science (Agriculture)"** in subject of **"Agricultural Economics"** of the Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya is a bona-fide research work carried out by **Mr. Avinash Mishra**, **Id. No.; A-10548/18** under my supervision and that no part of this thesis has been submitted for any other degree.

The assistance and help received during the course of investigation have been duly acknowledged.

Place: Kumarganj, Ayodhya
Date: , 2020

(**R. R. Kushwaha**)
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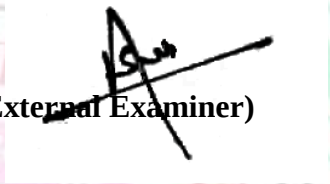
CERTIFICATE-II

This is to certify that the thesis entitled **"Economic analysis of Sugarcane cultivation in Sultanpur district of eastern Uttar Pradesh".** Submitted by **Mr. Avinash Mishra, Id. No.; A-10548/18,** to the Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.), in partial fulfillment of the requirements for the degree of "**Master of Science (Agriculture)"** in subject of "**Agricultural Economics"** has been evaluated satisfactory and approved by the **Student's Advisory Committee** after an oral examination on the same in collaboration with an External Examiner.



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"The pen is the tongue of mind, gratitude is the hearts memory"

Place: *Kumarganj, Ayodhya* ***(AVINASH MISHRA)***

July, 2020

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INTRODUCTION

Sugarcane (*Saccharum officinarum* L.) belongs to family gramineae and originated to tropical south Asia and south east- Asia. Sugarcane is a renewable, natural agriculture resource because it provides sugar besides biofuel, fibre, fertilizer and myriad of by-products with ecological sustainability. Sugarcane juice is used for making white sugar, brown sugar (Khandhasari), jaggery (Gur) and ethanol.

Sugarcane is an important cash crop grown in India. Sugarcane cultivation and development of sugar industry runs parallel to the growth of human civilization and is as old as agriculture. The importance and use of sugarcane and sugar in the country's socio-economic milieu is deep rooted and immense. In the current day rural economy set up sugarcane cultivation and sugar industry has been focal point for socio-economic development in rural areas by mobilizing rural resources generating employment and higher income, transport and communication facilities. About 7 million sugarcane farmers and large number of agricultural labourers are involved in sugarcane cultivation and ancillary activities. Apart from this the sugar industry provides employment to 5 Lakh skilled and semiskilled workers in rural area. ***"Statistical yearbook"; Food and Agricultural Organization, 2015.***

Sugarcane is grown in diversified climatic conditions. India is one of the largest sugarcane producers in the world, producing around 300 million tonnes of cane per annum. Production of sugar is the second largest agro processing industry in the country after cotton and textiles. In India, about more than 50 million farmers, their dependent and a large number of agricultural labourers are involved in sugarcane cultivation, harvesting and ancillary activities constituting 7.5 per cent of the rural population and many workers are employed indirectly in processing. Molasses is the chief by-product of sugar industry and is the main raw material for alcohol production and alcohol-based industries in India. ***(Anonymous 2015)***

Nearly 1877.10 million tonnes of sugarcane was produced in the harvesting year 2017-18 worldwide. With the production of over 739.27 million tonnes in 2017-18, Brazil was the leader in Sugarcane production followed by India (341.20 million tonnes) and

China (125.54 million tonnes). **(Food and Agriculture Organization Corporate Statistical Database, 2018)**

Production of sugarcane was 341.20 million tonnes in the year 2017-2018 with Uttar Pradesh being the highest producer (162.34 million tonnes) followed by Maharashtra (72.64 million tonnes) and Karnataka (29.92 million tonnes). The area under sugarcane cultivation is around 5.06 million hectare with an average yield of 67.43 tonnes/ha. Uttar Pradesh had the highest area under sugarcane cultivation in 2017-2018 (2.24 million hectare). Kerala has the highest productivity of 116.2 tonnes/ha. **(Food and Agriculture Organization Corporate Statistical Database, 2018)**

Sugarcane Production in India:

The information regarding the area, production and productivity of Sugarcane cultivation in India shows that the highest area under sugarcane cultivation in India was 50.66 lakh hectares in the year 2014-15 and the lowest area under cultivation was 41.7 lakh hectares in the year 2009-10. The highest production of sugarcane was in the year 2018-19 i.e. 4003.69 lakh tonnes and the lowest production was in the year 2009-10 i.e. 2923 lakh tonnes. The maximum yield was obtained in the year 2018-19 which was 75.5 tonnes/ha and the minimum yield was in the year 2012-13 which was 68.25 tonnes/ha. (**Department of Food & Public Distribution (for Sugar Production) and Agricultural Statistics (for production and area of Sugarcane). 3rd Advance Estimate Agricultural Statistics Division, June, 2019)**

Sugarcane Production in Uttar Pradesh:

The information regarding the area, production and productivity of Sugarcane cultivation in Uttar Pradesh shows that the highest area under sugarcane cultivation in Uttar Pradesh was 23.40 lakh hectares in the year 2018-19 and the lowest area under cultivation was 19.77 lakh hectares in the year 2009-10. The highest production of sugarcane was in the year 2018-19 i.e. 1753.5 lakh tonnes and the lowest production was in the year 2009-10 i.e. 1171.4 lakh tonnes. The maximum yield was obtained in the year 2018-19 which was 74.93 tonnes/ha and the minimum yield was in the year 2010-11 which was 56.73 tonnes/ha. **(Department of Agricultural and Farmers Welfare. 3rd Advance Estimates for Sugar Season 2017-18. March 2018, Vol.49, No.7.)**

Sugarcane Production in Sultanpur District of Eastern Uttar Pradesh:

The information regarding the area, production and productivity of Sugarcane cultivation in Sultanpur district of eastern Uttar Pradesh was recorded as 0.108 lakh hectares in the year 2013-14 and the lowest area under cultivation was 0.056 lakh hectares in the year 2009-10. The highest production of sugarcane was in the year 2018-19 i.e. 7.16 lakh tonnes and the lowest production was in the year 2009-10 i.e. 2.84 lakh tonnes. The maximum yield was obtained in the year 2018-19 which was 72.32 tonnes/ha and the minimum yield was in the year 2010-11 which was 43.97 tonnes/ha. **(*District Sugarcane Office*, Sultanpur District, 2019)**

Sugarcane is one of the main sources of income and employment of the farmers in the study area. It is only cash crop grown by the farmers which provides sufficient income and employment to growers of study area. Many thesis on economics of sugarcane cultivation were done in the department of Agricultural Economics, keeping in view the above mentioned facts, the present study entitled **"Economic analysis of sugarcane cultivation in Sultanpur district of eastern Uttar Pradesh**" was undertaken with the following main objectives:

i) To study the farm structure, cropping pattern and cropping intensity of sample farms.

ii) To work out the cost of cultivation and input-output relationship in production of sugarcane crop.

iii) To estimate the resource use efficiency in sugarcane cultivation and

iv) To find out the problems in the production of sugarcane and to suggest suitable measures to overcome them.

Chapter 2
Review of Literature

REVIEW OF LITERATURE

Lahoti *et al.* (2010) showed that the constraints experienced by most farmers were irregular supply of electricity, high cost of pesticides, inadequacy of irrigation water at required time, non-availability of labour for intercultural operations, high value of fertilizer, non- availability of good quality manure and lack of information about spraying insecticides and pesticides.

Singh *et al.* (2010) revealed that the average production of sugarcane on the sample farms came to 601 qt. per hectare, ranging from 253.3 qt. per hectare on small size farms to 1442.9 qt. per hectare on large size farms. They also observed that, on an average, 56.78 per cent production of planted and 43.22 per cent ratoon sugarcane. The total production of sugarcane including the production of ratoon crop showed an increasing trend with the increase in size of farms both in absolute and percentage terms whereas it showed reverse trend in case of production of planted crop only due to more area of sugarcane on larger farms than that of smaller ones.

Ramarao (2012) revealed that the total cost of cultivation of sugarcane was the highest in irrigated conditions (₹1,47,454/ha), followed by rain-fed (₹90,939/ha) and was least in ratoon irrigated crop (₹81,106/ha). Out of the total operational cost, under plant irrigated conditions, 76 per cent (₹72,569) was incurred on labour charges and 24 per cent (₹22,917) was on materials, whereas under rainfed condition 65 per cent (₹11, 733) was incurred on labour charges and 35 per cent (₹6,318) on materials. This shows the labour intensive nature of sugarcane under irrigated as well as rainfed conditions. It also revealed the importance of labour in sugarcane cultivation.

Devi and Chahal (2013) revealed that unaware of new technology, unavailability of labour and high rate of wages, insufficient source of irrigation and higher interest rate along with inadequate credit availability were major technological, socio economics, infrastructure, financial and marketing problems constraints faced by the farmers. The low sugar recovery, shortage of sugar supply, inability to pay were important problems faced during the processing of sugar which leads to non- viability of the sugar mills.

Keshavaiah *et al.* (2013) revealed that Co 62175 variety of sugarcane recorded higher cane yield (149.4t/ha), gross (₹164834/ha) and net income (₹77044/ha) and B:C ratio (1.88) over Co 86032 variety. Among the nutrient management practices, N7 recorded significantly higher gross income (₹192870/ha) but the net income (₹105543/ha) and B:C (2.28) were higher with when 50% of organic and 50% of inorganic component of nutrient were blended and applied indicating a balance of organic and inorganic nutrient is the right way of supplementing nutrients to sugarcane crop.

Phule *et al.* (2013) reported that economics of sugarcane cultivation is major concern for the sugarcane cultivator as well as sugar factories. Present research article highlighted cultivation cost and income form sugarcane cultivation of Malshiras tahsil. The major aim of this research article is to find the sugarcane cultivation cost and income of the different zones in the Malshiras tahsil. The data for calculating the cultivation cost is collected by survey through personal interviews and field visits within the Malshiras tahsil. It is interesting to find the, cultivation cost of sugarcane is high in the south zone vis-a-vis income and profit is also higher in this zone. The reasons behind this are quality of soil, adequate facilities of irrigation and adaptation of modern agriculture tools and techniques. However it is also suggested that, north zone also have potential for increasing the sugarcane production after development better irrigation facilities as well as training to the sugarcane cultivator.

Shrikala (2013) studied socio-economic characteristics in Nellore district, Andhra Pradesh and she observed that average size of the family was 6.36, 4.97 and 5.65 members in the case of small, large and combined farms indicating inverse relationship with the size of the holding. The participation family members in farming were confined to small farms only. The average size of the holding for the sample as a whole was 2.50 hectares with 67.20 per cent of total area under sugarcane. Obviously, the average size of land holding of large farmers (4.04 ha) was higher than that of small farmers (0.97 ha). The area under sugarcane was 0.81 ha (83.50 %) and 2.55 ha (63.11%) on small and large farms, respectively.

Singh (2013) studied that to analyse the economics of sugarcane based farming system that was sugarcane cultivation by all the category of farmers, cost benefit ratio from sugarcane cultivation major products of sugarcane and their economy etc. this study has been done for UP and four districts been selected for a parallel study but the detail study has been done in Bulandshahar district through primary observation.

Haider *et al.* (2014) revealed that the farmers in all categories belong to below 30 year age group and very intense to grow sugarcane in their fields Farmers were educated mostly up to high school. Majority of the farmers in all categories belong to joint family system. Farmers according to their size of land holding belonged to small category. Maximum numbers of agriculture implements were found in large and medium farmers. The subsidiary and causal occupational pattern of marginal and small farmer are agriculture labour, while medium and large farmers engaged in business activities as a subsidiary and casual occupation. This study will help to transfer of technologies in sugarcane crop on the production, productivity, marketing and socioeconomic status of sugarcane farmers.

Kumar *et al.* (2014) revealed that, the per hectare cost of sugarcane (planted) production was ₹89712.33. Net returns were ₹16914.66 per hectare. The per quintal cost of sugarcane production was ₹160.9 1. They also observed that Cost of ratoon sugarcane production was ₹78668.60 per hectare with net return s of ₹85 741 .30 per hectare. The per quintal cost of sugarcane production was ₹98.00. The input-output ratio of planted sugarcane production was 1.18 and 2.08 in ratoon sugarcane.

Prakash and Muniyandi (2014) concluded that cost of the sale and harvesting of sugarcane was high, the total cost of production was also very high. In order to reduce the cost of production, the farmers in the area may go for mechanical harvesting. The government may ensure fair price for the cane farmer in order to have wider difference between cost of production and gross return there by, higher return obtain.

Shivanaikar *et al.* (2014) reported that Indian agro-climatic conditions are favourable for the production of sugarcane. Sugarcane plays a pivotal role in the agro-industrial economy of India. The present study was undertaken with objective of assessing cost and return involved in organic and inorganic sugarcane cultivation in Bagalkot district of Karnataka. Multistage sampling design was used for drawing sample and tabular

analysis was employed to analysis collected data. The returns showed that, the per acre cost of sugarcane cultivation on organic farms (₹45974.50) was less when compared to that on inorganic farms (₹54331.82). This marginal difference was due to the higher cost incurred on chemical fertilizers, cost on more quantity of sets used as less spacing and more human labour used by inorganic sugarcane farmers. The return structure in sugarcane clearly revealed that the per acre gross return was higher (₹82328) on organic farms compared to that of inorganic farms (₹81360) with a positive net return on both the categories of the farms. The net return on organic farm was ₹36353.90 and was ₹27028.18 on inorganic farms. The B:C ratio was also higher on organic farms (1.79) compared to inorganic farms (1.50). Hence, cultivation of sugarcane in organic is better compared inorganic and it will improve soil health and farmers income.

Teshukumar *et al.* (2014) revealed that, the per hectare cost of sugarcane (planted) production was ₹89712.33. Net returns were ₹16914.66 per hectare. The per quintal cost of sugarcane production was ₹160.9 1.They also observed that, cost of ratoon sugarcane production was ₹78668.60 per hectare with net return s of ₹8574.30 per hectare. The per quintal cost of sugarcane production was ₹98.00. The input-output ratio of planted sugarcane production was 1.18 and 2.08 in ratoon sugarcane.

Waghmode *et al. (*2014) revealed that in regards to processing unit of sugarcane that production per annum worked out to be ₹16667.5 lakh of this share of variable and fixed cost estimate at 82.63 and 14.81%. Break-even volume was worked out to be 24.75 lakh tonnes. The % of break-even volume of installed capacity and actual quantities of sugarcane crushed was estimated at 170.68 and 247.25 per cent, respectively. The capital investment of distillery was worked out to be ₹2901.6 lakh. Net returns realize by distillery in year 2011-2012 estimated was 59.31 lakh, the input – output ratio for the year estimated was 1.10.

Krishnkant *et al*. (2015) revealed that the cost of sugarcane cultivation planted was ₹172679, in which share of operational cost, land rent and material cost was 38, 22 and 26 per cent respectively. The ratoon sugarcane was to be ₹129752.65 with share of operational cost and marginal cost 41.29 and 14 per cent, respectively.

Patil (2015) revealed that the highest share of cost of sugarcane cultivation goes towards manure (26.67 %) followed by fertilizers and pesticides (14 .34%), winnowing charges (10.18%) and cost of seeds (10.06%). The per acre cost of sugarcane cultivation was ₹79500. The per acre gross income received by sugarcane producer was ₹97000 with net profit of ₹17500.

Saravanan and Parvathi (2015) showed that out of 175 farmers the majority belongs to neutral family and had a small family income of ₹15000-30000. Their education was of secondary level. The study also show that majority of sugarcane farmer apply low level of modern technology in cultivation. The study emphasised on continuous research in understanding the different constraints that sugarcane production.

Saravanan (2016) found that average cost spend on seed was 14.40% of the total. 5.32% of the cost was spend on family labour, 64.96% on hired labour, 5.67% on machinery, 6.04% on chemical fertilizer and 3.61% on pesticides. The net return estimated in the study was ₹26424/acre. The study generalised on optimum farm for the area falls in the category of 5-7.5 acre.

Saravanakumar and Balasubramanian (2016) showed that sugarcane cultivation is more profitable under SSI method than under the conventional method. The study also indicated that farmers with higher education level and experience are the major determinant for adopting SSI. The study also suggested that to improve production profitability of sugarcane provision of drip irrigation, timely availability of critical input and periodical training of farmers on SSI method is very important.

Amala and Rajagopal (2017) said that area under sugarcane cultivation is decreasing day by day and at this movement there is no scope to increase sugarcane area in plain land. But there is a scope to increase sugarcane cultivation in the char lands, saline belt and hilly areas. Cultivation of sugarcane on fallow char lands is gaining popularity as the farmers are getting financial benefits through its cultivation. The shares of cost of major inputs for sugarcane production in the mills zones are seed (11.44%), fertilizer (12.58%), pesticides (3.40%) and irrigation (1.90%) and transportation for cane supply to mills (8.79%).

Pal *et al.* (2017) studied that majority 75.00% marginal 73.68% small and 67.74% medium farmers adopted agriculture as a main occupation. The Maximum sugarcane growers belonged to backward caste i.e. 58.06% medium, 58.03% marginal and 52% small farmers The Most of the 56.00% respondents owned marginal (up to 1 ha) size of holding followed by 2.50 and 15.50% respondents were having small and medium size of land holdings, respectively. The Most of the farmers i.e. 77.19% small, 74.19% medium and 37.50% marginal farmers belonged to medium income group. The Most of 43.00%sugarcane grower were using canal, 32.00% canal + private tube-well /pump set as a source of irrigation. The Majority of 56.50% farmers' sugarcane growers belonged to medium productively level where as 26.50% belonged to low Productivity level and 17.00% belonged to high productivity level.

Jaiswal *et al*. (2017) envisaged that among the different irrigation method, drip method has the highest % at large form and found to be in 78.70% area. Drip irrigation was not popular among marginal and small famers. The cropping intensity was also high ranging from 105 to 267%. The inputs used in fresh shown sugarcane and ratoon crops were not adequate. The cost of cultivation of crop under flood ratoon was ₹93728/ha, sprinkler ₹97973/ha and drip ₹93568/ha were as, fresh shown sugarcane under flood was₹126188/ha, sprinkler ₹133957/ha and drip ₹136043/ha respectively.

Patil *et al.* (2017) revealed that the cropping intensity was 181.92% at overall level. The higher cropping intensity was observed in large type of land holding. The per hectare cost of production (Cost C_2) of sugarcane for overall level was ₹92949.02 and average per hectare gross return was ₹148101.01. The input output ratio on an overall basis was 1.59. The average cost of production per tonne for sugarcane was ₹ 1172.25.

Samantaray *et al.* (2017) showed that the contracted growers had major constraints in planning, procurement and payment followed by credit and finance, infrastructure, fertilizers and chemicals as well as technological support. It was discovered that the farmers did not have much constraint in supply of seed cane and other management practices. No written agreement, produce not lifted in time, no attempt for farm mechanization and irrigation facilities, harassment in payment, no community organization and cluster approach, no transparency in measurement, inadequate training, no subsidy facilities and insurance coverage were the major constraints of the growers

which should be considered by the contracting firms for the sustainability of contract farming in sugarcane cultivation.

Upreti and Singh (2017) found the positive and significant contribution of human labour, machines, fertilizers, insecticides and size of plots towards productivity of sugarcane and thus efficient management of these inputs can certainly led to increasing the productivity of sugarcane in India.

Ahmad *et al.* (2018) found that area under sugarcane was stable in states like Uttar Pradesh, Uttarakhand and Gujarat on the other hand the yield of sugarcane was stable in states of Uttar Pradesh, Uttarakhand and Tamil Nadu. Technical efficiency at national level in sugarcane production was found to be 66% which indicated that the production of crop may further be raised by 34% with the available technology.

Rama (2018) agriculture is the major economic activity in Erode district providing employment to 59.68% of the work force. Nearly 3.09 lakh hectares of land accounting for 38% of the total land has been brought under cultivation. Sugarcane is a commercial crop and 309252 hectares area is under cultivation in Erode district. At present there has been a decline in the cultivation of the crop due to varied reasons like lower procurement price, cost of cultivation, non-availability of finance, delay in payment by the sugar factories, rise in price of other crops etc. Against this background an attempt is made to study the problems of the farmers both in production and marketing. The respondents were asked to rank the problems involved in the production and marketing of sugarcane.

Singh *et al.* (2018) showed that planting materials (seeds), tractor cost and plant protection chemical uses have a positive and significant influence on sugarcane yield, indicating that these resources are being used at sub-optimal levels and there exists the possibility of enhancing the yield of sugarcane by increasing their use. Labour shortage during peak period (81.50) average score in garret's ranking has been reported the major production constraints by the sugarcane growers. The general observation from the farmer's perception in the area is that in spite of the fact that the central and state Government price incentives have provided them a relief to some extent the mechanism evolved for fixing minimum price does not cover the entire cost components and the risk factors involved in the sugarcane cultivation.

Karpagam *et al*. (2019) revealed that majority (91.7%) of the respondent have more than 5 years of experience. Major constraints faced by cent- percent of the respondents were – non availability of labour, high cost of labour, yield reduction due to continuous cultivation, pro-longed drought, water scarcity, low procuring cost given by sugar factories.

Kumar *et al.* (2019) said that India is contributing 20.73% area and 19.97% in production in the world sugarcane statistics. In India sugarcane is an important cash crop in agriculture sector which share 7% of the total value of agricultural output and occupies only 2.5% of country's gross cropped area. The highest growth rate was registered for Maharashtra (11.17%) followed by Karnataka (9.51%), Haryana (8.70%) and Uttar Pradesh (4.49%). In terms of cost there was increase in ₹5261/ha/year in Maharashtra followed by Karnataka (₹3778/ha/year), Haryana (₹3657/ha/year) and Uttar Pradesh (₹11248/ha/year). In case value of sugarcane there was 8.38% growth in Haryana followed by Karnataka 5.84% and 4.74% in Maharashtra per year.

Chapter 3
Methodology

METHODOLOGY

This chapter deals with the methodology of the study. The methods of data collection and techniques used for analysis are the major parts of methodology. Its conceptual description is clearly mentioned below:

3.1 Sampling design:

Purposive cum random sampling design was used for the selection of district, tehsil, block, villages and respondents.

3.1.1 Selection of the district:

Keeping in view the limitation of resources and time of the investigator district Sultanpur of eastern Uttar Pradesh was selected purposively.

3.1.2 Selection of tehsil:

A list of all the 5 tehsil in Sultanpur district was arranged in ascending order according to number of sugarcane cultivators in the region and one block namely Sadar tehsil was selected purposively from the bottom.

3.1.3 Selection of block:

All the 13 blocks of Sadar tehsil were again arranged in ascending order according to number of sugarcane cultivators in the region and one block namely Kurebhar was selected purposively from the bottom.

3.1.4 Selection of villages:

A list of all 165 villages of selected block was prepared separately along with their area under sugarcane cultivation and five villages namely Mahilo Ashapur, Murlikapurwa, Vitthalpur, Mahmoodpur and Pratappur were selected randomly.

3.1.5 Selection of farmers:

A separate list of farmers growing sugarcane of selected villages was prepared along with their holding size. Based on size of holding, farmers were classified into three group i.e.

1. Marginal farmer (below 1 ha)
2. Small farmer (1-2 ha), and
3. Medium farmer (2-4ha & above)

Finally, 100 respondents were selected randomly through proportionate allocation to the population.

3.1.6 Period of Study:

The data was collected for the agricultural year 2019-20.

Table 3.1.6 (a): Village wise total farmers and selected farmers under different size group of farms:

		Size of Holding							
S. No.	**Name of Village**	**Marginal (below 1 ha)**		**Small (1-2 ha)**		**Medium (2-4 ha)**		**Total**	
		P	**S**	**P**	**S**	**P**	**S**	**P**	**S**
1.	**Mahilo Ashapur**	52	8	24	4	23	4	99	16
2.	**Murli ka Purwa**	74	12	36	6	17	3	127	21
3.	**Vitthalpur**	50	8	32	5	24	4	106	17
4.	**Mahmoodpur**	111	18	43	7	13	2	167	27
5.	**Pratappur**	86	14	20	3	13	2	119	19
	Total	373	60	155	25	90	15	618	100

where, P= Population, S= Sample

Table- 3.1.6 (b) Village wise selected farmers under different size groups

Sl.No.	Unit	Particulars	Design
1	**District**	**Sultanpur**	**Purposive**
2	**Tehsil (05)** **Sample Tehsil (01)**	Sadar, Kadipur, Lambhua, Baldirai and Jaisinghpur **Sadar**	**Purposive**
3	**Block (13)** **Sample Block (01)**	Akhand Nagar, Bhadayeea, Dhanpatganj, Dostpur, Dubepur, Jaisinghpur, Kadipur, Kurebhar, Kurwar, Lambhua, Motigarpur, PratappurKamaicha **Kurebhar**	**Purposive**
4	**Villages (165)** **Sample Villages (05)**	Kurebhar (165) Mahilo Ashapur (1), Murli ka Purwa (2), Vitthalpur (3), Mahmoodpur (4), Pratappur (5)	**Randomly**

5	**Respondents**	**Farmer's Category (land size based)**	**1**		**2**		**3**		**4**		**5**		**Total**		**Proportionate random sampling technique**
			P	**S**	**P**	**S**	**P**	**S**	**P**	**S**	**P**	**S**	**P**	**S**	
		Marginal	52	8	74	12	50	8	111	18	86	14	373	60	
		Small	24	4	36	6	32	5	43	7	20	3	155	25	
		Medium	23	4	17	3	24	4	13	2	13	2	90	15	
		Total	99	16	127	21	106	17	167	27	119	19	618	100	

where, P= Population, S= Sample

3.2 Method of enquiry:

The primary data were collected by survey method through personal interview on well-structured schedule, while secondary data were collected from books, journals, report and records of the district and block headquarters (Land acreage in Sultanpur district is four *bigha* per hectare).

3.3 Analytical Tools Used:

3.3.1 Analysis of data:

Both the tabular and functional analysis were used. Weighted average was worked out for interpretation of data with the help of following formula.

$$WA = \frac{\sum W_i X_i}{\sum W_i}$$

Where,

WA = Weighted Average

Xi = Variable

Wi = Weights of variable

3.3.2 Cropping intensity:

The intensity of cropping refers to the number of crops grown on a farm during the year with land as a fixed resource. It is calculated as:

$$C.I. = \frac{\text{Total Cropped Area}}{\text{Net Cultivated Area}} \times 100$$

Where,

C. I. = cropping intensity

3.3.3 Production function:

To study the resource use efficiency in sugarcane production, Cobb-Douglas production function was used. The mathematical form of Cobb Douglas production function is:

$$Y = aX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}\ldots\ldots\ldots\ldots X_n^{bn}e^{\mu}$$

Where,

Y = per hectare output (₹/ha)
X_1 = seed (₹/ha)
X_2 = Irrigation charge (₹/ha)
X_3 = Plant protection charges (₹/ha)
X_4 = Manure and fertilizers (₹/ha)
X_5 = Labour Cost (₹/ha)
b_i = Elasticity coefficient of the respective input variables
e = Error term or disturbance term
μ = Random variables

3.3.4 Cobb-Douglas Production function in log form:

Log Y = log a+b_1 log X_1+$b_2$log X_2+$b_3$log X_3+b_4 logX_4 +b_5 logX_5 …….b_n logX_n+ μlog e.

This form was used for estimating the parameters of the function based on sample data.

3.3.5 Estimation of Marginal Value Product:

The marginal value product of inputs was estimated by following formula:

$$MVP\ (X_j) = \frac{b_j \bar{Y}}{\bar{X}_j}$$

Where,

MVP = Marginal Value Product

b_j = Production elasticity with respect to X_j

$\bar{Y}$ = Geometric mean of the dependent variable (Y)

$\bar{X}_j$ = Geometric mean value of X_j independent variable

MVP_j = marginal value production j^{th} input

j = 1,2,3,4,5variables included in the study

3.3.6 Significance tests of the sample regression coefficients:

After estimating the elasticity coefficient, reliability of these estimates was worked out. The most commonly used "t" test was applied to ascertain whether the sample production elasticity coefficient, b_j is significantly different from zero or not at some specified probability level

$$'t' \text{ cal} = \frac{b_j}{\text{S.E. of } b_j}$$

If calculated 't' value was greater than table value of "t" at specified probability level at 'n-k-1' degree of freedom, b_j was statistically and significantly different from zero 'k' is number of independent factors and 'n' is sample size.

Farm efficiency:

To make efficient decisions on farm broadly two efficiency measures were considered; technical efficiency and financial efficiency. Financial efficiency measures will include:

Aggregate Measure:

It includes Gross Income, Net Income, Farm business income, Family labour income.

Ratio measures:

The probability of crop production cannot be justified completely unless benefit cost ratio are worked out. The B:C ratio presents the returns obtained over per rupee of expenditure.

$$\text{Output : Input ratio} = \frac{\text{Gross Income}}{\text{Total Cost}}$$

$$\text{Benefit : Cost ratio} = \frac{\text{Net Income}}{\text{Total cost}}$$

where,

Gross Income-

Gross income includes:

a) Cash received on account of the sale of farm produce.
b) Value of the produce, main or by-product use for home consumption and for cattle feed or given over as wages in kind.
c) Value of the seed stored for sowing purpose.

Net Income-

Net income is the gross income minus total expenses of production (cost of seed, manure, irrigation charges, wages of hired labour and imputed value of unpaid family labour, depreciation, rent, interest on owned and working capital and marketing cost).

Total Cost-

Total cost is the sum of all costs incurred by a firm in producing a certain level of output.

Formula:

$$TC = FC + VC$$

where,

TC= Total Cost

FC= Fixed Cost

VC= Variable Cost

Chapter 4
Result and Discussion

RESULT AND DISCUSSION

Results obtained from the analysis of the data used in the present study and interpretations there-of have been discussed in this chapter. For better understanding and to cover all the objectives of the study, results are presented under the following heads:

4.1 Socio-economic characteristics and farm structure of household
4.2 Cropping pattern & cropping intensity
4.3 Economics of sugarcane cultivation and resource use efficiency
4.4 Constraints in sugarcane farming

4.1 Socio-Economic Characteristics and farm structure of Household

Socio-economic structure considerably impacts various economic activities like decision making, size of business, pattern and utilization of resources, efficiency, production pattern, playing a crucial role. Heterogeneity is quite evident in socio-economic characteristics and a typical village of Uttar Pradesh is no exception. An effort has been made to analyse the important socio-economic characteristics of the respondent farmers.

4.1.1 Average size and composition of family of different households:

Data regarding size and composition of family of different household is given in table 4.1.1.

Table 4.1.1 Average size and composition of family of different households

Members	Farm Groups			All Farm Average
	Marginal	Small	Medium	
Male	2.17 (52.92%)	2.32 (51.32%)	2.67 (51.34%)	2.38 (51.73)
Female	1.93 (47.07%)	2.2 (48.67%)	2.53 (48.65%)	2.22 (48.26%)
Total	4.10 (100%)	4.52 (100%)	5.20 (100%)	4.60 (100%)

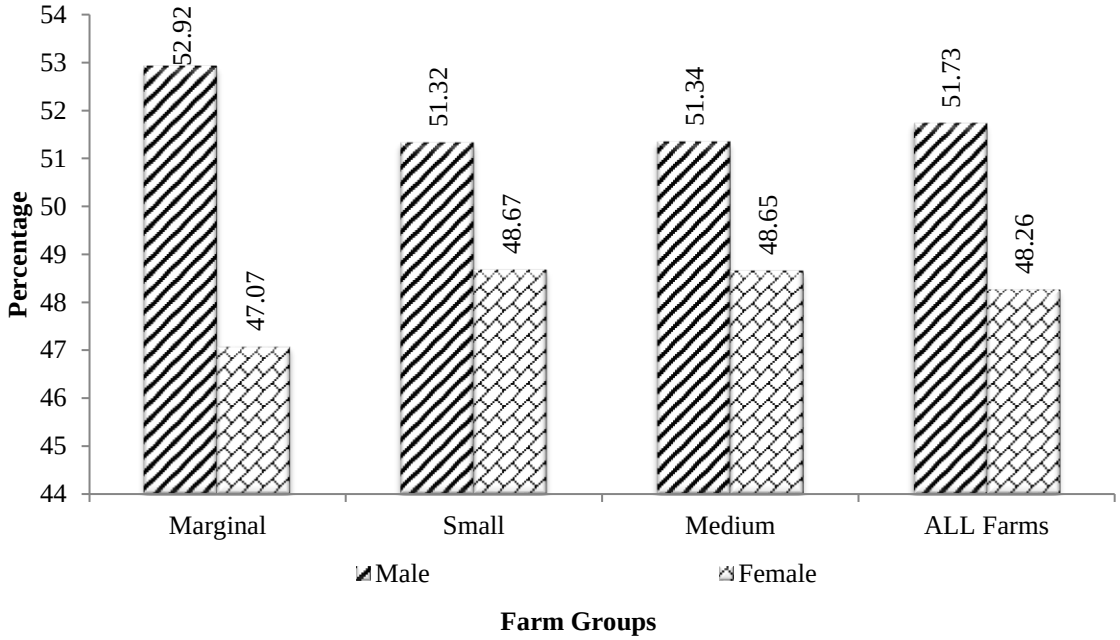

Fig. 1 Average size and composition of different farm groups

It is well known that most of the rural population is dependent on the agriculture sector for their livelihood and also for basic need and requirements and the people engage in that group collectively called farmers.

Farmers group are mainly classified in three groups i.e. marginal, small and medium one but marginal section constitute maximum share among Indian farmer population. The table shows that the average percentage of males in the study sample was 51.73 percent and female was 48.26 percent. In marginal household male was 52.92 percent and female was 47.07 percent. 51.32 percent male and 48.67 percent female were in small household. Marginal household comprised of 51.34 percent male and 48.65 female.

4.1.2 Average landholding of different categories of sample farmers:

The data regarding average landholding of the respondents are given in table 4.1.2.

Table 4.1.2 Average landholding of different households (hectare):

Farm Group	Land Holding
Marginal	0.65
Small	1.53
Medium	2.97
All Farm Average	1.71

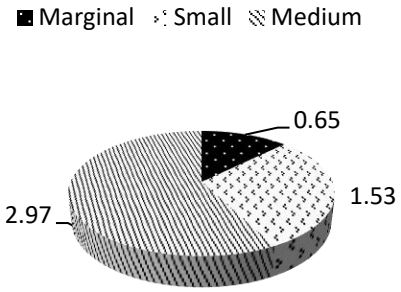

Figure 2: **Average landholding of different households (hectare)**

In this study we have also extract the information about the land holding in hectare of different groups of farmers. It was found that marginal section of farmer share only 0.65 ha, small farmer was 1.53ha and medium group share 2.97 ha the average land holding of all the farmers was 1.71 hectare.

4.1.3 Average age of the respondents:

The table 4.1.3 shows the distribution of respondents according to their age.

Table 4.1.3 Average age of the respondents (numbers)

Particulars	Farm Groups			All Farm Average
	Marginal	Small	Medium	
Average Age	45.73	48.92	50.40	48.35

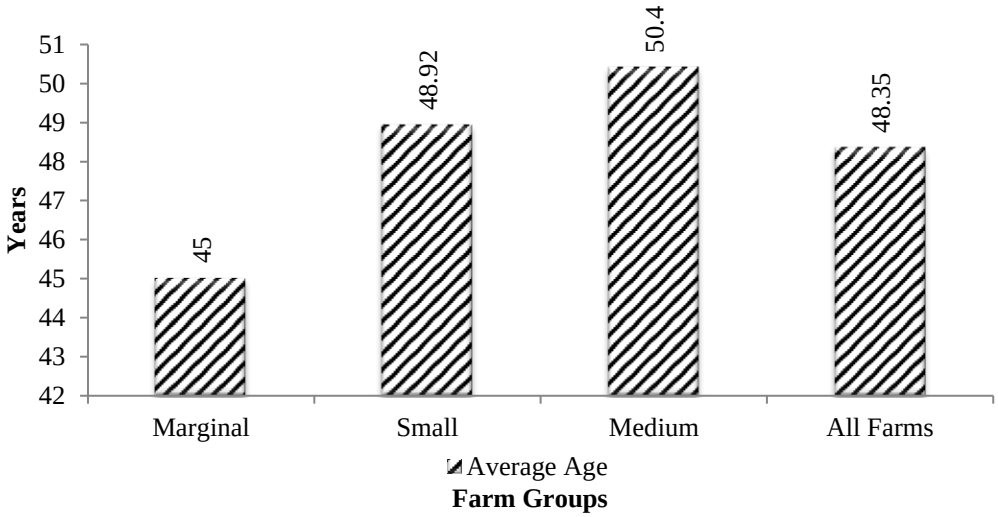

Fig. 3 Average age of respondents

In the study it was found that the average age of marginal farmer groups was found nearly 45.73 years, for small farmer group it was 48.92 year and for medium farmer group it was 50.40 years and the average of all farmer groups then was found to be out 48.35 years. It can be concluded that the average age of respondents increased with increasing land holding suggesting that head of the family of medium household were elderly people.

4.1.4 Distribution of respondents of households according to literacy status:

Table 4.1.4 shows the distribution of respondents according to their literacy status.

Table 4.1.4 Shows the distribution of respondents according to their literacy status (Numbers)

Literacy Status	Farm Groups			All Farm
	Marginal	Small	Medium	
Illiterate	15 (25.00%)	8 (32.00%)	0	23 (23.00%)
Primary	10 (16.66%)	2 (8.00%)	0	12 (12.00%)
Secondary	13 (21.66%)	6 (24%)	4 (26.66%)	23 (23.00%)
Senior Secondary	12 (20.00%)	7 (28.00%)	7 (46.66%)	26 (26.00%)
Graduation & above	10 (16.66%)	2 (8.00%)	4 (26.66%)	16 (16.00%)
Total	**60 (100%)**	**25 (100%)**	**15 (100%)**	**100 (100%)**

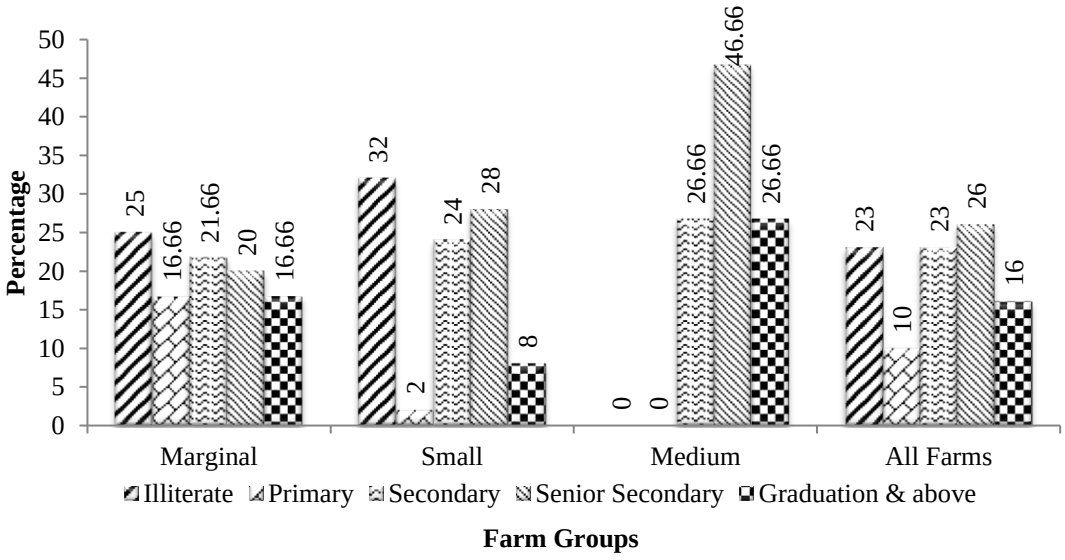

Fig. 4 Distribution of respondents of households according to literacy status

The level of literacy directly affects the level of adoption of scientific approaches and technology resource use efficiency and farm management. The table shows that 77.00 percent of the study sample was literate while only 23.00 percent were illiterate. In marginal household 15 (25.00 percent) and in small 8 (32.00 percent) respondents were illiterate. Primary education holders were found in marginal household which was 10 (16.66 percent) and small household which was 2 (8.00percent). Secondary education holder was 13 (21.66percent) in marginal, 6 (24.00 percent) in small and 4 (26.66 percent) in medium. 12 (20.00 percent) marginal, 2 (8.00 percent) small and 4 (26.66 percent) medium farmers had senior secondary education. Graduation was done by10 (16.66 percent) marginal, 2 (8.00 percent) small and 4 (26.66 percent) medium farmers.

4.1.5 Average livestock composition of the different household:

Table 4.1.5 shows the average herd composition of bovine animals in different households.

Table 4.1.5 Average livestock composition of the different household (numbers):

Category of Animal	Farm Groups			All Farm Average
	Marginal	Small	Medium	
Livestock	1.45	1.84	2.87	2.05

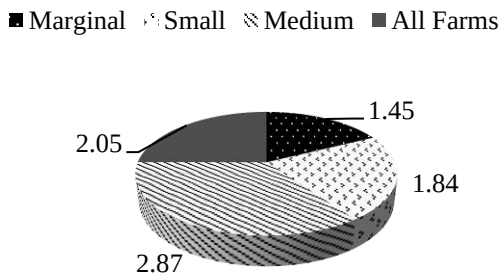

Fig. 5 Average livestock composition of household

Livestock population is directly associated with crop production techniques and so it is very beneficial for farmer to have such kind of animal in optimum number. Table shows that marginal household had 1.45 livestock on average while small and medium had 1.84 and 2.87 bovine, respectively. The all farm average of livestock in the study sample was found to be 2.05.

Table 4.1.6 Per farm investment on various assets of different size group of farms (₹)

Sl. No.	Particular	Size Group of Farms			All Farm Average
		Marginal	Small	Medium	
A.	**Major Implements**	**37550.64 (14.27%)**	**105121.85 (24.06%)**	**418113.68 (49.29%)**	**186928.73 (36.16%)**
1.	Tractor	16256.40 (6.12%)	64380.45 (14.74%)	227122.76 (26.78%)	102586.54 (19.85%)
2.	Trolley	5676.20 (2.14%)	17824.74 (4.08%)	37338.33 (4.41%)	20277.76 (3.93%)
3.	Harrow	872.11 (0.32%)	3824.58 (0.87%)	26385.26 (3.12%)	10360.65 (2.00%)
4.	Cultivator	2890.25 (1.09%)	4942.46 (1.14%)	31824.75 (3.76)	13019.16 (2.52%)
5.	Thresher	3425.85 (1.29%)	9566.34 (2.19%)	74052.00 (8.73%)	29014.73 (5.62%)
6.	Machine Drive Cart	2178.39 (0.82%)	-	16204.02 (1.92%)	6127.47 (1.19%)
7.	Sprayer	568.66 (0.22%)	-	224.76 (0.03%)	264.48 (0.05%)
8.	Chaff cutter	3470.35 (1.31%)	2267.19 (0.52%)	1719.47 (0.20%)	2485.67 (0.48%)
9.	Winnower	2218.43 (0.84%)	916.09 (0.20%)	3242.33 (0.39%)	2125.62 (0.42%)
B.	**Irrigation Structure**	**16260.59 (6.12%)**	**23182.75 (0.53%)**	**17739.52 (2.09%)**	**19060.96 (3.67%)**
1.	Electric Motor	6832.46 (2.57%)	3700.00 (0.85%)	7619.76 (0.9%)	6050.74 (1.18%)
2.	Diesel Engine	9428.13 (3.55%)	19482.75 (4.46%)	10119.76 (1.20%)	13010.22 (2.52%)
C.	**Minor Implements**	**678.28 (0.26%)**	**537.63 (0.12%)**	**978.85 (0.12%)**	**731.59 (0.14%)**
D.	**Livestock**	**34078.46 (12.02%)**	**36409.67 (8.33%)**	**62942.99 (7.42%)**	**44477.04 (8.60%)**
1.	Milch animal	34078.46 (12.02%)	36409.67 (8.33%)	62942.99 (7.42%)	44477.04 (8.60%)
E.	**Buildings**	**177239.10 (66.68%)**	**271535.98 (62.17%)**	**348559.00 (41.09%)**	**265778.09 (51.41%)**
1.	Residential	144614.75 (54.40%)	242352.08 (55.48%)	226616.66 (26.72%)	204527.83 (39.56%)
2.	Cattle shed	32624.35 (12.28%)	29183.90 (6.68%)	121942.34 (14.38%)	61250.20 (11.85%)
	Grand Total (A+B+C+D+E)	**265807.07 (100.00%)**	**436787.88 (100.00%)**	**848334.04 (100.00%)**	**516976.33 (100.00%)**

Table 4.1.7 Per hectare investment on different size group of farms (₹)

Sl. No.	Particular	Size Group of Farms			All Farm Average
		Marginal	Small	Medium	
1.	**Buildings**	**300363.12 (66.65%)**	**199493.16 (64.37%)**	**104320.33 (36.38%)**	**201392.20 (57.68%)**
a.	Residential	246804.67 (54.76%)	180275.33 (58.17%)	81511.05 (28.42%)	169530.35 (48.56%)
b.	Cattle shed	53558.45 (11.88%)	19217.83 (6.20%)	22809.28 (7.95%)	31861.86 (9.12%)
2.	**Live stock**	**56271.80 (12.48%)**	**23691.91 (7.64%)**	**13906.90 (4.85%)**	**31290.21 (8.96%)**
a.	Milch animal	56271.80 (12.48%)	23691.91 (7.64%)	13906.90 (4.85%)	31290.21 (8.96%)
3.	**Irrigation structure**	**24677.16 (5.47%)**	**15086.09 (4.86%)**	**9104.32 (3.17%)**	**16289.19 (4.66%)**
a.	Electric motor	9144.81 (2.02%)	1180.75 (0.38%)	5252.82 (1.83%)	5192.79 (1.48%)
b.	Diesel engine	15532.35 (3.44%)	13905.34 (4.48%)	3851.50 (1.34%)	11096.39 (3.17%)
4.	**Major Implements**	**65976.24 (14.63%)**	**71004.19 (22.91%)**	**158811.42 (55.38%)**	**98597.28 (28.24%)**
a.	Tractor	24576.29 (5.45%)	44491.79 (14.35%)	84158.60 (29.35%)	51075.56 (14.63%)
b.	Cultivator	6454.66 (1.43%)	4507.47 (1.45%)	12060.97 (4.20%)	23023.10 (6.59%)
c.	Harrow	2847.75 (0.63%)	1715.90 (0.55%)	9668.75 (3.37%)	4744.13 (1.35%)
d.	Trolley	6528.74 (1.44%)	11528.95 (3.72%)	15096.19 (5.26%)	11051.29 (3.14%)
e.	Thresher	6635.11 (1.47%)	6526.98 (2.10%)	27789.48 (9.69%)	13650.52 (3.91%)
f.	Chaff cutter	6977.82 (1.54%)	1427.69 (0.46%)	842.70 (0.29%)	3082.73 (0.88%)
g.	Machine drive cart	5093.29 (1.13%)	-	7955.72 (2.77%)	4349.67 (1.24%)
h.	Sprayer	1238.82 (0.27%)	-	324.55 (0.11%)	521.12 (0.14%)
i.	Winnower	5623.76 (1.24%)	805.41 (0.25%)	914.46 (0.31%)	2447.87 (0.70%)
5.	**Minor Implements**	**3401.45 (0.75%)**	**621.85 (0.20%)**	**582.00 (0.20%)**	**1535.10 (0.43%)**
	Grand total (1+2+3+4+5)	**450689.77 (100.00%)**	**309897.20 (100.00%)**	**286724.97 (100.00%)**	**349103.98 (100.00%)**

The table 4.1.6 revealed that the major components of all farm assets are building, livestock and major implements, constituting 51.41 percent, 8.60 percent and 36.16 percent, respectively. In case of marginal farm percentage of investment in building was 66.68 percent, investment in livestock was 12.02 percent and investment in major implements was 14.27 percent. For small farmer percentage of building, livestock and major implements investment were found to be 62.17 percent, 8.13 percent and 24.06 percent. The percentage of investment in building in case of medium farmers was 41.09, the percentage of investment in livestock was 7.42 and percentage of investment in major implements was 49.29. It can be concluded that investment on building, livestock and major implements increased with the increasing size of household.

It is evident from the table 4.1.7 that the all farm average per hectare building investment was worked out to be ₹ 201392.20, livestock investment was ₹ 31290.21 and major implements investment was ₹ 98597.28. In case of marginal farm per hectare investment in building, livestock and major implements were ₹ 300363.12, ₹ 56271.80 and ₹ 65976.24, respectively. The per hectare investment in building in case of small farmers was ₹ 199493.16, investment in livestock was ₹ 23691.91 and investment in major implements was ₹ 71004.19. For medium farmers the per hectare investments in building, livestock and major implement were worked out to be ₹ 104320.33, ₹ 13906.90 and ₹ 158811.42. It can be concluded that investment on building and major implements increased with the increasing size of household while the investment in livestock decreased i.e. it was higher in marginal household and lowest in medium household.

4.2 Cropping Pattern and Cropping Intensity

4.2.1 Cropping pattern under different size group of sample farms:

Table 4.2.1 shows the different cropping pattern adopted by different farm groups in the study sample**.**

Table4.2.1 Cropping pattern under different size group of sample farms (hectare):

Crop Grown	Average size of Farm Groups			All Farm Average
	Marginal	Small	Medium	
A. Kharif				
Paddy	0.27 (19.85%)	0.44 (16.00%)	0.97 (18.30%)	0.56 (17.89%)
Sugarcane	0.33 (24.26%)	0.82 (29.81%)	1.37 (25.84%)	0.84 (26.83%)
Maize	0.03 (2.20%)	0.16 (5.81%)	0.38 (7.16%)	0.19 (6.07%)
Moong/Urd	0.02 (1.47%)	0.11 (4.00%)	0.25 (4.71%)	0.12 (3.83%)
B. Rabi				
Wheat	0.25 (18.38%)	0.43 (15.63%)	0.97 (18.30%)	0.55 (17.57%)
Mustard/Pea	0.03 (2.20%)	0.13 (4.72%)	0.36 (6.79%)	0.17 (5.43%)
Potato	0.04 (2.94%)	0.15 (5.45%)	0.27 (5.09%)	0.15 (4.79%)
C. Zaid				
Chari	0.13 (9.55%)	0.18 (6.54%)	0.23 (4.33%)	0.18 (5.75%)
Onion	0.26 (19.11%)	0.33 (12.00%)	0.50 (9.43%)	0.37 (11.82%)
Total(A+B+C)	**1.36 (100%)**	**2.75 (100%)**	**5.30 (100%)**	**3.13 (100%)**

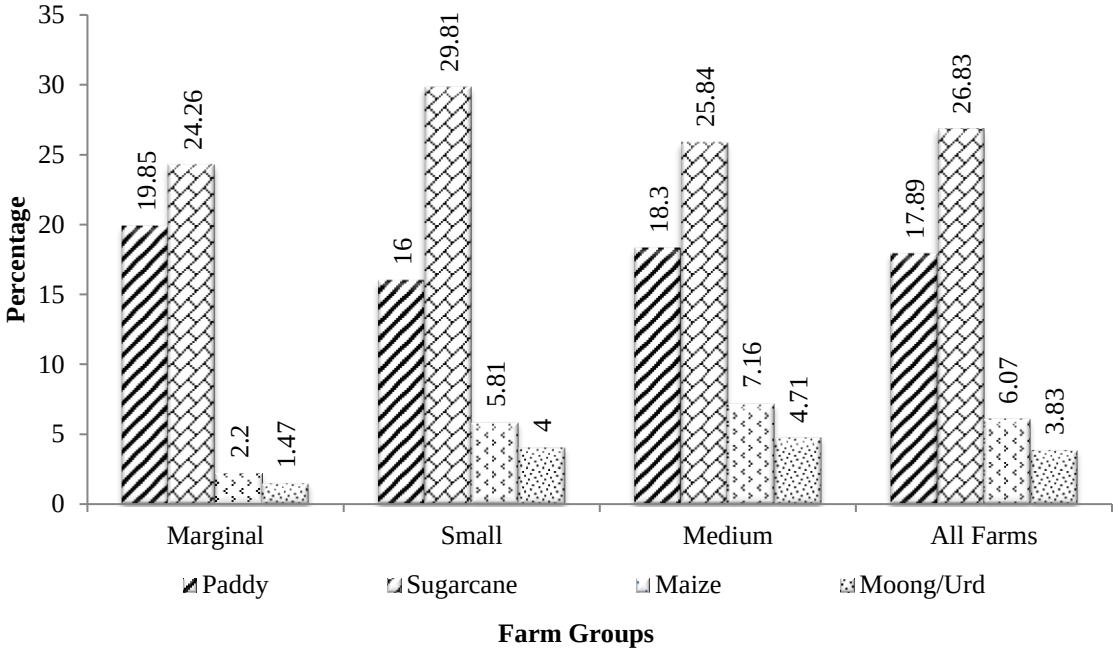

Fig. 6.1 Different crops grown during Kharif season

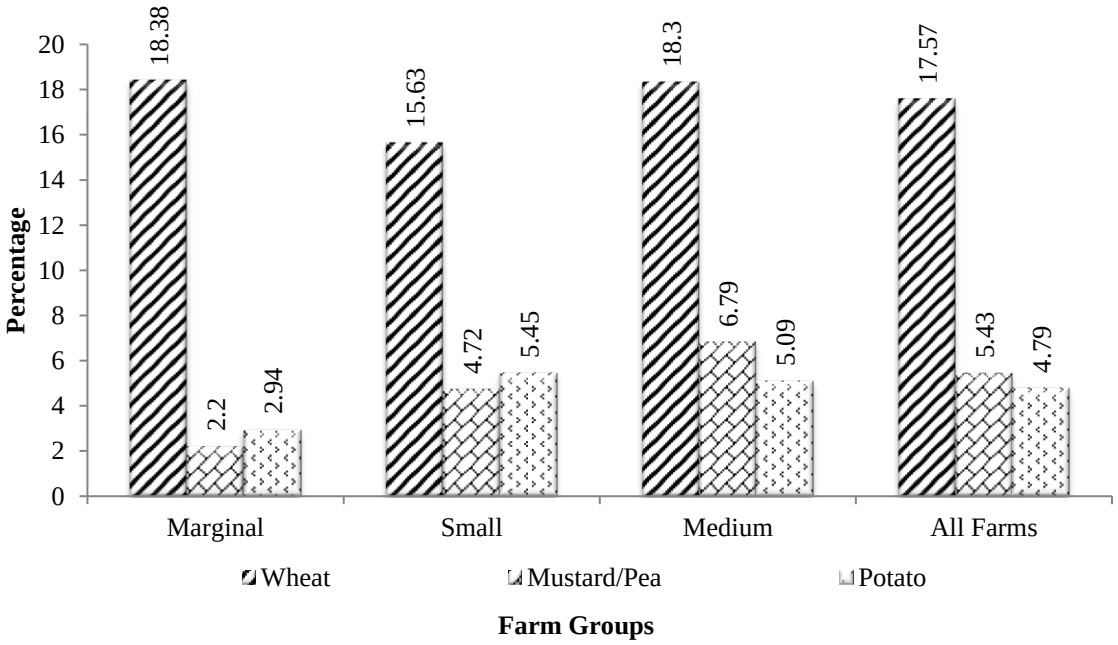

Fig. 6.2 Different crops grown during Rabi season

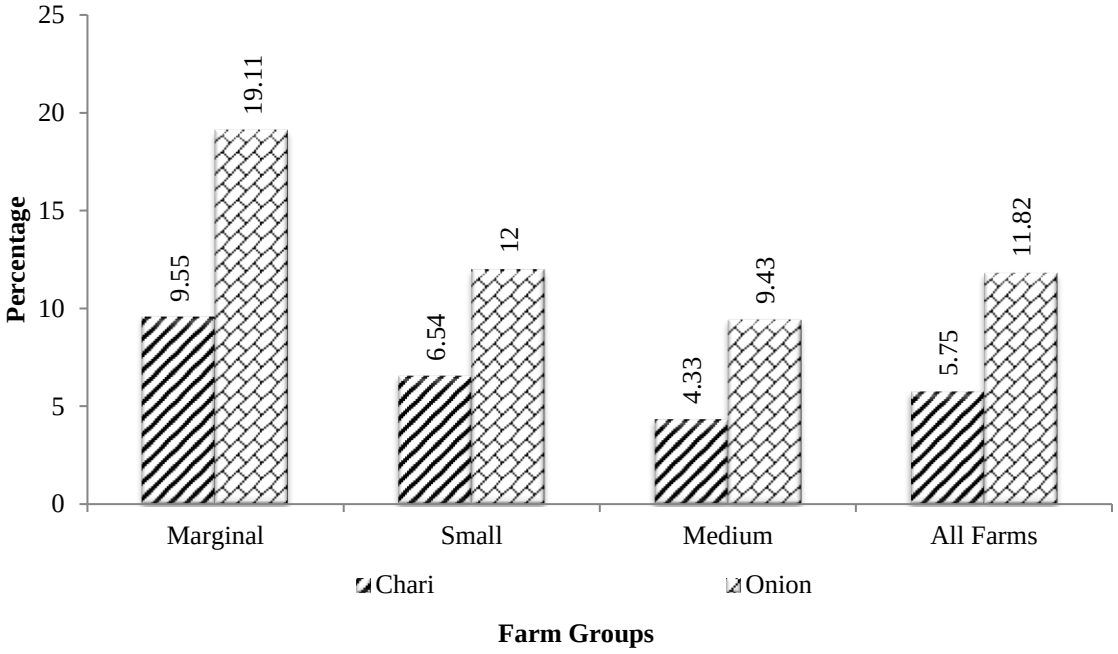

Fig. 6.3 Different crops grown during Zaid season

It can be concluded that in kharif season Paddy, Sugarcane, Maize and Moong/Urd were the major crops grown. Paddy on average was grown on 0.56 hectare (17.89 percent) land in the study sample while Sugarcane, Maize and Moong/Urd were grown on 0.84 hectare (26.83 percent), 0.19 (6.07 percent) and 0.12 (3.83 percent) area , respectively.

It can be concluded that in Rabi season Wheat, Mustard/ Pea and Potato were the major crops grown. Wheat on average was grown on 0.55 hectare (17.57 percent) land. Mustard/ PEA and Potato were grown on 0.17 hectare (5.43 percent) and 0.15 hectare (4.79 percent), respectively.

It can be concluded that in Zaid season Chari and Onion were the major crops grown. Chari and onion on average were grown on 0.18 hectare (5.75 percent) and 0.37 hectare (11.82 percent) area, respectively.

The total area under cultivation in a cropping year was found to be 1.36 for marginal farmers, 2.75 ha for small farmers and 5.30 ha for medium farmers. The all farm average was found to be 3.13 ha.

4.2.2 Cropping intensity of different size group of sample farms:

Table 4.2.2 shows the average cropping intensity of different households.

Table4.2.2 Cropping intensity of different size group of sample farms

Farm Groups	No. of farms	Net cultivated area (ha)	Gross cropped area (ha)	Cropping intensity
Marginal (below 1 ha)	60	0.65	1.38	212.31
Small (1-2ha)	25	1.53	2.76	180.39
Medium (2-4ha)	15	2.97	5.22	175.76
All farms	**100**	**1.71**	**3.12**	**182.46**

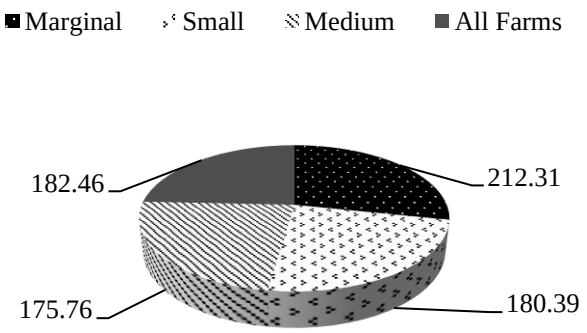

Fig. 7 Cropping intensity of different size group of farms

It is evident from the table that cropping intensity of marginal household was 212.31 percent. The average cropping intensity of small and medium households were 180.39 percent and 175.76 percent, respectively. The average cropping intensity of study sample was 182.46 percent. It can be concluded that the cropping intensity decreases with increasing landholding. This is due to the fact that marginal farmers have less area under cultivation and cultivate almost all of their land in all cropping season.

4.3 Economics of Sugarcane Cultivation and resource use efficiency

4.3.1 Cost of cultivation of Sugarcane₹ per hectare:

Table 4.3.1 shows the per hectare costs incurred on the various input factors in Sugarcane production

Table 4.3.1 Per hectare costs of different inputs used in Sugarcane production (₹)

Sl. No.	Particulars	Size group of farms			All farm average
		Marginal	Small	Medium	
1.	Human labour	13839.49 (16.11%)	13643.90 (15.68%)	13000.00 (15.05%)	13494.46 (15.61%)
a.	Family labour	8995.67 (10.48%)	4093.17 (4.21%)	3900.00 (4.51%)	5662.95 (6.55%)
b.	Hired labour	4843.82 (5.64%)	9550.73 (10.97%)	9100.00 (10.53%)	7831.52 (9.05%)
2.	Machinery charges	6756.18 (7.87%)	5224.50 (6.00%)	6430.57 (7.45%)	61370.09 (7.09%)
3.	Seed	20200.51 (23.52%)	20257.32 (23.27%)	19946.59 (23.08%)	20134.86 (23.29%)
4.	Manure and fertilizer	8871.34 (10.33%)	7682.93 (8.83%)	7346.34 (8.51%)	7966.87 (9.22%)
5.	Irrigation	7318.47 (8.52%)	8502.44 (9.77%)	8003.61 (9.27%)	7941.50 (9.19%)
6.	Plant protection	4407.64 (5.14%)	6990.24 (6.08%)	7024.39 (8.14%)	6140.76 (7.11%)
7.	Total working capital	61393.63 (71.46%)	62301.33 (71.56%)	61751.50 (71.48%)	61815.49 (71.49%)
8.	Interest on working capital	2455.75 (2.86%)	2492.06 (2.87%)	2470.06 (2.86%)	2472.63 (2.86%)
9.	Rental value of land	10,000.00 (11.64%)	10,000.00 (11.49%)	10,000.00 (11.58%)	10,000.00 (11.57%)
10.	Interest on fixed capital	4257.56 (4.96%)	4361.09 (5.00%)	4322.60 (5.00%)	4327.08 (5.00%)
11.	**Sub total**	**78106.94 (90.91%)**	**79154.46 (90.91%)**	**78544.16 (90.91%)**	**78615.20 (90.90%)**
12.	Managerial cost @ 10% of sub total	7810.70 (9.09%)	7915.45 (9.09%)	7854.41 (9.09%)	7861.52 (9.09%)
13.	**Grand total**	**85917.64 (100%)**	**87069.90 (100%)**	**86395.57 (100%)**	**86476.72 (100%)**

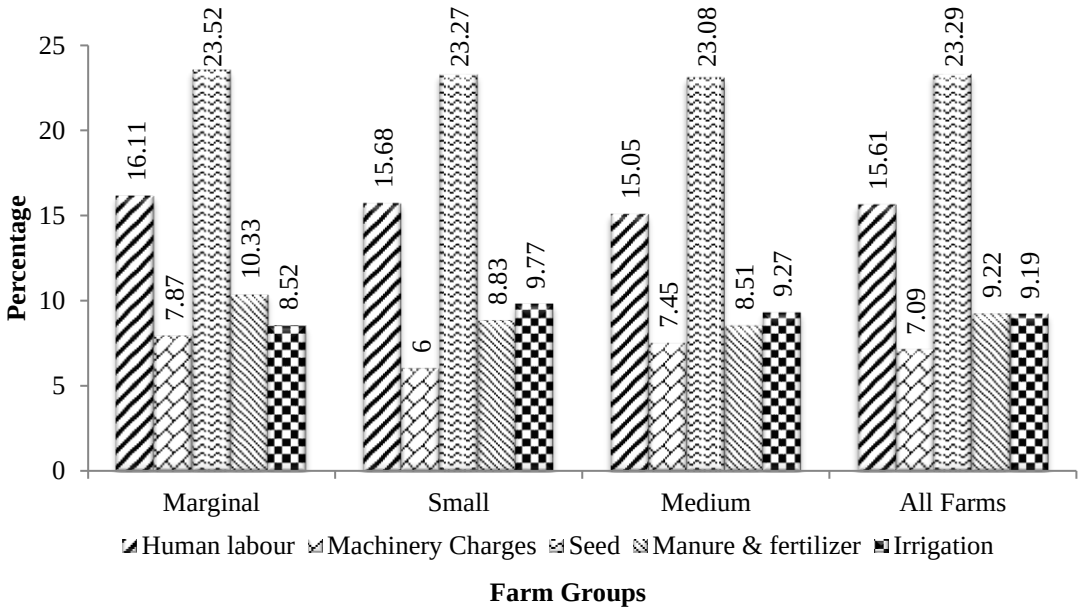

Fig. 8 Percentage of different inputs used in different size of farms for sugarcane production

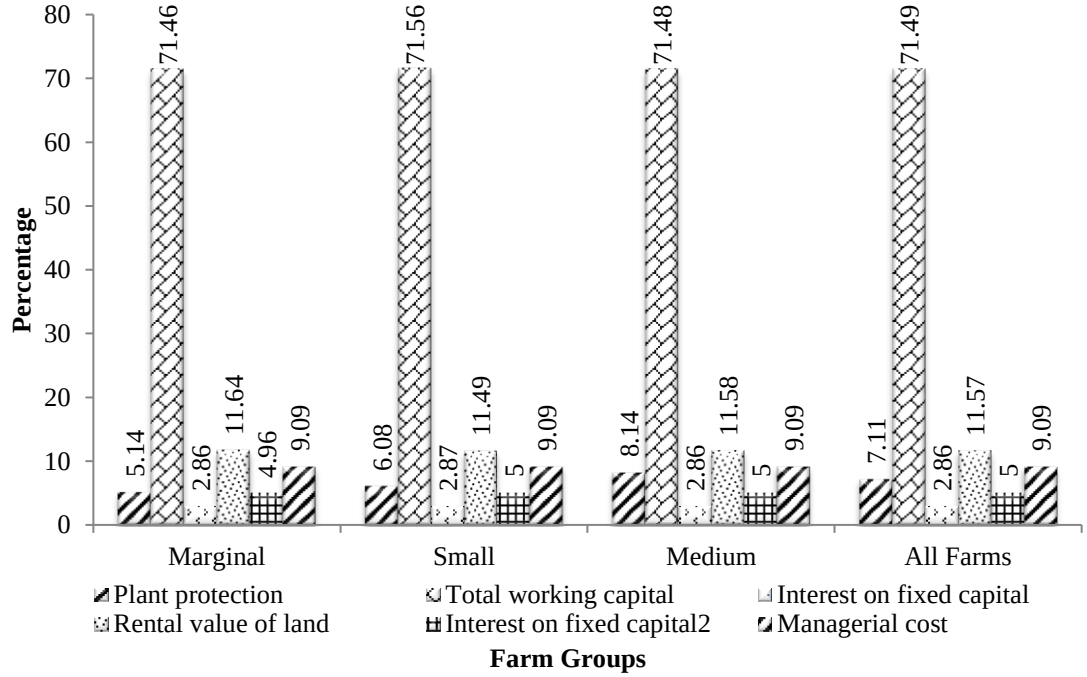

Fig. 9 Percentage of different inputs used in different size of farms for sugarcane production

The table 4.3.1 indicates that cost of cultivation, was highest on small farms (₹87069.00), followed by medium farms (₹86395.57) and small farms (₹85917.64),

respectively. The overall average costs of cultivation was observed (₹86476.72) on sample farms. The major component of the cost were human labour (15.61 percent), machinery charges (7.09 percent), manure and fertilizer (9.22 percent), recent value of owned land (11.57 percent), seed cost (23.29 percent), plant protection (7.11 percent) and irrigation charge (9.19 percent), respectively of the total cost of cultivation. Per hectare cost of cultivation was found of positive trend with farm size.

4.3.2 Estimates of different costs and annual returns from Sugarcane per hectare:

Table 4.3.2 shows the per hectare costs and income from the production of sugarcane crop on various costs concept.

Table 4.3.2 Per hectare costs and income from the production of sugarcane crop on various costs concept

Sl. No.	Particulars	Size group of farms			All farm average
		Marginal	Small	Medium	
1.	Cost A_1/A_2	63849.38	64793.99	64221.56	64288.31
2.	Cost B_1	68106.94	69154.48	68544.16	68601.86
3.	Cost B_2	78106.94	79154.48	78544.16	78619.86
4.	Cost C_1	77102.61	73247.65	72444.16	52531.47
5.	Cost C_2	87102.61	83247.65	82444.16	84264.80
6.	Cost C_3	95812.87	91572.42	90688.58	92691.29
7.	Gross income	191804.33	190829.27	192000.00	191544.53
8.	Net income	105886.69	103759.37	105604.43	105083.49
9.	Family labour income	113697.39	111,674.79	113455.84	112942.673
10.	Farm business income	127954.95	126035.28	127778.44	88922.89
11.	Farm investment income	118959.28	121942.11	123878.44	84926.61
12.	Yield (q/ha)	599.39	596.34	600.00	598.57
13.	Benefit-Cost ratio	1:1.10	1:1.13	1:1.17	1:1.13
14.	**Input- output ratio**				
(i)	On the basis of C_3	1:2.01	1:2.08	1:2.11	1:2.06
(ii)	On the basis of C_2	1:2.20	1:2.29	1:2.32	1:2.27
(iii)	On the basis of C_1	1:2.48	1:2.60	1:2.65	1:2.57
(iv)	On the basis of B_2	1:2.45	1:2.41	1:2.44	1:2.43
(v)	On the basis of B_1	1:2.81	1:2.75	1:2.80	1:2.78
(vi)	On the basis of A_1/A_2	1:3.00	1:2.94	1:2.98	1:2.97

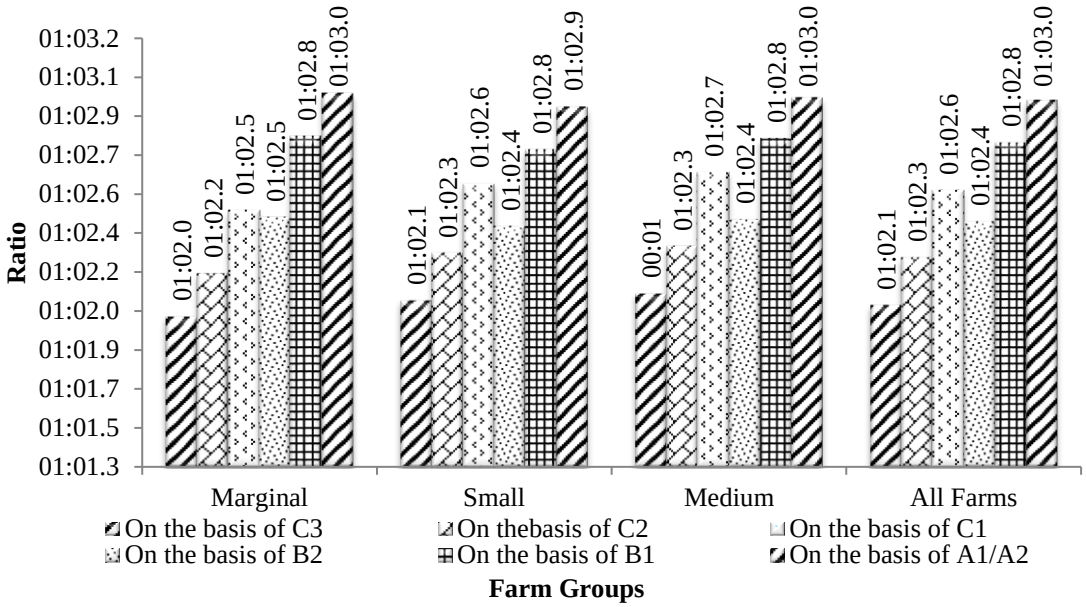

Fig. 10 Represnting input output ratio on the basis of various cost concept

The table4.3.2 showed that, on an average cost A_1/A_2, costB_1, cost B_1, cost C_1, cost C_2 and cost C_3 came to ₹64288.31, ₹68601.86, ₹78619.86, ₹52531.47, ₹84262.80, ₹92691.29, respectively.

On an average gross income was recorded ₹191544.33 and net income came to ₹ 105083.49. On medium farms, gross income was highest, which was recorded ₹192000.00, followed by marginal farms ₹191804.33 and lowest on small farms ₹, 190829.27, respectively. The net income was highest on marginal farms ₹ 105886.69 followed by medium farms ₹105604.43 and small farms ₹103759.37.

On an average family labour income, farm business income and farm investment income were observed to ₹112942.673, ₹88922.89 and ₹84926.61, respectively. Family labour income was highest on marginal farms followed by medium and small farms, farm investment income was highest on medium farms followed by small farms and marginal farms and farm business income was highest on marginal farms followed by medium farms and small farms. On an average, yield per hectare was estimated 598.57 quintal.

The benefit cost ratio for marginal, small and medium farmers were observed to be 1:1.10, 1:1.13 and 1:1.17, respectively. On an average benefit cost ratio were observed to be 1:1.13.

On an average input output ratio regarding costs C_3, C_2, C_1, B_2, B_1, and A_2/A_1 were recorded 1:2.06,1:2.27, 1;2.57, 1:2.43, 1:2.78 and 1:2.97, respectively. On the basis of cost C_3 input output ratio was highest on medium farms (1:2.11) followed by small farms (1:2.08) and marginal farms (1:2.01), respectively. It may be concluded the cost of cultivation on different size group of farm increases with an increase in farm size. But net return per hectare was found of negative trend with farm size. It was because of less increase in yield against the increased input factors at increasing size of farm.

4.3.3 Production elasticity of Sugarcane crop on different size group of farms:

Table 4.3.3 shows the production elasticity of sugarcane crops in different household.

Table 4.3.3 Production elasticity of Sugarcane crop on different size group of farms

Size group of sample farms (ha)	Production elasticities					Returns to Scale	R^2
	X_1	X_2	X_3	X_4	X_5		
Marginal	0.01 (0.01)	0.06 (0.05)	0.44 (0.25)	0.24** (0.10)	0.63 (0.33)	0.97	0.90
Small	0.10** (0.01)	0.20* (0.06)	0.25 (0.20)	0.07 (0.05)	0.47 (0.28)	1.09	0.93
Medium	0.30** (0.11)	0.44* (0.11)	0.11 (0.08)	0.23 (1.3)	0.02 (0.02)	1.10	0.95

** significant at 5% significance level

* significance at 1% significance level

Where,

X_1, X_2, X_3, $X_4$and X_5stand for seed, irrigation, plant protection chemicals, fertilizers and labour cost (₹) respectively.

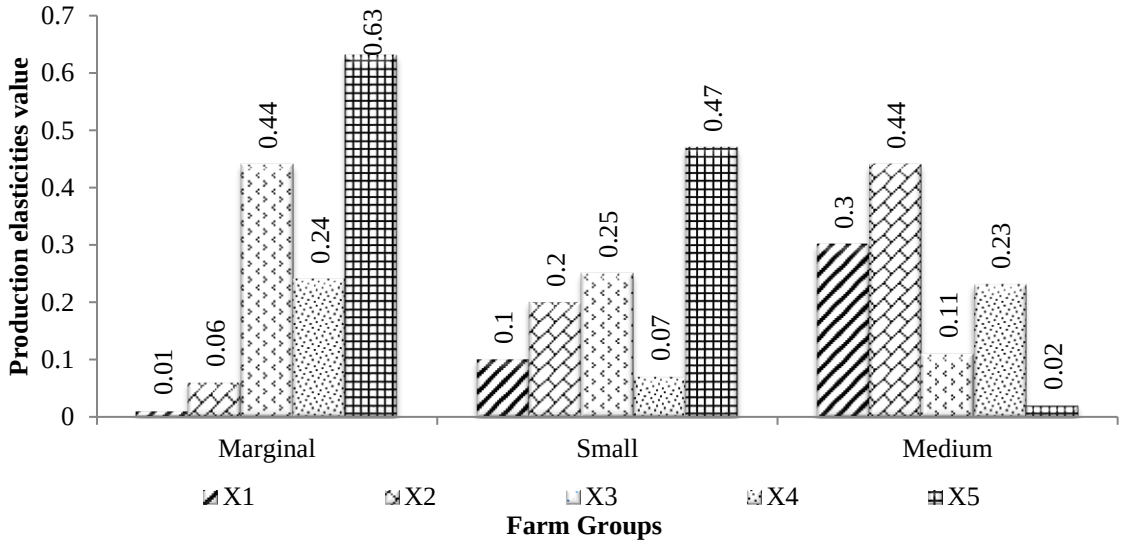

Fig. 11 Production elasticity of Sugarcane crop group on different size group of farms

In marginal household the production elasticity's of seed, irrigation, plant protection chemicals, fertilizer and labour were 0.01, 0.06, 0.44, 0.24 and 0.63, respectively. The return to scale in marginal farm was 0.97 which shows decreasing return to scale i.e. marginal farmers were gaining less than what they were spending. The R^2 value of marginal household was 0.90 i.e. the considered variable explains 90.00 percent of the variation in depending variable i.e. return from sugarcane. It can be concluded that cost of fertilizer at 5 percent level of significance had significant influence on the returns.

In small household the production elasticity's of seed, irrigation, plant protection chemicals, fertilizer and labour were 0.10, 0.20, 0.25, 0.07 and 0.47, respectively. The return to scale in small farm was 1.09 which shows increasing return to scale i.e. small farmers were gaining more than what they were spending. The R^2 value of small household was 0.93 i.e. the considered variable explains 93.00 percent of the variation in depending variable i.e. return from sugarcane. The cost of seed at 5 percent level of significance and cost of irrigation at 1 percent level of significance had significant influence at the returns from sugarcane

In medium household the production elasticity's of seed, irrigation, plant protection chemicals, fertilizer and labour were 0.30, 0.44, 0.11, 0.23 and 0.02, respectively. The return to scale in medium farm was 1.10 which shows increasing return to scale i.e. medium farmers were gaining more than what they were spending. The R^2 value of medium household was 0.95 i.e. the considered variable explains 95.00 percent of the

variation in depending variable i.e. return from sugarcane. It was found that the cost of seed at 5 percent level of significance and cost of irrigation at 1 percent level of significance had significant influence at the returns from sugarcane.

4.3.4 Marginal Value Productivity (MVP) of included factors of production process in Sugarcane production:

Table 4.3.4 shows the marginal value productivity (MVP) of different factors used in sugarcane production.

Table 4.3.4 Marginal Value Productivity (MVP) of included factors of production process in Sugarcane production

Size group of farms	Marginal value productivity of input/factors				
	X_1	X_2	X_3	X_4	X_5
Marginal	6.82	4.48	4.62	2.42	5.42
Small	5.53	2.19	2.36	1.88	1.39
Medium	4.12	1.21	1.64	0.73	1.55

Where,

X_1, X_2, X_3, X_4 and X_5 stand for seed, irrigation, plant protection chemicals fertilizers and labour cost (Rupees) respectively.

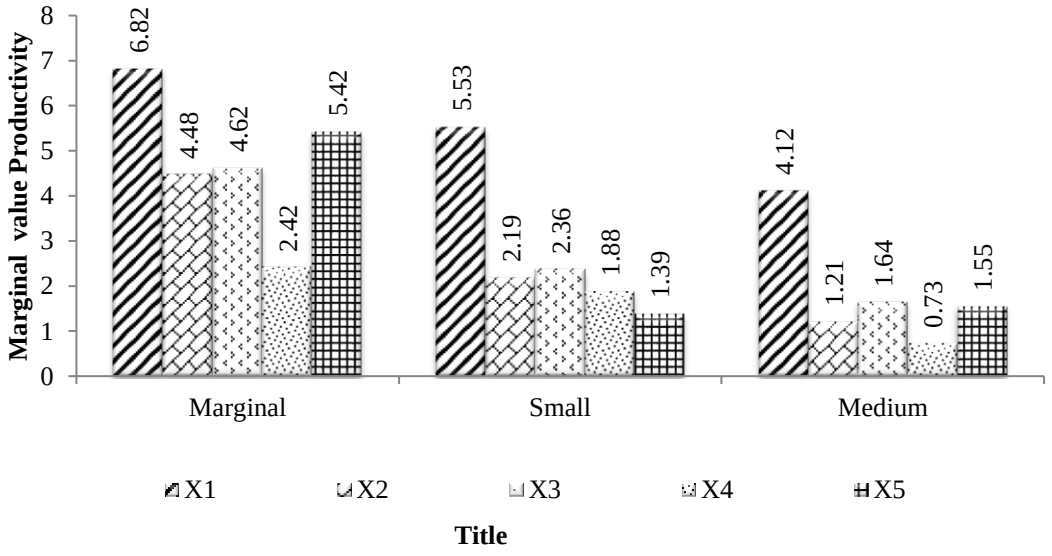

Fig. 12 Marginal Value Productivity (MVP) of included factors in production process of Sugarcane crop

In marginal the MVP of seed was 6.82, irrigation was 4.48, plant protection chemicals was 4.62, fertiliser was 2.42 and labour was 5.42 this shows that for production of one additional quintal of sugarcane the additional cost incurred for different is equal to the respected MVP.

In small the MVP of seed was 5.53, irrigation was 2.19, plant protection chemicals was 2.36, fertiliser was 1.88 and labour was 1.39 this shows that for production of one additional quintal of sugarcane the additional cost incurred for different is equal to the respected MVP.

In medium the MVP of seed was 4.12, irrigation was 1.21, plant protection chemicals was 1.64, fertiliser was 0.73 and labour was 1.55 this shows that for production of one additional quintal of sugarcane the additional cost incurred for different is equal to the respected MVP

4.4 Constraints in sugarcane farming

4.4.1 Constraints of Sugarcane cultivation on different size group of sample farms:

Table 4.4.1 shows the major constraints faced by sugarcane cultivators.

Table4.4.1 Constraints of Sugarcane cultivation on different size group of sample farms:

Constraints	Size group of farms			All farm	Rank
	Marginal	Small	Medium		
Availability of seeds in time	8 (13.33)	3 (12.00)	1 (6.67)	12 (12.00)	**8th**
Availability of human and machinery labour in peak time	12 (80.00)	10 (40.00)	13 (86.67)	35 (35.00)	**3th**
Irrigation Facility	15 (25.00)	5 (20.00)	4 (26.67)	24 (24.00)	**5th**
Availability of finance facility	24 (40.00)	9 (36.00)	7 (46.67)	40 (40.00)	**1th**
Availability of NPK doses	18 (30.00)	5 (20.00)	7 (46.67)	30 (30.00)	**4th**
Availability of PP chemicals	11 (18.33)	4 (16.00)	2 (13.34)	17 (17.00)	**6th**
Availability of quality seeds(HYV)	9 (15.00)	3 (12.00)	1 (6.67)	13 (13.00)	**7th**
Problem of technical knowledge	5 (8.33)	4 (16.00)	2 (13.34)	11 (11.00)	**9th**
Problem of Sugarcane receipt	20 (33.33)	13 (52.00)	4 (26.67)	37 (37.00)	**2th**
Natural calamity	2 (3.33)	3 (12.00)	0.00	5 (5.00)	**10th**
Total	**60**	**25**	**15**	**100**	

The rankings depicted in the table conclude that availability of finance facilities was the biggest problem faced by 40 farmers in the study sample. In availability of sugarcane receipts from sugar mills was the second constraints faced by 37 farmers in the study sample the third, fourth, fifth, sixth, seventh, eighth and ninth constraints were in availability of in availability of human and machinery labor, NPK dose, in availability of agriculture facilities, unavailability of plant protection chemical, in availability of high yield variety of sugarcane, unavailability of seed at proper time and the problem of technical knowledge respectively which were faced by 35,30,24,17,13,12 and 11 farmers, respectively in the study sample. The last and the most minor constraint of natural calamity was faced by only 5 farmers.

Major suggestion received from the respondent side to overcome the mentioned problems were to strengthen the extension services for improvement of update criterion for farmers on upcoming methodologies to improve 9^{th} and practice system following traditionally to get advancement for better use of machinery, to substitute labor problems, problems of unavailability of receipts from sugar mills and financial support from financial institutions. Detail knowledge about input management, crop planning and budgeting as well as disposal of farm produce along with market information should be made available by various government schemes.

Chapter 5
Summary and Conclusion

SUMMARY AND CONCUSION

Sugarcane is important cash crop grown in India. Sugarcane cultivation and development of sugar industry runs parallel to the grown of human civilization and is as old as agriculture. The importance and use of sugarcane and sugar in the country's socio-economic milieu is deep rooted and immense. Sugarcane is grown in diversified climatic conditions. India is one of the largest sugarcane producers in the world, producing around 300 million tonnes of cane per annum. Production of sugar is the second largest agro processing industry in the country after cotton and textiles. India is the only country that produces plantation while sugar unlike other countries that produce raw or refined sugar or both. Nearly 1877.10 million tonnes of sugarcane was produced in the harvesting year 2017-18 worldwide. With the production of over 739.27 million tonnes in 2017-18, Brazil was the leader in Sugarcane production followed by India (341.20 million tonnes) and China (125.54 million tonnes)

Sugarcane is one of the main sources of income of the farmers in the study area. It is only cash crop grown by the farmers which provides sufficient income and employment to growers of study area. But no any systematic study on Economics of sugarcane's production has been conducted so far, keeping in view of above mentioned facts, the present study entitled **"Economic analysis of sugarcane cultivation in Sultanpur district of eastern Uttar Pradesh**" was undertaken with the following main objectives:

i) To study the farm structure, cropping pattern and cropping intensity of sample farms.

ii) To work out the cost of cultivation and input-output relationship in production of sugarcane crop.

iii) To estimate the resource use efficiency in sugarcane cultivation.

iv)To find out the problems in the production of sugarcane and to suggest suitable measures to reduce them.

For achieving the stipulated objectives, Sultanpur district was selected purposively. The selection of the sample for the study was made by using purposive cum random sampling technique. In Pratapgarh district out of the 5 tehsils of selected district, Sadar tehsil was selected purposively for the study. Out of the 13 blocks of selected tehsil, Kurebhar block was selected. Farmers were selected based on sugarcane cultivation in the region and five villages were selected randomly from the block. For selection of

representative sample of respondents, they were classified into three strata viz., below 1 hectare (Marginal), 1 hectare to 2 hectares (Small), 2 hectare and above hectares (Medium).

Data were collected by the survey method with the use of pre-tested schedule designed for the purpose. The tabular analysis was extensively used to work out the socio-economic features of the households, economic of sugarcane cultivation, resource use efficiency and the constraints faced by sugarcane cultivators.

The analysis of socio-economic status revealed that the average percentage of males in the study sample was 51.73 percent and female was 48.26 percent. In marginal household male was 52.92 percent and female was 47.07 percent. 51.32 percent male and 48.67 percent female were in small household. Marginal house hold comprised of 51.34 percent male and 48.65 female. Marginal section of farmer share only 0.65 ha, small farmer was 1.53ha and medium group share 2.97 ha the average land holding of all the farmers was 1.71 hectare.

Average age of marginal farmer groups was found nearly 45.73 years, for small farmer group it was 48.92 year and for medium farmer group it was 50.40 years and the average of all farmer groups then was found to be out 48.35 years. 77.00 percent of the study sample was literate while only 23.00 percent were illiterate. In marginal household 15 (25.00 percent) and in small 8 (32.00 percent) respondents were illiterate. Primary education holders were found in marginal household which was 10 (16.66 percent) and small household which was 2 (8.00percent). Secondary education holder were 13 (21.66percent) in marginal, 6 (24.00 percent) in small and 4 (26.66 percent) in medium. 12 (20.00 percent) marginal, 2 (8.00 percent) small and 4 (26.66 percent) medium farmers had senior secondary education. Graduation was done by10 (16.66 percent) marginal, 2 (8.00 percent) small and 4 (26.66 percent) medium farmers. Marginal household had 1.45 livestock on average while small and medium had 1.84 and 2.87 bovine, respectively. The all farm average of livestock in the study sample was found to be 2.05.

The major components of all farm assets were building, livestock and major implements, constituting 51.41 percent, 8.60 percent and 36.16 percent, respectively. In case of marginal farm percentage of investment in building was 66.68 percent, investment in livestock was 12.02 percent and investment in major implements was 14.27 percent. For

small farmer percentage of building, livestock and major implements investment were found to be 62.17 percent, 8.13 percent and 24.06 percent. The percentage of investment in building in case of medium farmers was 41.09, the percentage of investment in livestock was 7.42 and percentage of investment in major implements was 49.29. It can be concluded that investment on building, livestock and major implements increased with the increasing size of household.

The all farm average per hectare building investment was worked out to be ₹201392.20, livestock investment was ₹ 31290.21 and major implements investment was ₹98597.28. In case of marginal farm per hectare investment in building, livestock and major implements were ₹ 300363.12, ₹ 56271.80 and ₹ 65976.24, respectively. The per hectare investment in building in case of small farmers was ₹ 199493.16, investment in livestock was ₹ 23691.91 and investment in major implements was ₹ 71004.19. For medium farmers the per hectare investments in building, livestock and major implement were worked out to be ₹ 104320.33, ₹ 13906.90 and ₹ 158811.42. It can be concluded that investment on building and major implements increased with the increasing size of household while the investment in livestock decreased i.e. it was higher in marginal household and lowest in medium household.

Cropping pattern analysis concluded that in kharif season Paddy, Sugarcane, Maize and Moong/Urd were the major crops grown. Paddy on average was grown on 0.56 hectare (17.89 percent) land in the study sample while Sugarcane, Maize and Moong/Urd were grown on 0.84 hectare (26.83 percent), 0.19 (6.07 percent) and 0.12 (3.83 percent) area, respectively. In Rabi season Wheat, Mustard/ Pea and Potato were the major crops grown. Wheat on average was grown on 0.55 hectare (17.57 percent) land. Mustard/ PEA and Potato were grown on 0.17 hectare (5.43 percent) and 0.15 hectare (4.79 percent), respectively. In Zaid season Chari and Onion were the major crops grown. Chari and onion on average were grown on 0.18 hectare (5.75 percent) and 0.37 hectare (11.82 percent) area, respectively. The total area under cultivation in a cropping year was found to be 1.36 hectare for marginal farmers, 2.75 hectare for small farmers and 5.30 hectare for medium farmers. The all farm average was found to be 3.13 hectare.

The cropping intensity analysis showed that cropping intensity of marginal household was 212.31 percent. The average cropping intensity of small and medium households were 180.39 percent and 175.76 percent, respectively. The average cropping intensity of study sample was 182.46 percent.

Cost estimation revealed that indicate that cost of cultivation, was highest on small farms (₹87069.00), followed by medium farms (₹86395.57) and small farms (₹85917.64), respectively. The overall average costs of cultivation was observed (₹86476.72) on sample farms.

The major component of the cost were human labour (15.61 percent), machinery charges (7.09 percent), manure and fertilizer (9.22 percent), recent value of owned land (11.57 percent), seed cost (23.29 percent), plant protection (7.11 percent) and irrigation charge (9.19 percent), respectively of the total cost of cultivation. Per hectare cost of cultivation was found of positive trend with farm size.

Estimates of different cost showed that on an average cost A_1/A_2, costB_1, cost B_1, cost C_1, cost C_2 and cost C_3 came to ₹64288.31, ₹68601.86, ₹78619.86, ₹52531.47, ₹84262.80, ₹92691.29, respectively.

The average gross income was recorded ₹191544.33 and net income came to ₹105083.49. On medium farms, gross income was highest, which was recorded ₹192000.00, followed by marginal farms ₹191804.33 and lowest on small farms ₹190829.27, respectively. The net income was highest on marginal farms ₹105886.69 followed by medium farms ₹105604.43 and small farms ₹103759.37.

On an average family labour income, farm business income and farm investment income were observed to ₹112942.673, ₹88922.89 and ₹84926.61, respectively. Family labour income was highest on marginal farms followed by medium and small farms, farm investment income was highest on medium farms followed by small farms and marginal farms and farm business income was highest on marginal farms followed by medium farms and small farms. On an average, yield per hectare was estimated 598.57 quintal.

The input output ratio regarding costs C_3, C_2,C_1,B_2,B_1, and A_2/A_1 were recorded 1:2.06,1:2.27, 1;2.57, 1:2.43, 1:2.78 and 1:2.97, respectively. On the basis of cost C_3 input output ratio was highest on medium farms (1:2.11) followed by small farms (1:2.08) and marginal farms (1:2.01), respectively. I t may be concluded the cost of cultivation on different size group of farm increases with an increase in farm size. But net return per hectare was found of negative trend with farm size. It was because of less increase in yield against the increased input factors at increasing size of farm.

The production function analysis showed In marginal household the production elasticities of seed, irrigation, plant protection chemicals, fertilizer and labour were 0.01, 0.06, 0.44, 0.24 and 0.63, respectively. The return to scale in marginal farm was 0.97 which shows decreasing return to scale i.e. marginal farmers were gaining less than what they were spending. The R^2 value of marginal household was 0.90 i.e. the considered variable explains 90.00 percent of the variation in depending variable i.e. return from sugarcane. It can be concluded that cost of fertilizer at 5 percent level of significance had significant influence on the returns.

In small household the production elasticity's of seed, irrigation, plant protection chemicals, fertilizer and labour were 0.10, 0.20, 0.25, 0.07 and 0.47, respectively. The return to scale in small farm was 1.09 which shows increasing return to scale i.e. small farmers were gaining more than what they were spending. The R^2 value of small household was 0.93 i.e. the considered variable explains 93.00 percent of the variation in depending variable i.e. return from sugarcane. The cost of seed at 5 percent level of significance and cost of irrigation at 1 percent level of significance had significant influence at the returns from sugarcane

In medium household the production elasticity's of seed, irrigation, plant protection chemicals, fertilizer and labour were 0.30, 0.44, 0.11, 0.23 and 0.02, respectively. The return to scale in medium farm was 1.10 which shows increasing return to scale i.e. medium farmers were gaining more than what they were spending. The R^2 value of medium household was 0.95 i.e. the considered variable explains 95.00 percent of the variation in depending variable i.e. return from sugarcane. It was found that the cost of seed at 5 percent level of significance and cost of irrigation at 1 percent level of significance had significant influence at the returns from sugarcane

In marginal the MVP of seed was 6.82, irrigation was 4.48, plant protection chemicals was 4.62, fertiliser was 2.42 and labour was 5.42 this shows that for production of one additional quintal of sugarcane the additional cost incurred for different is equal to the respected MVP. In small the MVP of seed was 5.53, irrigation was 2.19, plant protection chemicals was 2.36, fertiliser was 1.88 and labour was 1.39 this shows that for production of one additional quintal of sugarcane the additional cost incurred for different is equal to the respected MVP. In medium the MVP of seed was 4.12, irrigation was 1.21, plant protection chemicals was 1.64, fertiliser was 0.73 and labour was 1.55 this shows that for production of one additional quintal of sugarcane the additional cost incurred for different is equal to the respected MVP.

The constraints analysis concluded that availability of finance facilities was the biggest problem faced by 40 farmers in the study sample. In availability of sugarcane receipts from sugar mills was the second constraints faced by 37 farmers in the study sample the third, fourth, fifth, sixth, seventh, eighth and ninth constraints were in availability of unavailability of human and machinery labour, NPK dose, in availability of agriculture facilities, unavailability of plant protection chemical, in availability of high yield variety of sugarcane, in availability of seed at proper time and the problem of technical knowledge respectively which were faced by 35,30,24,17,13,12 and 11 farmers, respectively in the study sample. The last and the most minor constraint of natural calamity was faced by only 5 farmers.

Major suggestion received from the respondent side to overcome the mentioned problems were to strengthen the extension services for improvement of update criterion for farmers on upcoming methodologies to improve technological problems and practice system following traditionally to get advancement for better use of machinery, to substitute labour problems, problems of unavailability of receipts from sugar mills and financial support from financial institutions. Detail knowledge about input management, crop planning and budgeting as well as disposal of farm produce along with market information should be made available by various government schemes.

Hence it can be concluded that sugarcane farming is beneficial in the study area and can gain a lot of return with use of proper technique implementation and better extension services.

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APPENDIX

The details of the concept used in this study are as follows: Cost concept:

Costs include following certain concepts. The cost concepts and the items of cost included under each concept are given below:

Cost A_1: This cost includes actual expenditure incurred in cash and kind.

(i) Value of hired human, bullock and machinery labour

(ii) Value of seed (both farm produced and purchased)

(iii) Value of manure (owned and purchased)

(iv) Value of insecticides, pesticides and chemical fertilizer

(v) Deprecation on implements and farm buildings

(vi) Irrigation charges

(vii) Land revenue, and other taxes

(viii) Interest on working capital

(ix) Miscellaneous expenses (artisans, etc.)

Cost A_2: Cost A_1 + rent paid for leased in land

Cost B_1: Cost A_2 + interest on value of owned fixed capital assets (Excluding land)

Cost B_2: Cost B_1 + rental value of owned land (net land revenue) and rent paid for leased in land.

Cost C_1: Cost B_1 + imputed value of family labour.

Cost C_2: Cost B_2 + imputed value of family labour.

Cost C_3: Cost C_2 + 10 % of C_2 (managerial cost).

Income concepts:

Gross income:

Value of farm output (main product and by product) whether sold or utilized by the farm family.

Net income:

It is the difference between gross income and total cost, i.e. gross income minus cost C_3.

Family labour income:

Gross income minus cost B_1.

Farm business income:

Gross income - cost A_1 or Cost A_2 in case of leased in land.

Farm investment income:

Net income plus rental value of owned land plus interest on owned fixed capital.

Imputation Procedures:

Some of the inputs used in the production process come from family sources. The procedures adopted for deriving imputed values of these inputs are as under.

Family labour:

On the basis of wages to attached farm servant.

Owned animal labour:

On the basis of maintenance which includes the following:

(i) Cost of green and dry fodder

(ii) Cost of concentrates

(iii) Depreciation on animals and cattle sheds

(iv) Upkeep labour charges.

Owned machinery charges:

On the basis of cost of maintenance of farm machinery includes diesel, electricity, lubricants, depreciation, repairs and other expenses if any.

Implements:

Depreciation and charges on account of minor repairs.

Rent of owned land:

Estimated on the basis of prevailing rents in the village for identical type of land or as reported by the sample farmers, subject to the ceiling of fair rents given in the land legislation of the concerned state(Rs.10000/year for crop period).

Interest on owned fixed capital:

Interest on present value of fixed assets charged at the rate of 09 (fixed deposit rate) per cent per annum and half for the crop season.

Interest on working capital:

Interest on working capital is charged at the rate of 7 per cent (KCC rate) per annum on the working capital for half of the crop period.

DEPARTMENT OF AGRICULTURAL ECONOMICS

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TITLE: Economic Analysis of Sugarcane Cultivation in Sultanpur District of Eastern Uttar Pradesh

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ABSTRACT

Keeping in view the importance of Sugarcane crop as food, feed and fodder as well as income and employment generation in it's cultivation, disposal and industrial uses, a study on "Economic analysis of Sugarcane cultivation in Sultanpur district of Eastern Uttar Pradesh" was conducted. Main objectives were to analyse the cost and income measures, resource use efficiency and constraints in its cultivation. One hundred respondents were selected from Kurebhar block of distt. Sultanpur through purposive cum random sampling. Data were collected through personal interview on structured schedule. Tabular and functional analyses were done for presentation of the result. Selected respondents were distributed as 60, 25, and 15 per cent from marginal, small and medium category. Overall holding size was found 1.71 hectare varying from 0.65 to 2.97 hectare. Investment on farm assets was positively associated with size of farms. Sugarcane was placed on second place after wheat in cropping pattern and cropping intensity was inversely related with farm size. Costs of cultivation per hectare increased with farm size but income major had inverse relationship with size of holding, manures and fertilizers and irrigation found statistically significant on most of the farm size. MVP were more than one in all the cases except few which indicate the further chance of investment on variable inputs to get the additional income. From investigation in aggregate measures calculated for financial efficiency has shown the farm business income of marginal farms was seen to be more profitable than small and medium farms. Technical, irrigation, labour availability and finance problems were found as major constraints against Sugarcane cultivation which were suggested to overcome with the constructive support of the Government agencies and financial institution. Lastly it is conclude that sugarcane is most suitable crop from all points of view for the farmers of Sultanpur district.

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