

Socio-economic correlates of Rice production in Sakaldiha block of chandauli District (Uttar Pradesh)

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विश्वविद्यालय



BANARAS HINDU
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REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

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in

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Supervisor

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To,

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Through: The Head, Department of Extension Education, Institute of Agricultural Sciences, B.H.U, Varanasi.

Dear Sir,

This is to certify that the thesis entitled **“Socio-economic correlates of Rice production in Chandauli district”** submitted in partial fulfilment of the requirements for the degree of **Master of Science (Agriculture) in Extension Education**, from Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (U.P). , is a record of bonafide research carried out by **Ms. Damini kumari, ID. No. 18412EXE002**, under my supervision and no part of the thesis has been submitted for any other degree or institution.

I certify that the entire scheme of investigation reported here in was planned and carried out solely by the candidate under my guidance and supervision. The data presented in the thesis, to the best of my knowledge and belief, are genuine and have not been utilized for the award of other degree or distinction.

Thanking you,

Yours faithfully,
(Kalyan Ghadei)
Supervisor

Forwarded by

Head of Department

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By
Damini Kumari

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Date:

Place: Varanasi

(Damini Kumari)

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LIST OF SYMBOLS AND ABBREVIATION

%	-	Per cent
°E	-	Degree East
°N	-	Degree North
mha	-	Million hectare
et al.	-	(et albeit) and elsewhere
KCC	-	Kisan credit card
SHC	-	Soil health card
i.e.	-	Id est; that is
ICAR	-	Indian Council of Agricultural Research
M.Sc.	-	Master of Science
Avg.	-	Average
S.D.	-	Standard Deviation
NRRI	-	National Rice Research Institute

INTRODUCTION

“Everything else can wait, but not agriculture”

-Jawaharlal Nehru

Rice is a major food staple and a mainstay for the rural population and their food security. It is the second most cultivated cereal crop worldwide and is central to the lives of billions of people around the world (**Nguyen and Ferrero, 2006**). Rice belongs to the family Poaceae or Graminae and has two major subspecies which are called Japonica and Indica. Japonica is a sticky, short grained type of rice, usually cultivated in dry fields. Indica is nonsticky and long grained type of rice and is mostly grown in submerged fields. Both types have many different varieties. It is usually grown as an annual plant, but in the tropics it can be grown as a perennial. Rice prefers a tropical or warm climate, with a lot of rainfall. But if irrigation water is available, rice can also be grown in drier areas or during dry season. Rice is usually a self - pollinating plant, but cross pollination by wind is possible. Depending on the variety and soil, rice plant usually between 1 and 1.8 meter tall. Rice is usually grown on heavier soils that have a good water holding capacity.

Rice is the staple food of around three billion people of the world. The demand of rice is expected to rise globally as the population increases. India currently produces about 112 million tons of milled rice. To meet the demand of increased population, rice production has to be increased to 123 million tons in 2030 and 140 million tons in 2050. Productivity of rice, therefore has to be increased substantially to meet the growing demand of domestic market and export.(**T. MOHAPATRA, 2019**)

Rice is one of the most important staple food crops feeding more than half of human population across the world. Besides this, it accounts for about around 26 percent of total cereal production and about 20 percent of total cereal trade.

Out of the total net sown area of 140 mha, about 30% area is under rice. India is the 9th second largest producer of rice with an average annual production of 112 million tonnes from an area of 43 million hectares (mha) at an average productivity of 2.55 tonnes/hectare (t/ha). Our present national average productivity is less than global mean of 2.7 t/ha and less than half the productivity in countries such as China (6.71t/ha), Vietnam (5.57t/ha) and Indonesia (5.15t/ha). Out of total area, 24 mha of rice area in Punjab, Haryana, Uttarpradesh, West Bengal, Bihar, Odisha, and parts of Andhrapradesh, Tamilnadu is irrigated. About 17.2 mha is under rainfed area, Out of which more than 70% of which is in eastern India. Around 85% of the total rice production is contributed by the favourable ecologies of irrigated and shallow lowland. Rice is one of the most resource intensive crop among all the agricultural crops in India and annually it uses about 200 cubic kilometre of irrigation water, 6.5 mt of fertilizers, 17% pesticides used in Indian agriculture and emits 3.5 mt of methane. **(ICAR-NRRI, 2020)**

State Background

In Uttar Pradesh, agriculture is the most common occupation. Uttar Pradesh produces 19 percent of the country's total food grain production. Uttar Pradesh is the fifth largest Indian state, with an area of 2,43,286 sq km, and is located between 24° and 30.50° latitude and 77° and 84.50° longitude. It is one of the most populous states in the country. It is separated into three distinct regions: the Himalayan region in the north, which has a rough and varied landscape; the Gangetic plain in the middle, which has a lush, flat topography punctuated by numerous ponds, lakes, and rivers; and the Vindhya hills and plateau in the south. Uttar Pradesh's climate varies greatly, with temperatures ranging from 47 degrees Celsius in the summer to -1 degrees Celsius in the winter. Winter season lasts from October to February, summer season lasts from March to mid-June, and rainy season lasts from June to September. There are 75 districts in the state.

It offers diverse agro climatic conditions, which are conducive for agricultural production. The major crops grown in the state are paddy, wheat, sugarcane, potato, mustard, gram, pea, groundnut and lentil. The total cultivated area of the state is 16.68

Mha and the gross cropped area is 25.52 Mha. The cropping intensity in the state is 153%. The economy of Uttar Pradesh is based mainly on Agricultural and 65% of the total Population is dependent on agriculture. According to the survey of 2014-15, approximately 16.60 Mha (68.7%) land is used for cultivation. According to Agriculture Survey 2011-12 there are 233.25 lakh farmers in the state. In the year 2015-16, food grain production was 43.95Mt against the target of 62.66 Mt Out of which production in Kharif were 15.91Mt and Rabi 28.04 Mt. Production of oilseed crops was 0.85 Mt against the target of 1.30Mt. In the year 2016-17, 6.69 Mt fertilizer was distributed for achieving the higher yield by application of balanced nutrition. **(ICAR -NRRI 2019)**

U.P. is the most populous and dominating state on socio-political scenario of our country. The State is situated in the Gangetic plains between 24° and 30.50° latitude and 77° and 84.50° longitude. It is surrounded by Nepal and Uttarakhand in the North, Madhya Pradesh in the South, Bihar in the East and Haryana, Rajasthan & Delhi in the West. 2.2 area: The Total geographical area of the State is 240928 sq. km. The population growth rate recorded for this decade (2001-2011) was 77.73% which is worked out to be 7.32 percent of the total area of the country.

Uttar Pradesh comprises of the alluvial soil of Ganga and Yamuna and plateau of Bundelkhand. The entire state has tropical climate. Minimum and maximum temperature vary from season to season and place to place depending upon the climate and location. Monsoon remains active normally from June to September when 85% to 95 % of the annual rainfall is received during these months. The annual average rainfall is 854 mm in the state **(Roy and Ahmad 2015)**.

In Chandauli district most of the people depend on agriculture. The net sown area of the district is 1.37 lakh ha, of which, 1.30 lakh is irrigated (94.89%) and cropping intensity of 191%. The annual rainfall is around 497mm. The district contributes its significance with major production of rice and milk. Other crops include wheat, barley, pea, gram and lentil which are principle rabi crops. Paddy, bajra (pearl millet), jowar, sorghum and pulses are important kharif crops. The district also contributes in production of maize in zaid, fruits like mango, banana, guava and aonla

and vegetables like tomato, brinjal, cucumber and capsicum. In Chandauli district 28 rural market/ mandis, and 40 large and 150 small rice milling units are situated. The district contribute to Indian GDP by providing various cereals from the district include paddy and wheat popularly known as “*dhankakatora*” of Uttar Pradesh because of fertile lands of gangetic plan (**Source-District planning committee, Chandauli**).

Statement of the Problem

There have been many studies on the villages and its occupants of India, researching different issues and problems existing in these rural areas and affecting those populations which form the backbone of our country.

Chandauli district is famous for higher production of rice, also known as Bowl of rice(Dhan ka katora) . This fascinates us to know that what kinds of factors are responsible for higher rice production, which may be a climatic factor , social factor ,organizational factor, situational factor, psychological factor, technological factor etc. As a research scholar we want to know that which factor contributes more to the higher rice production and we also want to know that what type of the constraints experienced by the farmers in rice growing in the study area.

With this in mind, the present study “Socio-Economic correlates of Rice production in Sakaldiha block, Chandauli District” has been carried out.

Research questions-

The present study was conducted to answer the following research questions.

1. What is the socio-economic condition of the farmers in Sakaldiha block?
2. What are the factors responsible for higher rice production .
3. What kind of constraint experienced by the rice growers in chandauli district.
4. To study the relationship between Socio-economic characteristics and factors related to rice production.

Objective of the Study

The research on “Socio-economic Correlates of Rice production in Sakaldiha block, Chandauli District” was conducted, keeping the following objectives in view:

1. To study the Socio-economic profile of Rice growers.
2. To ascertain the factors responsible for higher rice production in study area.
3. To study the relationship between Socio-economic characteristics and rice production.
4. To study the constraints experienced by Rice growers in study area.

Assumptions of the Study

“An assumption is the supposition that an apparent fact or principle is true in the light of the available evidence” (**Goode and Hatt, 1981**).

The researcher made the following assumptions while undertaking the study:

- The respondents included in the sample were competent enough to reply to queries designed for the study.
- Responses furnished by the respondents were valid and reliable.
- Views and opinions of the respondents were reflective of the whole population of the study.
- The researcher was well adjusted to the social environment of the study area and the collected data was free from any biasness.
- The data was normally and independently distributed.
- The items and questions included in the questionnaire were relevant and appropriate.
- The results of study were applicable for all areas of India where similar socioeconomic conditions exist.

Importance of the Study

1. Through this study we will know the basics of rice production.
2. It also help us to know about the factors related to the rice production.
3. It help the policy makers and planners for developing the rice based industries.

Limitations of the Study

1. The research was conducted with limited time, resources and other research facilities.
2. The study was confined to Rice crop only.
3. As the study was confined to ten villages of a single block of Chandauli district, so the findings cannot be generalized on large scale or in broader perspective.
4. The collected information is based on the expressed responses and perception of the rice growers, their ability to recall and on the opinions expressed by them.
5. Due to limitation of time and researchers, some points may be left out or hidden from the purview of the present study.
6. The findings of the above study cannot be generalized for regions where similar socio-economic atmosphere does not prevail.

Organisation of thesis:-

There are five chapters that make up this thesis. Brief introduction, objectives, importance, and study limitations are all covered in the first chapter. In the second chapter, a survey of the literature pertinent to the subject was given. The third chapter provides an overview of the research methodology, covering the study's setting, its design, methods for collecting and measuring variables, as well as the statistical software utilised. The fourth chapter covers the investigation's findings, a result based on them, as well as appropriate tactics. The final chapter is limited to a summary and conclusion, as well as the study's implications and recommendations for additional research. References and Appendices appear at the end of the thesis.

REVIEW OF LITERATURE

With the goals of the research problem in mind, a concise review of the literature is provided below. The available and relevant literature related to the study have been presented under the following heads:

2.1 To study the Socio-economic profile of Rice growers.

2.2 To ascertain the factors responsible for higher rice production in study area.

2.3 To study the relationship between Socio-economic characteristics and rice production.

2.4 To study the constraints experienced by Rice growers in study area

2.1 Socio-Economic profile

2.1.1 Age

Subramanyeswari (1997) reported that majority of the respondents (52.50%) were of middle age followed by young (29.00%) and old age (18.50%) categories.

Kumar (2001) revealed that majority of the respondents (50.83%) were under middle age category followed by 30.84 per cent of young age category and 18.33 per cent old age category.

Bhagyalaxmi et al. (2003) noticed that majority (66.67%) of the respondents belonged to middle age group followed by young age (22.22%) and old age (11.11%).

Suresh (2004) reported that 64.58 per cent of respondents belong to middle age followed by 17.92 per cent in young age and 17.50 per cent in old age.

Samarpitha et al. (2016) noticed that in the study area maximum were middle aged (68.33%) whereas 23.33% belonged to old age group. However, the percentage of young farmers was very low with only 8.33%.

2.1.2 Caste Category

Pandey and Upadhyay (2012) concluded that majority of the respondents of the model village (82.50 per cent) belongs to general caste category followed by 20 per cent scheduled tribes (ST), 17 per cent other backward communities (OBC) and 15 per cent of scheduled castes (SC).

2.1.3 Education

Chandrapaul (1998) reported that majority (43.30%) of the respondents were functionally literate and only few (7.50%) respondents had high school education.

Baswarajaiah (2001) revealed that education status among the farm families of Mahaboobnagar district was 74.17 per cent, primary school (11.67%), middle school (8.33%), high school (4.17%) and college education (4.17%).

Vadher and Manoj (2014) indicated that about 30.2% of the farmers had completed graduation or post graduation, 18.3% of farmers had primary school level education and 3.4% of the shrimp farmers were illiterate.

Samarpitha et al. (2016) reported that Majority of the farmers (39.17%) were educated up to SSC to intermediate level followed by those with primary education (28.33%). One fourth (25%) of the sample farmers were found to be illiterates while 7.5% were graduates.

Venkatanarayana and Naik (2017) said that 72% of the farmers were either illiterate or had education up to 10th standard only, while the remaining 28% possessed higher educational qualifications.

2.1.4 Family size

Pandey and Upadhyay (2012) reported that the majority of the respondents (70 %) of the model village had larger family size i.e. more than five members. 25 per cent of the respondents had medium size of family consisting of three to five members. Only 5% of the respondents had small size of family (up to three members).

Kaur and Singh (2015) showed that half of the farmers (50%) had a family size of 5

to 6 members (medium sized families), 40% of the farmers belonged to the small sized families (upto 4 members in family), while just 10% of the farmers had large family size (more than 6 members in family).

Samarpitha et al. (2016) revealed that majority (51.67%) of the farmers belonged to medium sized families compared to small (43.33%) and large (5%) families. Thus, majority (95.00%) of the farmers owned small and medium sized families. Medium sized families might serve as an insurance against shortfall in supply of farm labour.

Venkatanarayana and Naik(2017) revealed that 60%of the farmers had a family size of 5 to 6 members, 36% the farmers belonged to the small sized families, while just 4% of the farmers had large family size.

2.1.5 Type of family

Yadav and Grover (2012) said that 68.00 per cent and 55.00 per cent of farm women labourers belonged to nuclear type of families and joint families respectively.

Devaki et al. (2015) revealed that majority (59.00 %) of the farm women had nuclear family, while the remaining 41.00 per cent had joint family.

Samarpith et al. (2016) reported that 56.67% of the farmers followed nuclear family system while 43.44% owned joint families. Nuclear families can play a vital role in the decision making process and adoption of new technology. The results showed the general inclination among the sample farmers towards having nuclear family where decision making would be quick and easier compared to joint family.

Tomar et al. (2016) concluded that Majority of the respondents (60.83 %) were from nuclear family and remaining 39.17 per cent belonged to joint family.

2.1.7 Annual income

Manjula (1995) reported that majority (65.00%) of respondents belonged to medium income group followed by high (21.67%) and low (13.33%) income group.

Kumar (2001) reported that 45.84 per cent of respondents were under medium income group followed by 27.50 per cent of low and 26.66 per cent of high income groups.

Suresh (2004) reported that most of respondents were in medium income group with 80.33 per cent followed by high and low income groups *i.e.*, 15.00 and 4.17 per cent, respectively.

Size of land holding

Kumar (1997) concluded that majority of the respondents (60.00%) had land holding of above 10 acres whereas 40.00 per cent of respondents had below 10 acres of land holding.

Sivanandan (2002) said that majority of the respondents (56.00%) were small farmers followed by marginal (26.00%) and big (18.00%) farmers.

Suresh (2004) revealed that majority of the respondents (68.75%) were having medium size of land holding followed by high (19.17%) and low (12.08%) size of land holding.

2.2 factors responsible for higher rice production in study area.

2.2.1 Climatic factor

Edeh (2011) revealed that Rice (*Oryza spp*) farming depends greatly on the environmental factors which are the most important among the several factors that influenced the agricultural production. Rainfall characteristics (intensity and duration), Relative humidity and temperature constitute the environmental factors that affect the rice yield.

Shuai *et al.* (2013) concluded that climate, technology and input, social and economic factors individually contribute about 23% to paddy rice production, and interactively contribute other 41%. Solar radiation is the dominant climate factor for paddy rice production.

2.2.2 land and soil factor

IJCRT (2018) concluded that Rice, wheat and pulses are the main crops in chandauli district. Because most of the part have alluvial (fertile) soil, adequate irrigation facilities and developed agricultural infrastructure. Fertile plane , gradual slope, irrigation facilities and proper market facilitated to rice production.

2.2.3 Economic factor

Ayoola *et al.*(2011) observed that farm production increases with the increase of farm size.

Obasi *et al.* (2012) findings implies that an increase in the size of land cultivated will inherently lead to an increase in rice production.

IJARSAS (2019) Economic factors have significant influence on rice production at farmer`s level and also on productivity.

Bashir (2019) concluded that rice production is influenced by human capital, labour, wages and price of rice significantly.

2.2.4 Situational factor

Singh (2015) Revealed that youngster are more prone to migration moving to urban centres for non- farm activities. Migration helped in rational use of two inputs, i.e. labour and irrigation in rice production. Migration helps in judicious use of labour at native place due to migration of surplus labour.

2.2.5 Technological factor

Kim (2010) said that the yield of rice production is affected not only by wheather factors but also by technological factors such as high-quality variety, breeding , dissemination and cultivation and policy support also

Chandio (2021) revealed that fertilizer consumption and agriculture credit positively influences rice production in the long and short run. Input factors (seed, irrigation ,fertilizer) play an active role in rice production.

2.2.6 psychological factor

Khushi (2019) said that the psychological factor is one of the most important matters of fact that affect farmer`s attitude towards rice production. Her findings of the study revealed that most of the farmer`s (98%) attitude towards rice production is favourable in the selected study area.

2.3 Constraint experienced by the rice grower in study area.

2.3.1 Bio-physical constraint

Somado *et al.* (2008) also founds weeds to be the most important biophysical constraint in rice cultivation.

Diagne (2013) Biotic constraints appeared to be the most important bio-physical constraint perceived by farmers. Among these biotic constraint weed infestation is the most important, followed by insect, birds and rodents.

2.3.2 Technological constraint

Baldeo (2006) revealed that 40.00 per cent of farmers in the locations of study faced the problem such as lack of combine fertilizers, not available bio-

Fertilizers to improve their soil, and high cost of fertilizers.

Nguyen (2006) said that lack of proper varieties was perceived by 60.00 per cent of respondents. The problems to create this constraint were poor quality, low yield, susceptibility to diseases, pests, saline soil, logging, etc.

Karangami (2019) find in their study that Constraint faced by the farmers are high cost of machineries (68.34%), lack of knowledge of making appropriate concentration of insecticide/ fungicide for use (65%), non availability of quality seeds(61.67%), could not identify pest and diseases(37.50%), unavailability of weedicide at village (52.5%).

Singh (2010) Lack of conviction in new technology was expressed by 35% of the respondent. Most of the respondents were not convinced about the merits of some of the costly rice technology and did not adopt them as they were unsure of proportionate increase in production. Non availability of desired technology was seen as a constraint by 38 % of the respondent in rice cultivation.

2.3.3 Socio-economic constraint

Nguyen (2006)) in their study found that the socio-economic constraint i.e. poor infrastructure (78%) , high cost of inputs , credit problems, low rice price, inadequate inputs supply (60%) and lack of training (54%) were most important constraint as

perceived by large percentage of farmers.

Singh (2006)The inadequate inputs supply was another constraint as perceived by 60 per cent of the Indian farmers.

2.3.4 Institutional constraint

Varshney Lack of proper communication system was reported as a constraint by 30% of the respondents. Due to inadequacy of agricultural programmes on radio and television, print publications, farm and home visit etc , the respondents were not aware of yield gap and how to eliminate it. Lack of transport facilities was reported by 29.17% of the respondents.

RESEARCH METHODOLOGY

In this chapter, the general techniques and description of the research methods and procedures adopted in the investigation are explained under the following major heads.

- 3.1 Locale of the study
- 3.2 Selection of villages and respondents
- 3.3 Research design
- 3.4 Variables and their empirical Measurement
- 3.5 Methods of data collection and tools preparation
- 3.6 Analysis and interpretation of data.

3.1 Locale of the Study

Uttar Pradesh is one of the major rice growing state in india and rank 3rd in the country in terms of production. Rice is grown in normal area of 59.04 lakh ha, which is 13.45% of the total national acreage with production of 132.67 lakh tones(12.3% of national production) and yield of 2247kg/ha(Avg.2013-14 to 2017-18). Uttar Pradesh is divided into 75 districts, the highest number of district in India. Rice is grown in all 75 district of the state.

The study was conducted in Sakaldiha block of Chandauli district in the state of Uttar Pradesh. The total population of the district is 1,952,756. The district fall under eastern plain agro-climate zone and is divided into 9 blocks with 494 villages. **(Census, 2011)**

Selection of District and Block

Chandauli is a district in the Uttar Pradesh State with an area of 2,541 km² which includes 2,487.28 km² rural area and 53.72 km² urban area. It has a density of around 768 persons per square kilometer. Chandauli district ranks 48th in term of population in the state. Chandauli is one of the major rice growing district also known as Bowl of rice (dhan ka katora) .

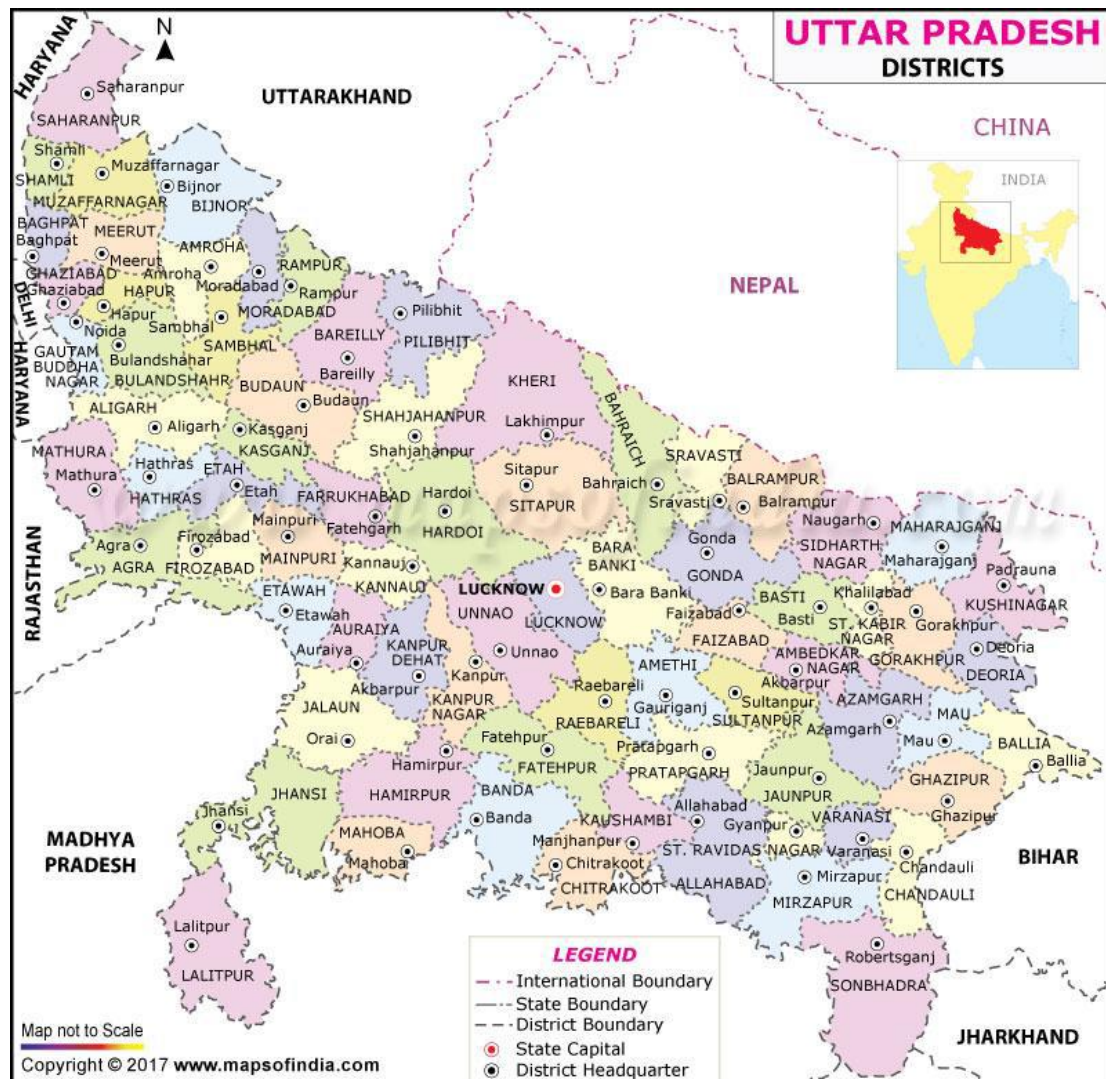


Fig. 3.1 Uttar Pradesh with its districts

About 77.73% of total rural population living in rural areas of Uttar Pradesh has around 55% of the households living in 1329 villages (Census 2011), so it becomes an apt place to study the profile of farmers and the results can hopefully be generalized for

other regions with similar socio-economic conditions of living.

Table 3.1: Basic facts about India, Uttar Pradesh and Chandauli:

S.No.	Parameter	India	Uttar Pradesh	Chandauli
1	Latitude	8 ⁰ 4' to 37 ⁰ 6'N	23°52'N to 31°28'N	24 ⁰ 56'N to 25 ⁰ 35'N
2	Longitude	68.7 ⁰ to 97.25 ⁰ E	77.3 ⁰ to 84.39 ⁰ E	81 ⁰ 14'E to 84 ⁰ 24' E
3	Area	3,287,263 km ²	2,43,286 km ²	2,541km ²
4	Total population	1.211 billion	204.2 million	1,952,756
5	Urban population	31.16%	22.2%	12.42%
6	Rural population	68.84%	77.73%	87.58
7	Male population	51.50%	52.28%	52%
8	Female population	48.50%	47.72%	48%
9	Total literacy	74.04%	67.68%	71.48%
10	urban literacy	85%	75.14%	76.7%
11	Rural literacy	68.9%	65.46%	70.7%
12	Male literacy	82.10%	77.28%	81.72%
13	Female literacy	65.46%	57.18%	60.35%
14	Population density	382	666	768
15	No of village	649481	107753	494
16	No of household	24,84,98,494	33,232,433	2,96,804
17	Sex ratio	940	912	913

(Census 2011)

Chandauli district consist of 9 blocks out of which one block was selected through purposive sampling as maximum number of rice growers resides in this area.

The administrative blocks of Chandauli are:

1. Barahani
2. Chandauli
3. Sakaldiha

4. Dhanapur
5. Chakiya
6. Niyamtabad
7. Shahabganj
8. Naugarh
9. Chahaniya



Fig. 3.2 Chandauli district with Sakaldiha block

Sakaldiha block

Study of “Socio-economic correlates of rice production” in Sakaldiha block of Chandauli district in Uttar Pradesh was undertaken in this study. Sakaldiha is a town and tehsil in chandauli district of Uttarpradesh. According to census 2011 information, the sub-district code of sakaldiha block (CD) is 00992.Total area of sakaldiha tahsil is 662 km sq. including 660.71km sq.rural area and 1km sq urban area. Sakaldiha tahsil has total population of 691,346. Out of which, 358,065 are males and 333,281 are females. It has 109223 kids in the age bracket of 0-6 years. Among them 57141are boys and 52082 are girls Literacy rate in Sakaldiha block is 74.26%. Among which85.66% males and62.07% females are literate.

3.2 Selection of Villages and Respondents

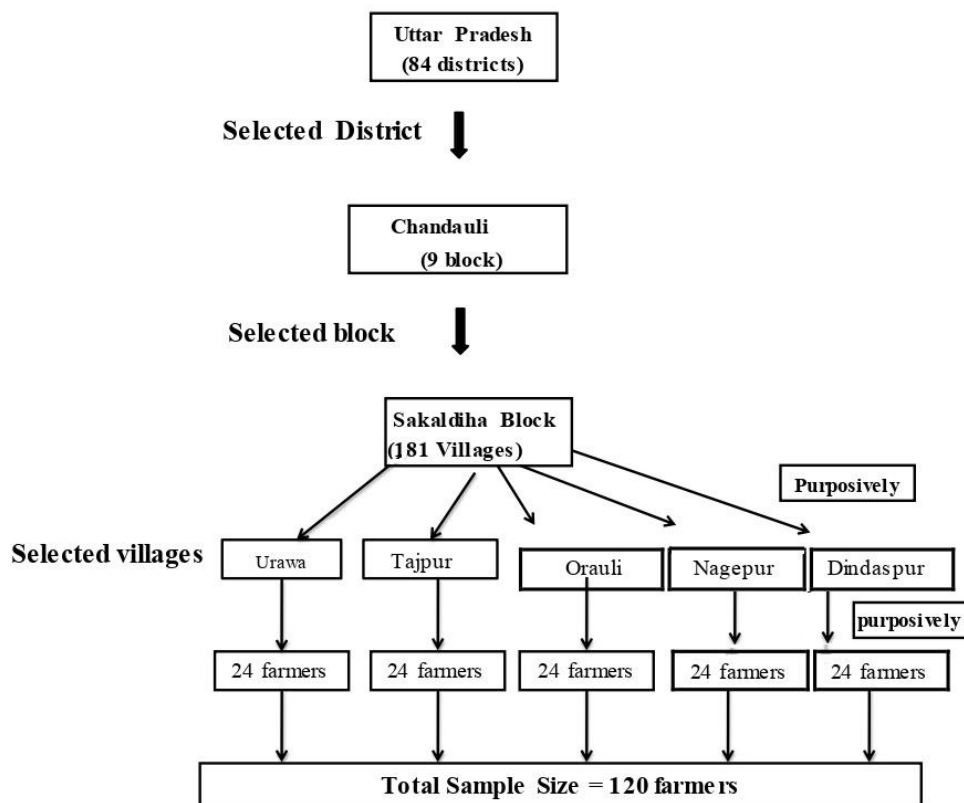


Fig. 3.3: Multistage Sampling method for selection of respondents

The study was conducted in Sakaldiha block of Chandauli district. Out of 181 villages of Sakaldiha block, 5 villages were selected for the study. The villages selected for the study are: 1.Urawa 2.Tajpur 3.Orouli 4.Dindaspur 5.Nagepur.

Method used for selection of respondents was purposive sampling. Out of the total farmers, 120 farmers were selected for the study. The respondents were selected from different strata of the village society to truly reflect the Socio-economic Profile and factors related to the rice production This study was undertaken to know the socio-economic and some other factors responsible for rice production in Sakaldiha block of Chandauli district, so that the results can be studied for finding the factors which correlates the higher rice production.

3.3 Research Design

A descriptive Research design was used for the present study. Descriptive research refers to the method that describes the characteristics of the variables under study. Descriptive research is called an observational research method as none of the variables in the study are influenced during the process of research.

3.4 Variables and their empirical measurement.

3.4.1 Socio-economic profile of the farmers

3.4.1.1 Age

It is referred to the chronological age of the respondents in completed years at the time of investigation. The respondents were further grouped into three categories.

S.N	Category	Range	Score
1	Young	Up to 46 years old	1
2	Middle	Between 47 to 69 years	2
3	Old	Above 70 years	3

3.4.1.2 Gender

It refers to the gender of the respondents. It was measured in terms of Male and Female.

S.No.	Category	Score
1	Male	2
2	Female	1

3. 4.1.3 Caste category

It refers to the social status or position of the respondents which is acquired through heredity. It was measured as per the Government of India norms in terms of General, Other Backward Caste, Scheduled Caste and Scheduled Tribes and The scores for measurement given as -

S.No	Social Category	Score
1.	General	1
2.	OBC	2
3.	SC	3
4.	ST	4

3.4.1.4. Education

It refers to the formal education obtained by the respondent through educational institutions. It was measured in terms of Illiterate, Literate, Primary school (1to 4 class), Middle school (5th-7th), secondary School (8th-10th), Intermediate (11th-12th), Graduation and above graduation and the score for the measurement was given as follow-

S.No.	Category	Score
1.	Illiterate	1
2.	Literate	2
3.	Primary	3
4.	Middle	4
5.	Secondary	5
6.	Intermediate	6
7.	Graduation	7
8.	Above graduation	8

3.4.1.5. Type of Family

The type of family refers to the family being nuclear or a joint family. Nuclear family is one which is composed of a married couple and their unmarried children. A joint family is composed of two or more married couples and their children.

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

3.4.1.5. Marital status

It refers to the state of being married or not married of the respondents. It was measured in terms of the status of respondents as Unmarried, Married, widow and the score for measurement was given as follow-

S.No.	Category	Score
1.	Married	3
2.	Unmarried	2
3.	Widow	1

3.1.4.6. Size of family

The number of family members indicates the size of a family. It was measured in terms of small (1-3 members), Medium(4-6), Large(7-9), Very large family (>9 members) and score for the measurement was given as follow-

S.No.	Category	Score
1.	Small (1-3 members)	1
2.	Medium (4-6 members)	2
3.	Large (7-9 members)	3
4.	Very large (> 9 members)	4

3.4.1.7. Annual income

It refers to the estimated annual income of the respondents coming from Rice farming. Three categories of annual income were made according to mean (123208.3) and standard deviation (100848.9).

S.No	Categories	Range	Score
1.	Low	<22359.42	1
2.	Medium	22359.42 - 224057.2	2
3.	High	>224057.2	3

3.4.1.8. Land holding

It means total area owned by a family in Bigha or Acre or Hactare. This variable was measured in terms of marginal (<1ha), small(1-2ha), semi-medium(2-4ha),medium(4-10ha)and large (>10ha) as per GOI classification. Conversion formula 1 ha =6.40 bigha was used.

S.N.	Category	Range	Score
1	Marginal farmers	< 1 ha	1
2	Small farmers	1-2 ha	2
3	Semi-medium farmers	2-4 ha	3
4	Medium farmers	4-10 ha	4
5	Large farmers	>10 ha	5

3.4.1.9. Farming experience.

It has been operationally defined as the total no. of year for which farmers engaged in farming practices. It is measured by direct questioning to the respondent about the no. of years completed by them on farming activities. Farming experiences categories were made according to the **mean (34.81)** and **standard deviations (12.26)**.

S.N.	Categories	Score
1.	Low (< 22 years)	1
2.	Medium (22-47 years)	2
3.	High (> 47 years)	3

3.4.10 Possession of SHC

To protect the soil health and for sustainable agriculture, the government of India launched soil health card scheme in February 2015. A SHC is meant to each farmer soil nutrient status of his holding and advise him on dosage of fertilizers and micronutrients and also needed the soil amendments that he should apply to maintain soil health in long run. The scheme is considered as holistic measure for soil health and farm economy.

A SHC carries crop wise recommendation of nutrients and fertilizers required for the individual farms to help farmers to improve productivity through judicious use of inputs.

S.no	Category	Score
1	Yes	0
2	No	1

3.4.11 Factors responsible for higher rice production in study area.

There were some factors responsible for higher rice production in study area. A structured schedule was prepared and few statements regarding the factors were given. Perception of the respondents was taken in 5 point rating scale. Contribution of these factors to rice production were measured in 5 point rating scale as No effect, Minor effect, Neutral, Moderate effect, Major effect and score for measurement was given as follow-:

Rating scale	Scores
NO effect	1
Minor effect	2
Neutral	3
Moderate effect	4
Major effect	5

3.4.12 Constraint experienced by the rice growers in study area.

Some constraints were experienced by the rice growers. In a structured schedule few statements regarding these constraints were given, perception of the respondents regarding these constraints was taken in 3 point rating scale as Not Important, Less Important, Important and score for the measurement was given as-

Rating Scale	Score
Not Important	1
Less Important	2
Important	3

Hypothesis Formulation

According to Kerlinger (1973) Hypothesis is the conjectural statement of the relation between two or more variables. Hypothesis is always in declarative sentence form, and they relate either generally or specifically, variables to variables. The hypothesis to be tested in this study is given below-

<p>H0: There is no relationship between independent variable (climatic factor, land and soil factor, economic factor, technological factor, psychological factor, organizational factor, social factor) and rice production.</p> <p>H1: There is significant relationship between independent variable and rice production.</p>
<p>H0: There is no relationship between Socio-economic characteristics of the respondents and rice production.</p> <p>H1: There is significant association between profile characteristics and rice production.</p>

3.5 Tools and technique of data collection

A structured interview schedule was developed for collection of data in the study area. It consists of three parts based on objectives of the study. Part I dealt with question related to Socio-Economic profile of rice growers, Part II dealt with perception of farmers towards the factors responsible for higher rice production and Part III dealt with some constraints experienced by the farmers in growing of rice.

3.6 Analysis and interpretation of data

The data collected from the respondents were scored and tabulated according to respective categories. Various Statistical methods were used in the study for precise and meaningful analysis and interpretation of the data collected which are given as follows-

Frequency and percentage

Frequency and percentage were used to know the distribution pattern of respondents for each of the selected categories. Percentages were used for standardization of size by calculating the number of individuals that would be in a given category, if the total number of cases were 100.

Arithmetic mean

Arithmetic mean is the result of sum of all the items in the series divided by the number of items. Mean of sample was calculated by summing all the individual score and dividing it by number of cases. The formula is:

Mean was calculated by using the following formula.

$$\bar{X} = \frac{\sum X_i}{n}$$

Whereas,

\bar{X} = Mean

n = number of observation

X_i = value i^{th} of observation

Standard Deviation

It is defined as the positive square root of the arithmetic mean of the squares of the deviations of the given values from arithmetic mean. The square of the standard deviation is called variance.

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu)^2}$$

Where,

μ = mean of all the scores of the respondents

σ = standard deviation

N = total number of respondents

X_i = each score of the respondents

Correlation

Correlation is used to test relationships between quantitative variables or categorical variables. In other words, it's a measure of how things are related. The study of how variables are correlated is called **correlation analysis**.

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

RESULTS AND DISCUSSION

This chapter deals with the results of the present study. The findings of the study have been presented on the basis of collected data and its analysis was done using relevant statistical tools and techniques with relation to the specific objectives of the study. Thus, the data collected was coded, analyzed, interpreted and the results were presented and discussed under the following head:-

4.1 To study the Socio-economic profile of Rice growers.

4.2 To ascertain the factors responsible for higher rice production in study area.

4.3 To study the relationship between Socio-economic characteristics and rice production.

4.4 To study the constraints experienced by Rice growers in study area.

4.1 Socio-Economic variables of farmers –

Age

Table 4.1.1 shows that respondents who are between the ages of 35 and 55 years i.e middle age category have the highest percentage of respondents (60.00%), followed by respondents who are younger (20.00%) and (16.66%) respondents were older in age. Based on the Mean (44.99) and S.D(9.4) this classification was created.

Similar responses were observed in a study conducted by Kewalemadhuri (2013) at AAU Anand, where the majority of respondents were in the middle age range.

Table 4.1.1: Distribution of respondents according to their age
(N=120)

S.N.	Category	Frequency	Percentage
1	Young (Upto 35 years)	28	23.34
2	Middle (35 to 55 years)	72	60.00
3	Old (above 55 years)	20	16.66

Gender

4.1.2 Distribution of the respondent according to their gender (N=120)

S.N.	Category	Frequency	Percentage
1	Male	89	74.17
2	Female	31	25.83

According to Table 4.1.2's breakdown of respondents by gender, 74.14 percent of respondents are male and 25.83 percent of respondents are female.

4.1.3 Caste category

Table 4.1.3: Distribution of respondents according to their caste category (N=120)

S. N.	Category	Frequency (n)	Percentage (%)
1	General	38	31.67
2	OBC	62	51.67
3	S.C	20	16.66
4	S.T	0	0

Table 4.1.3 shows that the majority of the respondents (51.67%) belonged to OBC category. Around 31.67 per cent belonged to general category and 15.83 per cent belonged to SC category. There were no respondents from ST category.

4.1.4 Education

Out of 120 respondents, 25.83 percent had completed schooling up to the intermediate level, followed by 17.5 percent of post-graduates, 15 percent of graduates, 13.33 percent of primary students (1-4), 13.33 percent Secondary students , and 9.16 percent of middle students (5-7).

Table 4.1.4: Distribution of respondents according to their education level

N=120

S.N.	Category	Frequency	Percentage
1	Illiterate	5	4.16
2	Literate	2	1.66
3	Primary(1-4)	16	13.33
4	Middle (5-7)	11	9.16
5	Secondary	16	13.33
6	Intermediate	31	25.83
7	Graduation	18	15
8	Post-graduation	21	17.5

4.1.5 Marital status

Table 4.1.5: Distribution of the Respondents according to marital status (N=120)

S. N.	Category	Frequency (n)	Percentage (%)
1	Unmarried	0	0
2	Married	50	100

Table 4.1.5 revealed that all respondents were married and none of the respondents belongs to Unmarried category.

4.1.6 Land holding

Table 4.1.6 clearly shows that Out of the total respondents, the majority of respondents (35%) fall into the small farmer category, followed by 25 percent of marginal farmers and 20.83 percent of respondents with medium-sized farms.

Table 4.1.6: Distribution of respondents according to landholding

N=120

S.N.	Category	Range	Frequency	Percentage
1	Marginal farmers	<1 ha	30	25.00
2	Small farmers	1-2 ha	42	35.00
3	Semi-medium farmers	2-4 ha	18	15.00
4	Medium farmers	4-10 ha	25	20.83
5	Large farmers	>10 ha	5	4.17

4.1.7 Annual Income

The bulk of respondents i.e. 90.83 percent of the total respondents have annual incomes that fall into the medium category. Only 10% of farmers fell into the high income category, defined as earning more than Rs 224057.2 per year, and only 0.83 percent of respondents fell into the low income category based on **Mean (123208.3) and S.D (100848.9)**

Table 4.1.7: Distribution of respondents according to their income

N=120

S.No.	Category	Range	Frequency	Percentage
1	Low	<22359.42	1	0.83
2	Medium	22359.42-224057.2	109	90.83
3	High	>224057.2	10	8.33

4.1.8. Farming experience.

4.1.8 Distribution of respondent based on farming experiences (n =120)

S.No.	Categories	Frequency	Percentage
1.	Low (up to 22 year)	23	19.16
2.	Medium (22-47)	75	62.5
3.	High (above 47)	22	18.34

S.D -12.26 Mean - 34.81

Table show that majority of the respondent (62.5%) had a medium level of farm experiences followed by low (19.16%) level of farm experiences.

4.1.9 Possession of SHC

4.1.9 Distribution of the respondent having SHC

S.no	Category	Frequency	Percentage
1	Yes	55	45.84
2	No	65	54.16

Table 4.1.9 shows that 45.83% respondents have SHC.

4.1.10 Distribution of respondent based on use of rice varieties for cultivation.

S.N.	Name of variety	Frequency	Percentage
1	Nati masuri (MTU7029)	25	20.83
2	Moti	46	38.33
3	Chintu	17	14.16
4	Badsahbhog	3	2.5
5	Sambha	11	9.16
6	Ratnagiri	1	0.83
7	Badi masuri	4	3.33
8.	Zeera -32	7	5.83
10.	Sonam	2	1.66
11.	Krishna	2	1.66
12.	R-31	1	0.83
13.	Dhan-rekha	1	0.83

Table 4.1.10 shows that majority(38.33%) of the respondents used moti variety followed by (20.83%) of respondents used nati masuri (MTU 7029) and (14.16%) of the respondents used chintu variety whereas some of the respondents used (9.16%) sambha variety and merely of the respondents (0.83%) used R-31, Dhan- rekha and Ratanagiri variety.

4.2 Factors responsible for higher rice production in study area.

There are some factors responsible for higher rice production in study area. A structured schedule is prepared and few statements regarding the factors are given then perception of the respondents was taken in 5 point rating scale and contribution of these factors to rice production are measured in terms of frequency and percentage according to the perception of farmers as No effect, Minor effect, Neutral, Moderate effect and Major effect.

4.2.1 Distribution of the respondent according to the perception of climatic factor

Name of factor	No effect		Minor effect		Neutral		Moderate effect		Major effect	
	F	%	F	%	F	%	F	%	F	%
1 climatic factor										
i. Length and pattern of rainfall is responsible for more rice production.	0	0	0	0	5	4.16	45	37.5	70	58.3
ii. Solar radiation is essential for rice.	5	4.16	9	7.5	13	10.8	59	49.1	34	28.3
iii. Day - length is favorable for rice production.	0	0	2	1.66	18	15	43	35.8	57	47.5
iv. Relative humidity promotes the growth of rice.	0	0	5	4.16	30	25	40	33.3	45	37.5

It could be observed from the table 4.2.1 that there were no respondents (0%) who perceived that there is no effect of length and pattern of rainfall and merely respondent (4.16%) said that solar radiation has no affect on rice production. (0%) of the respondents perceived that day-length has no contribution in rice production whereas (0%) of the respondent perceived that relative humidity has no affect on rice production.

It is also observed that there were no respondents (0%) who perceived that there is minor affect of length and pattern of rainfall on production of rice whereas (7.5%) of the respondent said that there were minor affect of solar radiation on rice production and (1.66%) of the respondent perceived that rice production is minorly contributed by day- length and (4.16%) of the respondent favors that relative humidity has minor affect on rice production.

Table 4.2.1 also shows that merely respondents (4.16%) said that there is neutral affect of rainfall, Whereas (10.8%) respondents perceived neutral affect of solar radiation, and (15%) said that day length has neutral affect and (25%) perceived neutral affect of relative humidity on rice production.

It could also observed from the table 4.2.1 that (37.5%) of the respondents perceived moderate and (58.3%) of respondents perceived major effect of length and pattern of rainfall,(49.1%) perceived moderate and (28.3%) of respondents perceived major effect of solar radiation and (35.8%) of day length and (33.3%) favors moderate affect of relative humidity on rice production.

Whereas majority of the respondents (47.5%) perceived major contribution of day length in rice production and (37.5%) of the respondents perceived major affect of relative humidity on rice production.

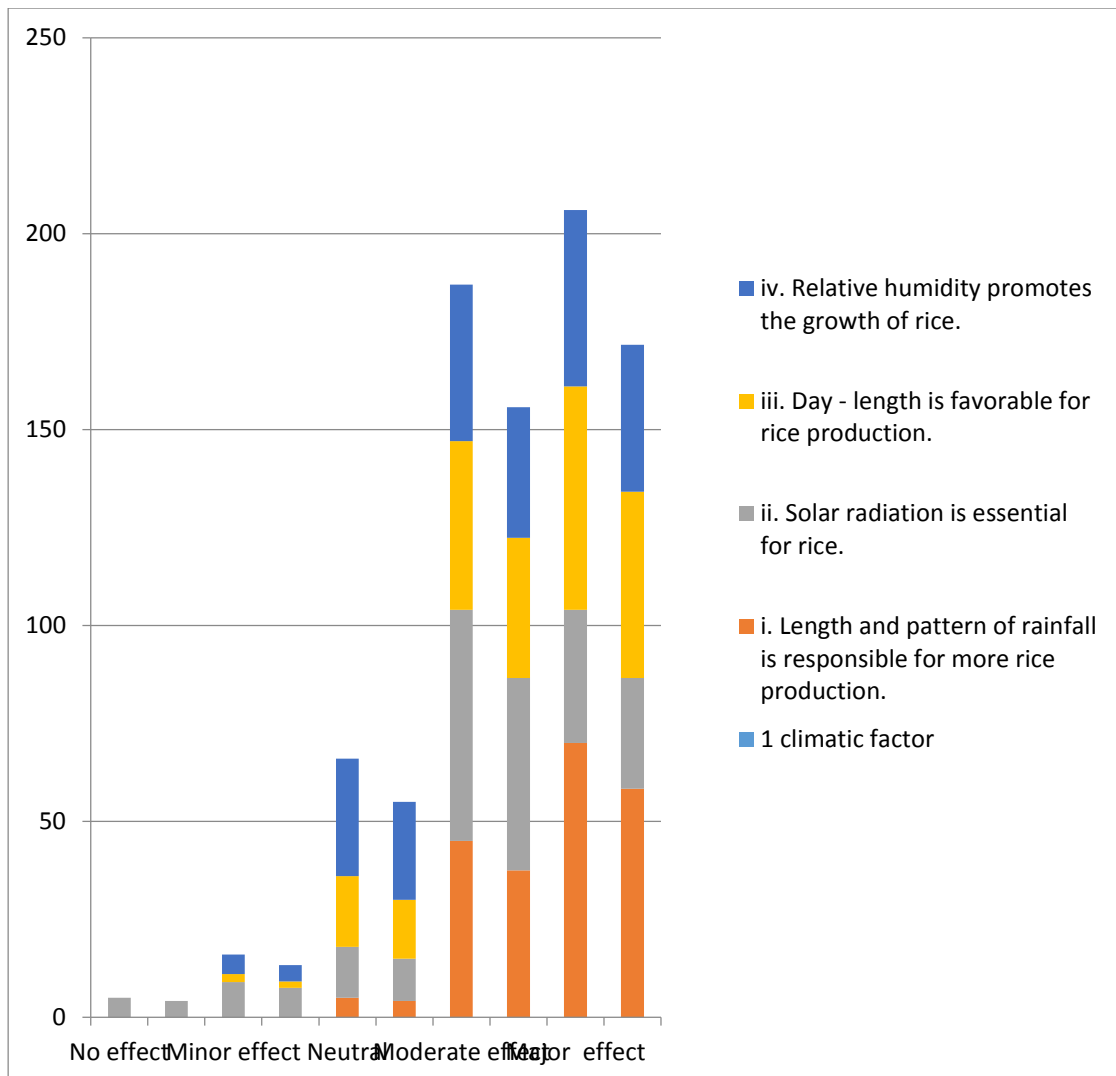


Fig. 4.1 : Distribution of the respondent according to the perception of climatic factor

4.2.2 Distribution of the respondent according to the perception of land and soil factor.

Name of factor	No effect		Minor effect		Neutral		Moderate effect		Major effect	
	F	%	F	%	F	%	F	%	F	%
2. land and soil factor										
i .Grain yield is high due to plain area.	0	0	0	0	1	0.83	54	45	65	54.16
ii. Soil type is more productive for rice.	0	0	0	0	2	1.66	76	63.33	42	35
iii. Level of soil fertility is good for rice.	0	0	1	0.83	10	8.33	69	57.5	40	33.33
iv. Soil testing facility help in rice production.	10	8.33	7	5.83	26	21.6	56	46.6	21	17.5
v. Water holding capacity of soil is good for rice.	3	2.5	13	10.83	81	67.5	17	14.16	6	5
vi. Soil solarisation in nursery is responsible for rice production.	49	40.83	53	44.16	14	11.6	3	2.5	1	0.83
vii. Soil preparation is better for rice production.	2	1.66	8	6.66	34	28.33	55	45.83	21	17.5
Viii. Summer ploughing helps in rice production.	1	0.83	12	10	25	20.83	49	40.83	33	27.5

It could be observed from the table 4.2.2 that (54.16%) of the respondent perceived that grain yield is high majorly due to plain area whereas (33.3%) respondents said that level of soil fertility is good for rice and(35%) respondents said that soil type is very good for rice and (17.5%) said the major effect of soil testing and (17.5%) respondents perceived the major effect soil preparation and (27.5%) of the

respondents said that summer ploughing helps in rice production.

Whereas (45%) of the respondents perceived moderately that grain yield is high due to plain area and (63.3%) said the moderate effect of soil type in rice production, and (57.5%) of the respondents perceived moderate effect of level of soil fertility, (46.6%) said the moderate effect of soil testing in rice production and (45.83%) respondent perceived that there is moderate effect of soil preparation and (40.83%) perceived moderate effect of summer ploughing in rice productio

4.2.3 Distribution of the respondent according to the perception of economic factor

Name of factor	No effect		Minor effect		Neutral		Moderate effect		Major effect	
	F	%	F	%	F	%	F	%	F	%
i. Provision of credit facility (KCC) helps in rice production.	56	46.6	50	41.6	8	6.66	4	3.33	2	1.66
ii. Market accessibility is important factor for rice production.	0	0	2	1.66	5	41.6	76	63.33	37	30.83
iii. Demand of rice facilitates rice production.	0	0	0	0	9	7.5	44	36.66	67	55.8
v. Guaranteed selling price encourages rice production.	0	0	7	5.83	43	35.8	57	47.5	13	10.83
vi. Low cost of production helps in rice cultivation	50	41.66	50	41.6	20	16.6	0	0	0	0

It is observed from the table that (46.6%) of the respondents perceived that there is no contribution of KCC in rice production and (41.6%) respondents perceived minor contribution of KCC in Rice production whereas merely (1.66%) and (3.33%) of the respondents perceived major and moderate effect of KCC in rice production.

It is also observed from the table that (63.33%) of the respondents perceived moderate effect of market accessibility followed by (33.33%) respondents have

perceived major affect in rice production.

Whereas (55.8%) of the respondents said that demand of rice is majorly facilitates rice production followed by (36.66%) of the respondents perceived moderately that demand of rice facilitates rice production and (47.5%) of the respondents perceived the moderate effect of guaranteed selling price in production.

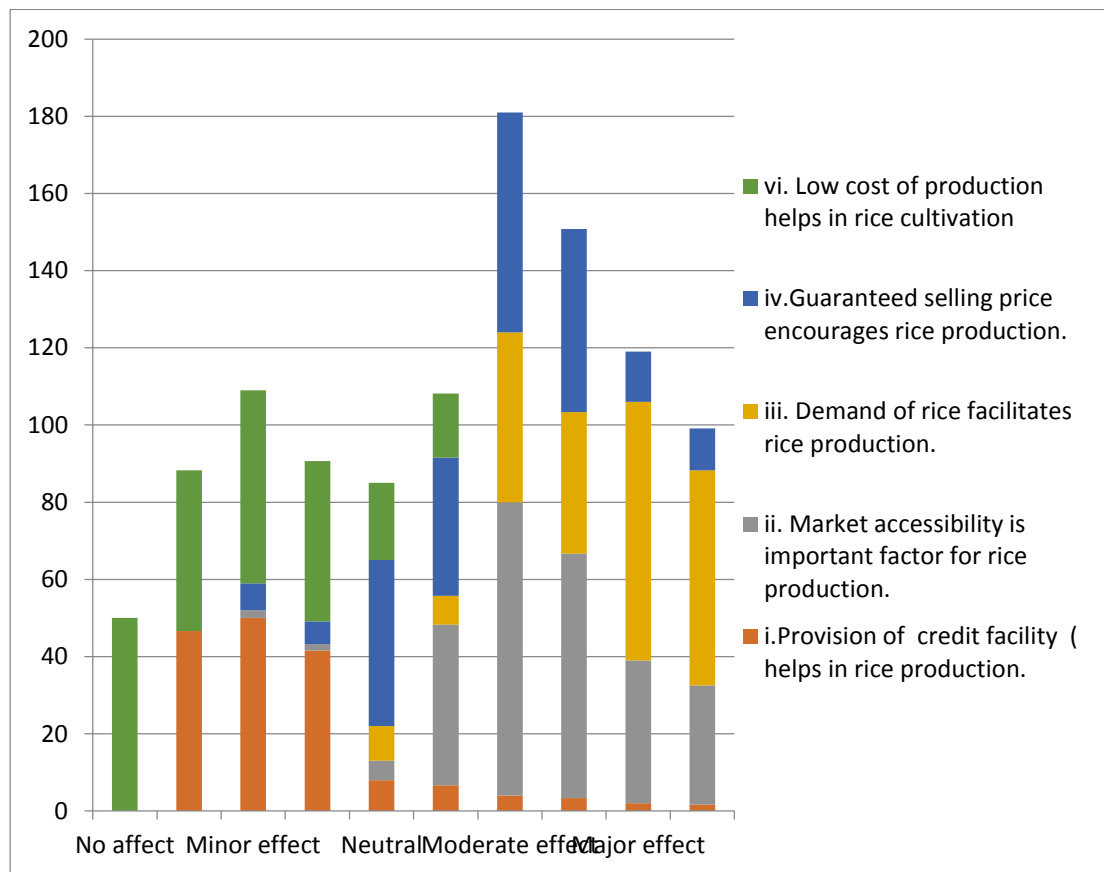


Fig. 4.2 : Distribution of the respondent according to the perception of economic factor

4.2.4 Distribution of the respondent according to the perception situational factor

Name of factor	No effect		Minor effect		Neutral		Moderate effect		Major affect	
	F	%	F	%	F	%	F	%	F	%
4. Situational factor										
i. Impact of migration affect high rice production	78	65	25	20.8	12	10	5	4.1	0	0
ii. Availability of storage facility helps in rice production.	97	80.8	19	15.8	4	3.3	0	0	0	0
iii. Availability of processing facilities are responsible for rice production.	94	78.3	26	21.6	0	0	0	0	0	0

Table 4.2.4 shows that majority of the respondents (65%) perceived no effect of impact of migration on followed by (20.8%) respondents have opinion that minor effect of impact of migration on rice production and (80.8%) of the respondents also perceived that that there is no effect of availability of storage facility on rice production.

Whereas (78.3%) of the respondents said that no effect of availability of processing facility, followed by (21.6%) of the respondents perceived minor effect of availability of processing facility on rice production.

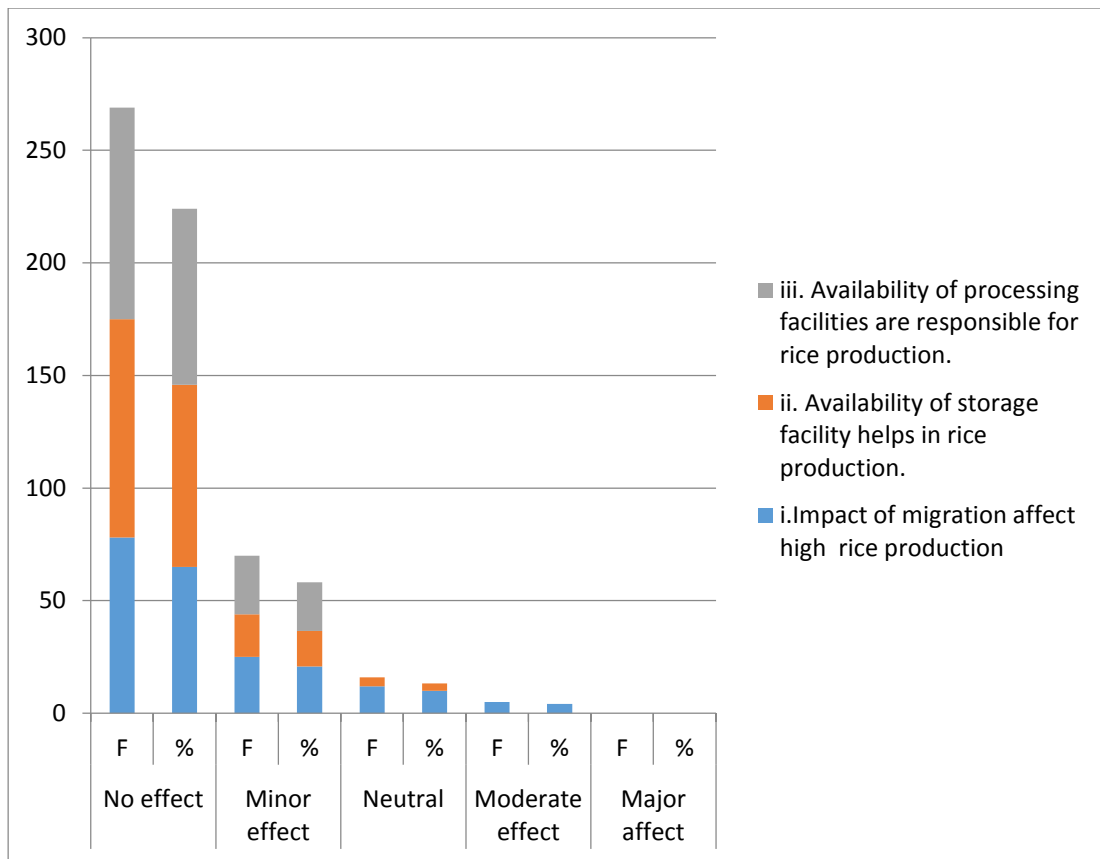


Fig. 4.3 : Distribution of the respondent according to the perception situational factor

4.2.5 Distribution of the respondent according to the perception of technological factor

Name of factor	No affect		Minor affect		Neutral		Moderate affect		Major affect	
	F	%	F	%	F	%	F	%	F	%
5. Technological factor										
I. Seed										
Ia .Use of High yielding varieties of rice.	18	15	8	6.6	25	20.83	59	49.16	10	8.3
Ib. Use of hybrid seeds of rice	52	43.3	55	45.83	10	8.33	3	2.5	0	0
Ic. Use of long duration varieties.	19	15.8	22	18.33	24	20	50	41.66	5	4.16
II.facilities for proper irrigation help in rice production	2	1.33	3	2.5	9	7.5	38	31.66	68	56.6
III. Improved production practices is responsible for rice production	36,	30	31	25.83	41	34.16	9	7.5	3	2.5
IV. Balanced use of fertilizer helps in rice production	5	4.16	3	2.5	7	5.83	78	65	27	22.5
V.. Scope to use rice By-products is a factor of rice production	81	67.5	34	28.33	3	2.5	2	1.66	0	0
VI. Value addition in this area is factor responsible for rice production	100	83.3	15	12.5	4	3.33	1	0.83	0	0
VII. Use of Weedicide for proper weed management.	8	6.66	25	20.83	53	44.16	29	24.16	5	4.16
VIII. Rice- Fish culture ponds helps in irrigation and rice production	104	86.6	10	8.33	4	3.33	1	0.83	1	0.83

It is observed from the table 4.2.5 that in case of **technological factor** (49.16%) of the respondents perceived moderate affect of use of HYV of rice and (45.83%) of the respondents perceived Minor affect of use of hybrid seed and (41.66%) of the respondents perceived moderate affect of use of long duration varieties in rice production.

Table 4.2.5 also shows that majority (56.66%) of the respondents perceived major affect of proper irrigation facilities in rice production and (31.66%) of the respondents perceived moderate affect of irrigation facilities in rice production.

It can also observed from the table 4.2.5 that (34.16%) of the respondents said neutral affect of improved farm practices and (30%) of the respondents perceived no affect of improved farm practices on rice production Whereas majority (65%) of the respondents perceived moderate affect of balanced use of fertilizers followed by (22.5%) of the respondent perceived major affect of it on rice production.

Table 4.2.5 also shows that majority (67.7%) of the respondents said neutral affect of Scope to use rice by-products in rice production and majority (83.3%) of the respondents perceived no affect of value addition in the area on rice production.

Whereas (44.16%) of the respondents perceived neutral affect and (24.16%) of the respondents perceived moderate affect and (20.83%) of the respondents perceived minor affect of use of weedicide on rice production. And majority (86.6%) of the respondents said no affect of rice- fish culture ponds in production of rice.

4.2.6 Distribution of the respondents according to the perception of Psychological factor

Name of factor	No effect		Minor effect		Neutral		Moderate effect		Major effect	
	F	%	F	%	F	%	F	%	F	%
6.Psychological factor										
1.Scope to use new technology of rice cultivation	42	35	36	30	22	18.3	18	15	2	1.66
ii. Low risk preference in rice production.	6	5	15	12.5	25	20.8	35	29.16	39	32.5

It could be observed from the table 4.2.6 that majority of the respondents (35%) perceived no affect of scope to use new technology of rice cultivation followed by (30%) of the respondents perceived minor effect of this on rice production.

Whereas majority of the respondents (32.5%) said that there is major effect of low risk preference in rice production followed by (29.16%) of the respondents perceived moderate effect of low risk preference on rice production and (20.8%) perceived neutral effect.

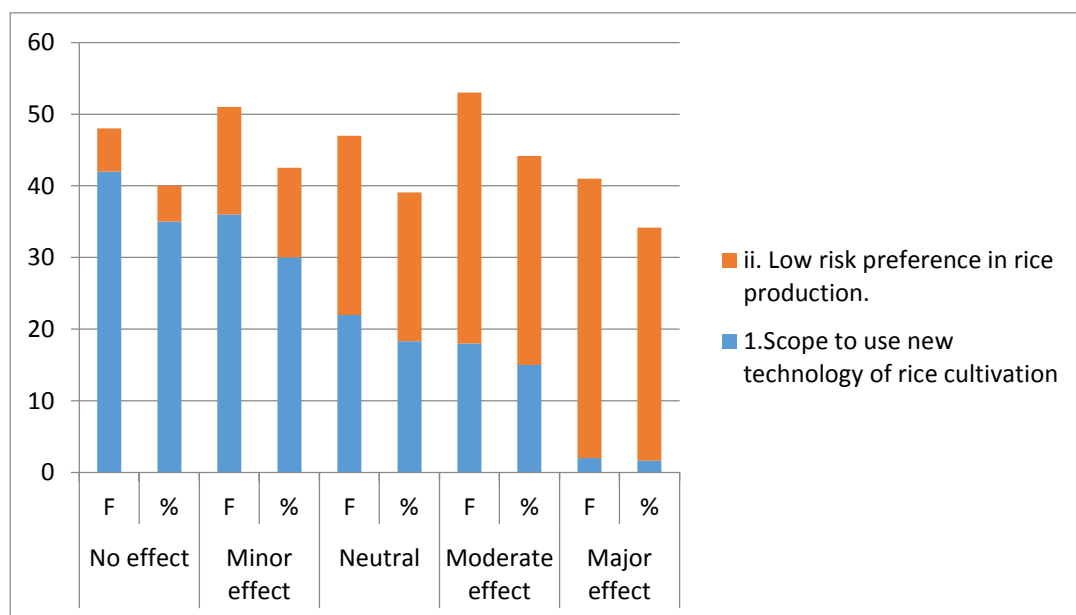


Fig. 4.4 Distribution of the respondents according to the perception of Psychological factor

4.2.7 Distribution of the respondents according to the perception of organizational factor

Name of factor	No effect		Minor effect		Neutral		Moderate effect		Major effect	
	F	%	F	%	F	%	F	%	F	%
7. organizational factor										
i. Loans available from bank in the form of KCC or others helps in rice production	20	16.66	19,	15.83	43	35.83	28	23.33	10	8.33
ii. Membership in different organization helps in rice production.	67	55.3	46	38.3	6	5	1	0.83	0	0
iii. Guidance of KVK is a support for rice production	20	16.66	34	28.33	34	28.33	29	24.16	3	2.5
iv. Contact with extension agent helps in rice cultivation.	80	66.66	34	28.33	4	3.33	2	1.66	0	0

It could be observed from the table 4.2.7 that (23.3%) of the respondents perceived moderate effect of loans available from the bank on rice production and merely (8.33%) respondents perceived major effect.

Table 4.2.7 also shows that majority of the respondents (55.3%) said that there is no effect of membership in different organization on rice production. Whereas (28.3%) of the respondents perceived minor and neutral effect of guidance of **KVK** is a support for rice production and (24.16%) moderate effect on rice production.

And majority of the respondents (66.6%) perceived no effect of contact with extension agent on rice production whereas (28.33%) of the respondents perceived minor effect on rice production.

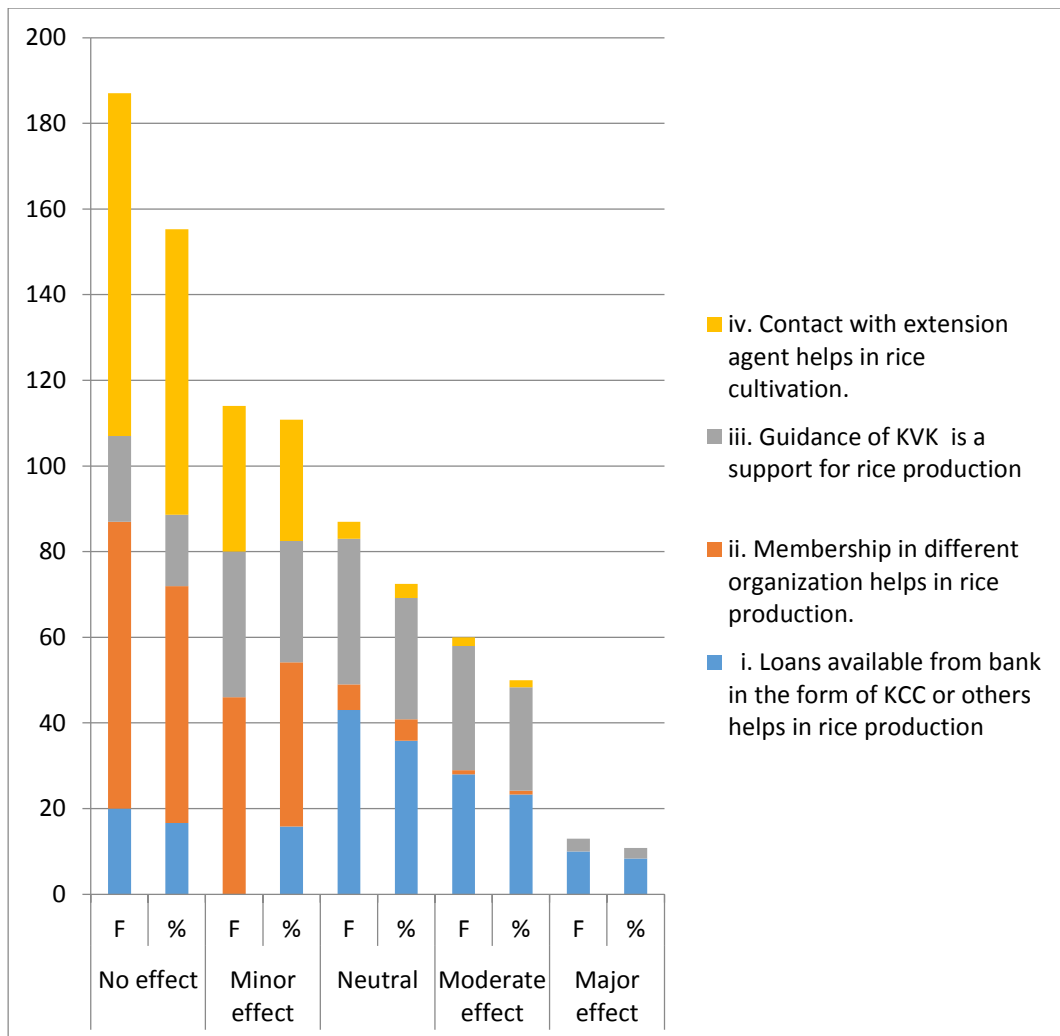


Fig. 4.5 : Distribution of the respondents according to the perception of organizational factor

4.2.8 Distribution of the Respondents according to the perception of social factor

Name of factor	No effect		Minor effect		Neutral		Moderate effect		Major effect	
	F	%	F	%	F	%	F	%	F	%
3. Social factor										
1.Rice based food habits encourages rice production	36	30	29	24.16	22	18.33	32	26.6	1	0.83
2. Support from family members helps in rice production.	11	9.16	11	9.16	31	25.83	45	37.5	22	18.33
3. Tradition of growing rice as a family occupation for long time.	3	2.5	11	9.16	28	33.33	36	30	42	35
4. Encouragement from other farmers helps in rice production	41	34.1	37	30.83	25	20.83	12	10	5	4.16

It could be observed from table 4.2.8 that in case of **social factor**, (30%) of the respondents perceived no effect of rice based food habits on rice production followed by (26.6%) of the respondents perceived moderate effect and merely (0.83%) respondents perceived major effect on rice production.

Table 4.2.8 also shows that (37.5%) of the respondents perceived moderate effect of support from family members in rice production and (25.83%) respondents perceived neutral and (18.3%) respondents perceived major effect of it on rice production.

It is also observed from the table 4.2.8 (35%) of the respondents said that there is major effect of tradition of growing rice as a family occupation for long time and (30%) of the respondents perceived moderate effect on rice production. Whereas only (4.16%) respondents perceived major effect of encouragement from other farmers helps

in rice production and majority of the respondents (34.16 %) perceived no effect and (30.83%) perceived minor affect of it on rice production.

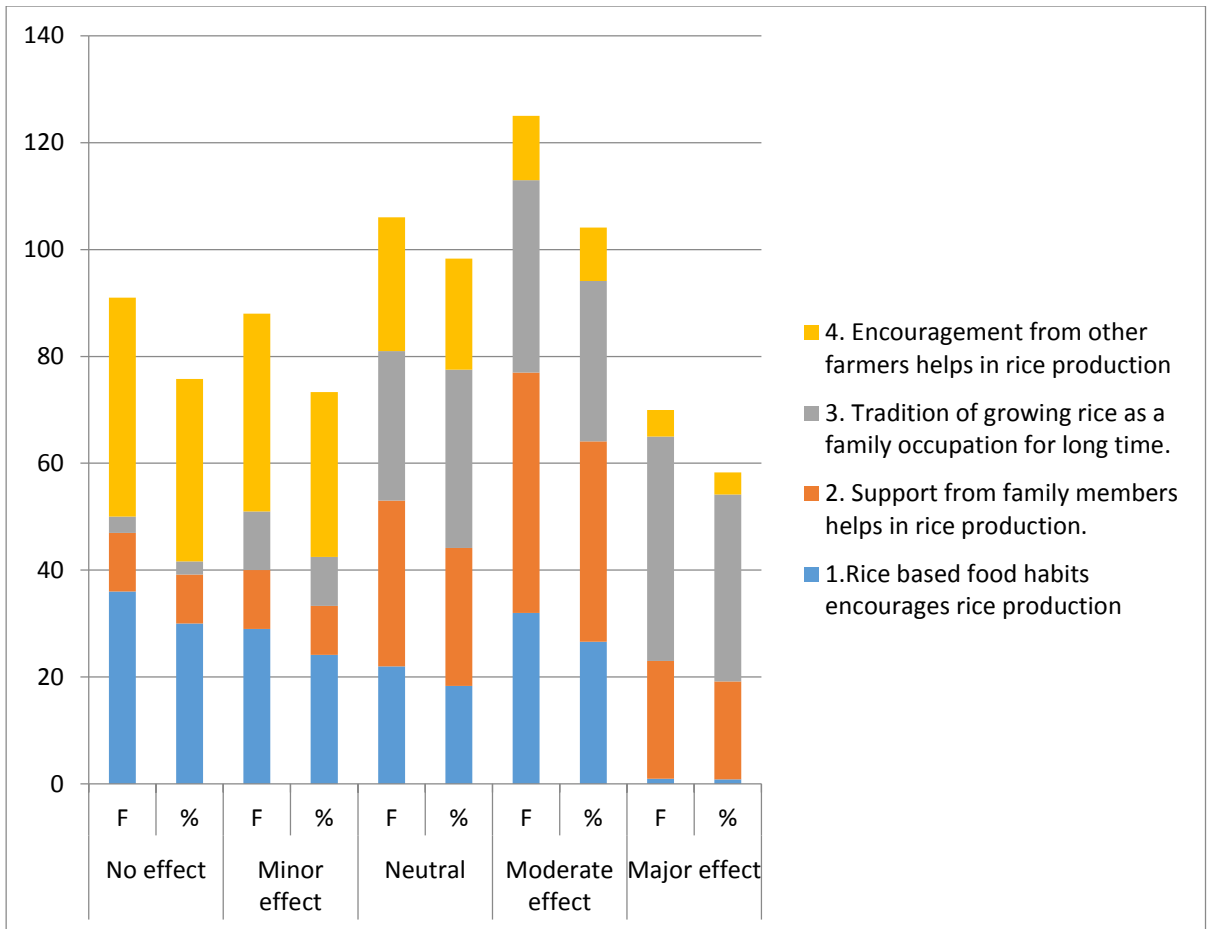


Fig. 4.6 Distribution of the Respondents according to the perception of social factor

Correlation

Variables		r
Climatic factor	Pearson Correlation	.782*
	Sig. (2-tailed)	.000
	N	120
Land and soil factor	Pearson Correlation	.813*
	Sig. (2-tailed)	.000
	N	120
Economic factor	Pearson Correlation	.501*
	Sig. (2-tailed)	.000
	N	120
Situational factor	Pearson Correlation	.389*
	Sig. (2-tailed)	.000
	N	120
Technological factor	Pearson Correlation	.813*
	Sig. (2-tailed)	.000
	N	120
Psychological factor	Pearson Correlation	.050
	Sig. (2-tailed)	.590
	N	120
Organizational factor	Pearson Correlation	.118
	Sig. (2-tailed)	.201
	N	120
Social factor	Pearson Correlation	.057
	Sig. (2-tailed)	.537
	N	120

Above table signifies that there are 5 variables i.e. climatic factor, land and soil factor, economic factor, situational factor, technological factor, which have significant and positive effect on rice production which is .782, .813, .501, .389, .813 having 0.01 level of significance respectively. Other variables like Psychological factor, organizational factor and social factor are having non- significant but positive effect on rice production so null (Ho) hypothesis is rejected and alternate hypothesis (H1) is accepted i.e there were relationships present between independent variables and rice production.

4.3 To Study the Relationship between socio-economic characteristics and rice production.

Correlation

Variables		r
Age	Pearson Correlation	.364*
	Sig. (2-tailed)	.000
	N	120
Gender	Pearson Correlation	-.070
	Sig. (2-tailed)	.448
	N	120
Caste	Pearson Correlation	.347*
	Sig. (2-tailed)	.000
	N	120
Education	Pearson Correlation	.602*
	Sig. (2-tailed)	.000
	N	120
Type of family	Pearson Correlation	.163
	Sig. (2-tailed)	.074
	N	120
Marital status	Pearson Correlation	.114
	Sig. (2-tailed)	.213
	N	120
Size of family	Pearson Correlation	-.100
	Sig. (2-tailed)	.363
	N	120
Size of land holdings	Pearson Correlation	.890*
	Sig. (2-tailed)	.000
	N	120
Annual income	Pearson Correlation	.991*
	Sig. (2-tailed)	.000
	N	120
Farming Experience	Pearson Correlation	.408*
	Sig. (2-tailed)	.000
	N	120

Above table signifies that there are most of the variable like Age, education, caste, size of land holding, annual income, and farming experience are showing significant positive correlation with rice production i.e they have significant and positive effect on rice production whereas, gender and size of family shows non-

significant and negative effect on rice production. So the null hypothesis (Ho), is rejected and alternate hypothesis (H1) is accepted.

4.4 To Study about constraints experienced by rice grower in study area.

4.4.1 Distribution of the respondents according to the perception of Bio-physical constraint

Constraint in Rice production	Not important		Less important		Important	
	F	%	F	%	F	%
I Moisture stress/ Flooding	33	27.5	38	31.6	49	40.8
ii. Low and erratic rainfall.	73	60.8	39	32.5	8	6.6
iii. Biotic stresses (insect pest , Diseases, weeds) and Abiotic stress (Drought, Submergence and salinity)	36	30	64	53.3	20	16.6
iv. Heavy infestation of weeds.	36	30	57	47.5	27	22.5
v. Timeliness sowing	60	50	42	35	18	15

It can be observed from the table 4.4.1 that (60.8%) of the respondents said low and erratic rainfall is not important constraint whereas (32.5%) perceived it as less important Bio-physical constraint and (40.8%) respondents perceived moisture stress/flooding as a important constraint whereas (50%) of the respondents perceived timeliness sowing is not an important bio-physical constraint.

4.4.2 Distribution of the respondents according to the perception of technological constraint.

Constraint in Rice Production	Not important		Less important		Important	
	F	%	F	%	F	%
2. Technological constraint						
i. Poor knowledge about use of inputs like seed, fertilizers, irrigation	18	15	50	41.6	52	43.3
2. Poor knowledge about improved farm practices.	24	20	76	63.3	20	16.6
3. Difficulty in doing inter-cultural and field operation in canal area.	60	50	45	37.5	15	12.5
4. Lack of proper varieties.	21	17.5	73	60.8	26	21.6
5. Lack of post harvest technology like combined harvester, threshing machine.	59	49.1	49	40.8	12	10
6. Lack of processing facility	36	30	66	55	18	15
7. storage problem	20	16.6	65	54.16	35	29.1

Table 4.4.2 shows that (43.3%) of the respondents said poor knowledge about input like seed, fertilizer, irrigation is an important technological constraint whereas (63.3%) respondents perceived poor knowledge about farm practices as a less important technological constraint.

And (50%) of the respondent said that difficulty in doing inter-cultural and field operation is not an important technological constraint whereas (49.1%) of the respondents perceived lack of post harvest technology like combined harvester, threshing machine is not an important technological constraint.

4.4.3 Distribution of the respondents according to the perception of Socio-economic constraints.

Constraint in Rice Production	Not important		Less important		Important	
	F	%	F	%	F	%
2. Socio-economic constraints						
i. .Non availability of credit or bank loan at time.	50	41.6	49	40.8	21	17.5
ii. Scarcity of Water at proper time.	68	56.6	49	40.8	3	2.5
iii. High cost of inputs like seed, fertilizer, weedicide, irrigation, etc.	37	30.8	52	43.3	31	25.8
iv. Low price of farm produce.	41	34.1	53	44.1	26	21.6
v .Poor infrastructures.	76	63.3	37	30.8	7	5.83
vi .Irregular supply of power and canal water	95	79.16	20	16.6	5	4.16
vii. Difficulty to access the market	101	84.16	16	13.33	3	2.5
viii. Unequal land ownership	100	83.33	20	16.6	0	0
ix. Scarcity of labor in peak period of operation.	48	40	45	37.5	27	22.5
x. Poor marketing of Hybrid Rice.	102	85	18	15	0	0
xi. Burning of straw	81	67.5	33	27.5	6	5

Table 4.4.3 shows that majority of the respondents(84.16) perceived difficulty to access the market, (83.33%) respondents perceived unequal land ownership ,(85%) respondents perceived poor marketing of hybrid rice,(79.16%) perceived irregular supply of power and canal water is less important constraint.

4.4.4 Distribution of the respondents according to the perception of Institutional constraints.

Constraint in Rice Production	Not important		Less important		Important	
	F	%	F	%	F	%
3. Institutional constraint						
i. Poor extension services at village level.	97	80	22	18	1	0.83
ii. Lack of training development program.	107	89.16	12	10	1	0.83
iii .Poor linkage between farmers and extension agencies.	103	85.83	17	14.16	0	0
iv .Lack of help from local government	118	98.3	2	1.66	0	0
v. Poor input delivery system.	81	67.5	36	30	3	2.5
vi. Poor prevailing organizational and promotional supporting agencies for modernizing agriculture	94	78.33	23	19.16	3	2.5

It is observed from the table 4.4.4 that majority of the respondent (80%) perceived poor extension service at village level is not important institutional constraint and (89.16%) of the respondents perceived lack of training programme is less important institutional constraint and (98.3%) respondents perceived lack of help from local government is also not important institutional constraint.

SUMMARY AND CONCLUSION

The main purpose of this chapter is to summarize the outcomes and state the findings based on the above assessment and to indicate some of their implications for actions.

5.1 The specific objectives of the study are given as follows;-

To study about socio- economic profile of the farmers .

To ascertain the factors responsible for rice production in study area.

To study about the relationship between some socio-economic characteristics with rice production in the study area.

To study about the constraints experienced by the rice growers in study area.

5.2 Methodology

The study was conducted at sakaldiha block of chandauli district of Uttar Pradesh. Out of 181 villages in sakaldiha block 10 villages were selected and from each village 12 respondents were selected randomly constituting total sample size of around 120 respondents. A purposive Sampling method was used for selection of respondents. The data for the study was collected using interview schedule and collected data was coded, then analyzed using relevant statistical tools and techniques like frequency & percentage, arithmetic mean, standard deviation and correlation and the results were then interpreted . A Descriptive Research Design was adopted for this study.

5.3 Major findings of the study

5.3.1 Profile characteristics of the farmer.

- The middle age category ranging between 47 to 69 years has highest number of respondents *i.e.* around 60.83 percent, followed by young age category *i.e.* 20.00

percent and old age category *i.e.* 19.17 percent.

- One fourth of the total respondents 25.83% were female, and 74.14 percent respondents are male.
- More than half 51.6 percent of the total respondents belonged to OBC category followed by 31.6 percent general category and 15.83 percent belonged to SC category.
- More than one fourth of the respondents 25.83 percent has finished their schooling up to intermediate level followed by post-graduation 17.5 percent and graduation 15 percent.
- Majority of the respondents belongs to small farmers (35%) followed by marginal 25 percent and 20.83 percent medium category of farmers.
- Majority of the respondents (90.83%) belongs to medium income category followed by (10%) high income category and very less farmer 0.83 percent belongs to low income category.
- Majority of the respondent 63.5 percent had a medium level of farming experiences followed by 19.16 percent of low level of farm experiences.
- Less than half 45.83 percent respondents have SHC.
- Majority of the respondents (38.33%) used **Moti** variety of rice followed by (20.83%) of the respondents used Nati masuri (MTU 7029) and 14.16 percent used Chintu variety.

5.3.2 Factors responsible for higher rice production in study area.

1. In case of **Climatic factor** out of 120 respondents majority of the respondents (58.3%) perceived major affect of length and pattern of rainfall on rice production followed by (37.5%) respondents perceived moderate affect of length and pattern of rainfall that helps in rice production.

Whereas 28.3 percent respondents said major affect of solar radiation on rice

production followed by 49.1 percent perceived moderate affect of it.

And Majority of the respondents (47.5%) perceived no affect of day-length whereas 37.5 percent perceived major affect of relative humidity which promotes the growth of rice.

2. In case of Land and soil factor more than half 54.16 percent respondents perceived major affect that grain yield is high due to plain area followed by 45 percent perceived moderate affect of it.

Whereas 63.33 percent of the respondents perceived moderate affect of soil productivity on rice production followed by 35 percent perceived major affect of it. And 57.5 percent of the respondents said the moderate affect of level of soil fertility followed by 33.33 percent of the respondents perceived major affect of it. Less than half (45.83%) respondents perceived moderate effect of soil preparation and (48.3%) perceived moderate effect of summer ploughing in Rice production.

3. In case of Economic factor, Majority of the respondents (63.3%) perceived moderate effect of market accessibility in rice production. More than half (55.8%) of the respondents said that demand of rice is majorly facilitates Rice production whereas merely respondents (1.66%) perceived major effect of KCC helps in Rice production.

4. In case of Situational factor, majority of the respondents (65%) no effect of migration on Rice production and (80.8%) of the respondents perceived no effect of availability of storage facility, (78.3%) perceived no effect of processing facility on rice production.

5. In case of Technological factor, Majority of the respondents (56.6%) perceived major effect and (31.3%) perceived moderate effect of irrigation facilities on rice production. (65%) of the respondents perceived moderate effect of balanced use of fertilizers , (34.16%) of the respondents said neutral effect of improved farm practices on Rice production.

6. In case of Psychological factor, (32.5%) of the respondents perceived major effect of low risk preference on rice production, (35%) perceived no effect to use new

technology of rice cultivation.

7. In case of **Organizational factor**, merely (8.33%) of respondents major effect of loans available from bank on rice production. More than half of the respondents (55.3%) said that there is no effect of membership in different organization and (24.16%) perceived moderate effect of support from KVK in Rice production.

8. In Case of **Social Factor**, (35%) of the respondents perceived major effect of tradition of growing rice as a family occupation for long time and (30%) of the respondent perceived moderate effect on rice production.

5.3.3 Relation.

- There was some factors like climatic factor, land and soil factor, economic factor, situational factor, technological factor have significant and positive relation with rice production these factors have positive effect on rice production and other factors like psychological factor, Organizational factor, and Social factor have non-significant but positive effect on rice production.
- Most of the Socio- economic variable like Age, education, Caste, Size of land holding, annual income, and farming experience have significant positive correlation with rice production and other variables gender, size of family have non-significant and negative effect on rice production.

5.3.4 Constraints experienced by rice growers in study area.

- Less than half (40.8%) of the respondents moisture stress/ flooding as an important Bio-physical constraint. (60.8%) of respondents perceived low and erratic rainfall is not an important Bio-physical constraint.
- Majority of the respondents (63.3%) perceived poor knowledge about input like seed, fertilizer, irrigation as an important technological constraint . half of the respondent (50%) perceived difficulty in doing intercultural and field operation is not an important technological constraint.

- (84.16%) of the respondent perceived difficulty to access the market and (83.33%) perceived unequal land ownership is less important Socio-economic constraint.
- Majority of the respondents (80%) perceived poor extension service at village level is not an important institutional constraint.

Conclusion

From the whole study it can be concluded that most of the Factors like climatic factor, land and soil factor, economic factor, Situational factor, technological factor were contributing majorly to higher rice production in chandauli district and Socio-economic variables like age, education, annual income, farming experience have positive effect on rice production. All these factors favors the higher rice production in study area.

Implications and Suggestions

Rice is a major crop in India. Fortunately Chandauli district of Uttarpradesh is having good production of rice there are different factor associated with such kind of production and productivity. The researchers had tried to find out different factors responsible for rice production in this area and the outcomes of the research possibly will help the farmers , agriculture officers and planners in the field of agriculture to take necessary steps for future action plans, policy decisions, and agricultural extensional activities.

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APPENDICES

INTERVIEW SCHEDULE

Part-1

GENERAL INFORMATION

Respondent no. -

Village:

Block:

District:

Profile of the selected farmers

1. Age:

2 Sex:

Male / Female

3. Caste Category:

General / OBC / SC / ST

4. Education:

S.NO	EDUCATION	YES	NO
1	Illiterate		
2	Literate		
3	Primary (1-4class)		
4	Middle (5-7)		
5	Secondary(8-10)		
6	Intermediate		
7	Graduation		
8	Above graduation		

9. Type of Family: Nuclear /Joint

10. Marital status: a. Married b. Unmarried c. widow

11. Size of Family: a. Small (1-3)

b. Medium (4-6)

c. Large (7-9)

d. very large(>9)

- 12. Have you Soil health card?
- 13. Which variety of rice you use personally
- 14. Size of Land Holding (ha) -
- 15. Annual income- Rs.
- 16. Farming experience (Years) -

Part – II

These are some factors responsible for rice production in your area. They are listed below .Please rate their contribution in a 5 point scale as per your perception.

Name of factor	Rating scale				
1 climatic factor	1	2	3	4	5
i. Length and pattern of rainfall is responsible for more rice production.					
ii. Solar radiation is essential for rice.					
iii. Day - length is favorable for rice production.					
iv. Relative humidity promotes the growth of rice.					
2. land and soil factor					
i. Grain yield is high due to plain area.					
ii. Soil type is more productive for rice.					
iii. Level of soil fertility is good for rice.					
iv. Soil testing facility help in rice production.					
v. Water holding capacity of soil is good for rice.					

vi. Soil Solarisation in nursery is responsible for rice production.					
vii. Soil preparation is better for rice production.					
Viii. Summer Ploughing helps in rice production.					
3. Economic factor					
i.Provision of credit facility (KCC) helps in rice production.					
ii. Market accessibility is important factor for rice production.					
iii. Demand of rice facilitates rice production.					
v. Guaranteed selling price encourages rice production.					
vi. Low cost of production helps in rice cultivation					
4. Situational factor					
1.Impact of migration affect high rice production					
ii. Availability of storage facility helps in rice production.					
iii. Availability of processing facilities is responsible for rice production.					
iv. Distance of storage facility from farm					

5. Technological factor	1	2	3	4	5
I. Seed					
i .Use of High yielding varieties of rice.					
ii. Use of hybrid seeds of rice.					
iii. Use of long duration varieties					
II. facilities for proper irrigation help in rice production					
III. Improved production practices is responsible for rice production					
IV. Balanced use of fertilizer helps in rice production					
V.Scope to use rice By-products is a factor of rice production					
VI. Value addition in this area is factor responsible for rice production					
VII. Use of Weedicide for proper weed management.					
VIII. Rice- Fish culture ponds helps in irrigation and rice production					
6.Psychological factor					
1.Scope to use new technology of rice cultivation					
ii. Low risk preference in rice production.					
7. Organizational factor					
i. Loans available from bank in the form of KCC or others helps in rice production					

ii. Membership in different organization helps in rice production.					
iii. Guidance of KVK is a support for rice production					
iv. Contact with extension agent helps in rice cultivation.					
v. farmer producer companies support rice cultivation.					
3. Social factor					
1.Rice based food habits encourages rice production					
2. Support from family members helps in rice production.					
3. Tradition of growing rice as a family occupation for long time					
4. Encouragement from other farmers helps in rice production					

Part-III

These are some constraints listed below. If you face these constraints, please rate in 3 point scale as per your experience in rice cultivation.

Constraint in Rice production	Responses		
	1	2	3
Bio-Physical constraint			
I Moisture stress/ Flooding			
ii. Low and erratic rainfall.			
iii. Biotic stresses (insect pest , Diseases, weeds) and Abiotic stress (Drought, Submergence and salinity)			
iv. Heavy infestation of weeds.			
v. Timeliness sowing			
2.Technological constraint			
i. Poor knowledge about use of inputs like seed, fertilizers, irrigation			
2. Poor knowledge about improved farm practices.			
3. Difficulty in doing intercultural and field operation in canal area.			
5. Lack of proper varieties.			
6. Lack of post harvest technology like combined harvester, threshing machine.			
7. Lack of processing facility			
8 storage problem			
3.Socio-economic constraints	1	2	3
i. Scarcity of Water at proper time.			
ii.Non availability of credit or bank loan at time.			
iii High cost of inputs like seed, fertilizer, weedicide, irrigation,etc.			
iv. Low price of farm produce.			

v .Poor infrastructures.			
Vi .Irregular supply of power and canal water			
vi. Difficulty to access the market			
vii. Unequal land ownership			
viii. Scarcity of labour in peak period of operation.			
ix. Poor marketing of Hybrid Rice.			
x. Burning of straw.			
4. Institutional constraint			
i. Poor extension services at village level.			
ii. Lack of training development programme			
iii .Poor linkage between farmers and extension agencies.			
iv .Lack of help from local government			
v. Poor input delivery system.			
vi. Poor prevailing organisational and promotional supporting agencies for modernising agriculture			