MARKET STRATEGY AND SALE POTENTIAL OF RICE VARIETY OF VNR SEEDS IN RANCHI (JHARKHAND)

Abhinav Chandra Dubey

CENTRE FOR AGRIBUSINESS MANAGEMENT
FACULTY OF AGRICULTURE

BIRSA AGRICULTURAL UNIVERSITY
KANKE, RANCHI- 834 006 (JHARKHAND)

Regd. No. MBA/ BAU/5646/2019
2021

MARKET STRATEGY AND SALE POTENTIAL OF RICE VARIETY OF VNR SEEDS IN RANCHI (JHARKHAND)

PROJECT SUBMITTED TO THE

BIRSA AGRICULTURAL UNIVERSITY

KANKE, RANCHI- 834 006 (JHARKHAND)

By

Abhinav Chandra Dubey

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION IN AGRIBUSINESS

Regd. No. MBA/ BAU/5646/2019

2021

BIRSA AGRICULTURAL UNIVERSITY

KANKE, RANCHI- 834 006 (JHARKHAND)

Dr. M.K. Barnwal
Junior Scientist-cum
Assistant Prof. (Senior-Scale)

Deptt. of Plant Pathology
Faculty of Agriculture
Kanke, Ranchi-834 006
(Jharkhand)

Dated_____

Certificate

This is to certify that the thesis entitled, **"MARKET STRATEGY AND SALE POTENTIAL OF RICE VARIETY OF VNR SEEDS IN RANCHI (JHARKHAND)"** submitted in partial fulfilment of the requirements for the degree of **MASTER OF BUSINESS ADMINISTRATION IN AGRIBUSINESS** of the Faculty of Post-Graduate Studies, Birsa Agricultural University, Kanke, Ranchi, Jharkhand is faithful record of bonafide project work carried out by **Mr. Abhinav Chandra Dubey** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

It is further certified that the assistance and such help received by her during the course of investigation have been duly acknowledge.

Endorsed

_____
Prof. In-charge
Centre for Agribusiness Management

_____
(M.K. Barnwal)
Major Advisor

_____
Director
Centre for Agribusiness Management

BIRSA AGRICULTURAL UNIVERSITY
KANKE, RANCHI- 834 006 (JHARKHAND)

Certificate

(Certificate of Approval by the Advisory Committee)

We, the undersigned members of the Advisory Committee of **Mr. Abhinav Chandra Dubey**, a candidate for the degree of **MASTER OF BUSINESS ADMINISTRATION IN AGRIBUSINESS** have gone through the manuscript of the project and agree that the project entitled **"MARKET STRATEGY AND SALE POTENTIAL OF RICE VARIETY OF VNR SEEDS IN RANCHI (JHARKHAND)"** may be submitted by **Mr. Abhinav Chandra Dubey** in partial fulfilment of the requirements for the Degree.

_____
Prof. In-charge
Centre for Agribusiness Management

_____
(M.K. Barnwal)
Major Advisor
Advisory Committee

_____
Director
Centre for Agribusiness Management

Members of Advisory Committee

Endorsed

1. _____
(B.K. Jha)

2. _____
(Krishna Prasad)

_____
(S.K. Pal)
Dean
Faculty of Agriculture

3. _____
(C.S. Singh)

BIRSA AGRICULTURAL UNIVERSITY
KANKE, RANCHI- 834 006 (JHARKHAND)

Certificate

(Certificate of Approval by Examining Committee and External Examiner)

This is to certify that the thesis entitled, **"MARKET STRATEGY AND SALE POTENTIAL OF RICE VARIETY OF VNR SEEDS IN RANCHI (JHARKHAND)"** submitted by **Mr. Abhinav Chandra Dubey** in partial fulfilment of the requirements for the degree of **MASTER OF BUSINESS ADMINISTRATION IN AGRIBUSINESS** of the faculty of Post-Graduate Studies, Birsa Agricultural University, Kanke, Ranchi (Jharkhand) was examined and approved on ……2021.

_____
(M.K. Barnwal)
Major Advisor
Advisory Committee

_____
(External Examiner)

Members of Advisory Committee

1. _____
(B.K. Jha)

_____
Director
Centre for Agribusiness Management

2. _____
(Krishna Prasad)

_____
Dean
Post-Graduate Studies
Birsa Agricultural University
Kanke, Ranchi-834 006

3. _____
(C.S. Singh)

…… Abhinav Chandra Dubey

ACKNOWLEDGEMENT

The satisfaction and euphoria that the successful completion of the work would be incomplete unless I mention the people, as an expression of gratitude, who made it possible and whose constant guidance and encouragement served as a beacon of light and crowed my efforts with success. This report has been impossible but for the support and guidance that I received from the various people at different stages of the project. I record my profound sense of gratitude and regards to the chairman and my major advisor, ***Dr. M.K, Barnwal,*** *Junior Scientist-cum-Assistant Professor (Senior Scale), Department of Plant Pathology, Birsa Agricultural University (BAU), Ranchi, for his valuable suggestions and meticulous and continuous guidance throughout the period of the study.*

I am thankful to the Members of the Advisory Committee, ***Dr. B.K, Jha****, Assistant Professor-cum-Junior Scientist (Senior Scale), Department of Agricultural Extension and Communication,* ***Dr. Krishna Prasad,*** *Assistant Professor-cum-Junior Scientist (Senior Scale), Department of Genetics and Plant Breeding and* ***Dr. C.S. Singh,*** *Junior Scientist-cum-Assistant Professor, Department of Agronomy for their valuable suggestions and constructive criticism, that helped me to work upon the problem areas of my project. I would also like to thank* ***Dr. S. Karmakar,*** *Chief Scientist-cum-University Professor and Prof. In-charge, CABM, for his suggestions and guidance during the project evaluation, which helped me to make the necessary improvements.*

I deem it a proud privilege to express my highest veneration and respectful gratitude to ***Dr. S.K, Pal,*** *Dean, Faculty of Agriculture, BAU and* ***Dr. M.K, Gupta****, DRI-cum-Dean PGS, BAU. The patronage inspiration and blessings of* ***Dr. O.N. Singh****, Hon'ble Vice-chancellor, BAU, Ranchi are duly acknowledged.*

I would like to express my heartfelt thanks to my seniors ***Mr. Pushp Gautam, Mr. Prince Simon Kunkal*** *and* ***Ms. Smitha Kumari*** *for their constant support and advice throughout the project. Thanks are due to my friends who have made each day a new experience for me at CABM. I would like to thank* ***Anuj, Anurag, Adarsh, Mun Gaurav, Ajit, Anand, Naval, Premica, Nitu and Nomita.*** *I would like to thank especially to* ***Md. Islam****, Technical Assistant, CABM, BAU, Ranchi without whom I would have never been able to complete my project write-up.*

I can't express my gratitude in words, towards my Parents for their unconditional love and support that gave me the strength to move forward, no matter what the circumstances. I owe a deep sense of honour, regard and cordial love to ***Mr. Dinesh Chandra Dubey*** *and* ***Mrs. Sushma Dubey****, my brother* ***Mr. Vaibhav Chandra Dubey.***

Finally, I would like to thank the Almighty for bestowing me with the courage to face all the complexities and make this project successful.

Place:

Date: ……/……. / 2021 ***Abhinav Chandra Dubey***

ABSTRACT

Rice cultivation probably dates back to the antiquity and has probably been the staple food and the first cultivated crop in Asia. In India, rice has been cultivated since ancient times. Rice is the major growing crop among the Indian farmers rice is grown in almost all the states are West Bengal, Andhra Pradesh, Uttar Pradesh, Punjab, Orissa, Chhattisgarh, Bihar and Jharkhand *etc*. At present, the productivity of rice in Jharkhand is just half of national average. It may be due to lack of knowledge, unavailability of high yielding varieties of rice and management of yield loss due to biotic and abiotic factors, *etc.*

The main seed companies involved in marketing of hybrid rice are VNR, Bayer, Syngenta, Pioneer, Tata, Advanta, Dhanya *etc*. Where VNR rice variety contributes large number of productions among the selected blocks. This study was conducted in two blocks of Ranchi district of VNR Seeds Pvt Ltd namely Kanke and Ormanjhi blocks to know the socio-economic profile of rice growing farmers, to identify the farmers preferences with respect to duration, grain type, and yield of rice in different land situation and to analyze the market strategy of VNR rice seeds and assess sale potential. Sixty farmers were selected from each of Ormanjhi and Kanke blocks of Ranchi for the study. Survey results are based on the primary data were collected from the farmers of Kanke and Ormanjhi block and secondary data were collected from the VNR Seeds, newspaper, magazine *etc*. it was found that 83.3% of the farmers from Kanke were literate and 76.7% of the farmers from Ormanjhi block. Annual income of 36.7% farmers from Kanke block had more than Rs. 1 lakh and 51.6% farmers from Ormanjhi had above Rs. 1 lakh, 58.3% and 63.3% of the farmers belonged to nuclear family from Kanke and Ormanjhi blocks respectively. 43.3% farmers from Kanke block and 45.0% farmers from Ormanjhi block was small farmers (1 to 2 ha) and the large farmers were not found in Kanke block study area. Internet is most often used by respondents of Kanke block and Ormanjhi block *i.e.*, 53.3% and 50.0% respectively. Maximum respondents of 54.2% farmers preferred medium duration rice for cultivation.

Majority of the respondents agreed that advertisement has large influence on buying behaviour and 39.2% total percentage of the farmers from both above blocks said that village level meeting is the most effective advertisement technique. It was found that there was a sharp increase in the sales of hybrid rice of VNR Seeds in the last 3 years. Pioneer was found to be the market leader in hybrid rice market. It was concluded that there is a great potential for hybrid rice seeds in Kanke and Ormanjhi blocks of Ranchi district, but special attention needs to be given on the promotion and marketing, in order to create awareness among the farmers.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

CHAPTER 1

INTRODUCTION

Rice is central food commodity for the lives of billions of people around the world. It is possibly the oldest domesticated grain. Rice is the staple food for 2.5 billion people and growing rice is the largest single use of land for producing food, covering 9% of the earth's arable land. Rice provides 21% of global human per capita energy and 15% of per capita protein. Calories from rice are particularly important in Asia, especially among the poor, where it accounts for 50-80% of daily calorie intake. As expected, Asia accounts for over 90% of the world's production of rice, with China, India and Indonesia producing the most. We all know that 85% of the rice which is produced in the world is used for direct human consumption. Rice is used as snack foods, brewed beverages, flour, oil, syrup and religious ceremonies to name a few other uses.

Rice is staple food of more than 60% of Indian population. It accounts for about 43% of total food grain production and 46% of total cereal production in the country. In order to meet the domestic demand of the increasing population the present-day production of 99 million tons of milled rice has to be increased to125 million tons by the year 2030. Since the yield of high yielding varieties (HYVs) of rice is stabilizing, it is rather difficult to achieve this target with the present-day inbred varieties. Therefore, to sustain the self-sufficiency in rice, additional production of 1.5 million ton is needed every year. Among the limited options, hybrid technology is the only proven technology currently available for stepping up rice production significantly.

Early as in 1954, Indian rice scientists Sampath and Mohanty at the Central Rice Research Institute, Cuttack, reported on the existence of cytoplasmic male sterility, indicating the possibility of developing hybrids in rice (Sampath and Mohanty, 1954). The same view was also expressed during the early 1970s at the International Rice Research Institute (IRRI), Philippines, and in the United States (Barwale, 1993).

Hybrid rice was first successfully developed in China in the 1970s and an area of 15,210 ha was devoted to hybrid rice in the country, accounting about 52% of the total rice area during 2003. Jharkhand is a state in eastern India, carved out of the southern part of Bihar on 15th November 2000. Jharkhand has a population of 3,29,88,134 with male population of 1,69,30,315 and female population of 1,60,57,819. The literacy rate of male is 76.84% and that of female is 55.42% (as per census 2011). The total geographical area of Jharkhand is 79.70 lakh ha out of which cultivable area is about 38 lakh ha and net area is 26 lakh ha approximately. The average rainfall of Jharkhand is 1397 mm. Agriculture is the main source

of livelihood for major proportion of people living in Jharkhand. Rice is grown mainly as a Kharif crop in India. Rice is grown in 43.8 million ha with the production of 168.5 million tons and the productivity of about 3848 kg/ha in India. (Anonymous, 2017) whereas, In Jharkhand, rice is grown in an area of 18.0 lakh ha with the production and the productivity of 32.7 lakh tons and 1814 kg/ha, respectively during 2016-17 (Jena and Somu, 2015). While, the production of rice in India has increased by 3.5 times in last 60 years making country second largest producer of rice major states are West Bengal, Uttar-Pradesh, Andhra-Pradesh, Punjab, Orissa, Chhattisgarh, Bihar and Jharkhand *etc*. At present, the productivity of rice in Jharkhand is just half of national average. It may be due to lack of knowledge, unavailability of high yielding varieties of rice and management of yield loss due to biotic and abiotic factors, *etc.*

Agricultural productivity depends to a great extent on the use quality seeds (Kundu *et al*,. 2019). Suitable varieties of seeds are capable of producing higher yields, provided other associated factors are available in proper combination. Improved varieties of seeds are one of the most important components of strategic inputs. The farmers of Jharkhand use local as well as hybrid seeds. The main seed companies involved in marketing of hybrid rice are VNR, Bayer, Syngenta, Pioneer, Tata, Advanta, Dhanya *etc*. VNR seeds Pvt Ltd is one of the new emerging leading company in Jharkhand with it headquarter in Raipur, Chhattisgarh. In Jharkhand, VNR has spread its business in ten different territories. This company focuses on its mission to empower fellow farmers by giving training for crop management. It supplies high quality seed on low price in order to help the farmer. Its moto is “Good Seeds, Better Yield”.

Sustainable availability of good quality seeds and well-functioning seed marketing system is vital development issue, without which attaining the required agricultural production and productivity is impossible. The companies need not only produce good quality seeds but also inform their consumers about the benefits of their product which can be only achieved by proper advertisement. The mass media like television, radio, newspaper, internet is widely used by people as source of information to which companies can target. The seed companies use village level meeting, crop show, jeep campaign, mic campaign and other techniques to promote their product. Advertisement is an important aspect for success in marketing of any product and increasing sale volume. Market strategy and sale potential is a strategy of expanding the market size by focusing on different segment of consumers. The socio-economic conditions of farmers, Identifying the farmers preferences with respect to duration, grain type, and yield of rice in different land situation, market expansion of rice of VNR Seeds Pvt Ltd and most effective way of advertisement for increasing market in Jharkhand are unexplored.

Keeping these facts in mind, the present project work was undertaken with the following specific objectives:

I. To study socio-economic status of rice growing farmers
II. To identify the farmers preferences with respect to duration, grain type and yield of rice in different land situation.
III. To analyze the market strategy of VNR rice seeds and assess sale potential.

CHAPTER 2

ORGANIZATIONAL PROFILE

Agriculture in India has been a way of life. However, over the years and especially after the Green Revolution in the 1960 and 70's it has also become a business proposition. The Green Revolution is considered to have had one of its most successful impacts in India. The country reportedly recorded 131 million tonnes of grain output in 1978-79, more than any other country touched by the revolution. India also became an exporter of food grains during this time.

One of the key factors that ushered in the breakthrough was seeds with improved genetics. This is the crucial aspect that VNR (Vegetable and Rice) Seeds focuses on in its mission to empower fellow farmers. Primarily a vegetable seeds company started by a farmer himself, VNR understands the importance of high quality planting material and in order to help the farmer-businessmen prosper, provides the same. Its motto-Good Seeds, Better Yield.

ABOUT VNR

VNR Seeds, established in 1993 by a humble farmer Krishi Pandit Dr. Narayanbhai Chawda, is one of the leading and most trustworthy seeds company in central India. The company believes in creating a prosperous and knowledgeable farming community by sharing with fellow farmers every new breakthrough in seed technology in the form of the best quality planting material.

VISION

VNR envisage a knowledgeable and prosperous farming community where they can act as a major contributor by sharing the best in research technology and quality seeds that ensure optimal yield and also by sharing our own experience as fellow farmers.

MISSION

There mission is to give fellow farmers the best seeds that ensure maximum profit through optimum yield. **Kisano ke hith mein** (in the interest of farmers) is their mantra.

PRODUCTS

- VNR offers fellow farmers a wide range of quality product seeds that are not only disease resistant but also give high yield.
- VNR's product range includes vegetable, cereal and fruit seeds. The company has got 20 high quality and advanced vegetable seed products with over 150 varieties in the OP and hybrid range.
- It has five high yielding hybrid varieties for paddy. Other cereals products like maize and bajra are currently under research. VNR also has open pollinated papaya in its fruits range. Research is in progress for various other advanced fruit varieties.

Vegetables

VNR seeds work on 20 different vegetable crops with over

150 high quality and advanced varieties in OP and hybrid range.

Cereals

VNR is currently working on three cereal crops namely Paddy,

Maize and Bajra. Currently it has released five high yielding varieties of paddy suiting different Agro-climatic zones.

Fruits

VNR Seeds presently has open pollinated (OP) Papaya and Watermelon in its fruits range. Researchers are in progress for various new advanced fruits varieties.

Hybrid Paddy varieties of VNR

1. VNR 2355 plus

Mid duration variety(130-135days), suitable for lowland, medium height and strong stem more filled grains per panicle and more tillers per plant medium slender and aromatic grain 25 % more yield over the local varieties tolerant to bacterial leaf blight (BLB).

2. VNR 2245, 2228

Mid early variety (120-125days), suitable for midland, medium plant height and strong stem long slender grain with medium aroma high yielding capacity tolerant to bacterial leaf blight.

3. VNR 2111

Short duration variety (105-110 days), suitable for upland, dwarf plant (90 -100 cm) with strong stem, more tillers per plant, more filled grains per panicle, suitable for low rainfall area. 100% Capable of surviving blast.

CHAPTER 3

REVIEW OF LITERATURE

The review of past studies helps in framing objectives, developing research design, variable selection, interpreting the results and in drawing meaningful conclusions. An extensive survey of literature must therefore be undertaken in order to have a perfect knowledge of the various concepts related to the study. In accordance with the objectives of the study, a brief review of literature is presented here under the following sub-headings

3.1 Socio-Economic Characteristics

3.2 Farmer's Preferences

3.3 Market Strategy

3.1 Socio-Economic Characteristics of Farmers

Ananthnag *et. al.* (2010) studied on socio economic status of farmers practicing rice farming in Eastern Dry Zone (EDZ) of Karnataka state during 2010-11. They found that more than half of the respondents (51.7%) were medium landholders, more than one-third of respondents had high school (38.3%) education, nearly two third (65.0%) of the respondents were having pucca house, majority (66.7%) of the respondents belonged to OBC category, majority (95.0%) of the farmers had small family and 100% of the respondents were following agriculture as their main occupation.

Bihari *et. al.* (2012) reported that majority of women farmers were found to have small (38.7%) and medium (49.3%) size of family with farming (83.3%) as the major source of livelihood. As regard to education, 62.0% were found to be illiterate. Only 12.0% had education above 8th class. They found that the mass media exposure to the farmers are very less and due to their busy schedule in involvement in household and farm activities, they could not get the benefit of government agricultural related schemes. Only 72.7% women were found to have low media exposure and about 46.7% had low social contacts.

Roy *et. al.* (2013) studied on socio economic condition of Almora District in Uttarakhand and found that 58.0% of the respondents were in SC category and rests were in unreserved category. The average age of the respondents was 42 years and most were having medium education level (63.3%). Agriculture was the sole occupation of 25.0 % farmers whereas, others had subsidiary occupations like labour, shop keeping, driving etc. Majority were found having medium level of social participation (78.3%). The average landholding was 0.40 ha and most were having a medium herd size (66.7%). The respondents had an average farming experience of 19 years and had medium levels of annual income (55.0%). In totality, the study revealed

that 26.7 per cent of farmers belonged to low (SES) socio economic status category, 55.0 per cent of farmers belonged to medium SES category and 18.3 per cent farmers belonged to high (SES) category.

Phukan *et. al.* (2013) found that the 70 per cent of the respondents had medium level of communication behaviour followed by low level of communication and high level of communication behaviour i.e., 16.6% and 13.3%, respectively.

Neethi *et. al.* (2014) found that the utility of mass media was very limited. The sources of information were TV, Newspaper, Radio, Farm literature, Film shows and Internet in the order of ranking. A majority of the farmers do not use any of the mass media as the source of information. The reasons for a majority of farmers not utilizing the mass media as a source of information was poverty, illiteracy and being unaware of receiving messages from such sources etc.

Reddy *et. al.* (2015) reported that 73.0% of the farmers considered farming source of income showing positive intense towards farming. 69.9% of the farmers were saying the reason for farming is mainly inheritance. 40.7% of the farmers were saying reason for not liking farming is mainly risky.

Mallesh and Yadav (2020) explained that agricultural mechanization offers a significant opportunity in agriculture to produce timely farming operations; reducing the cost of operation; optimizing productive use of costly input (seeds, fertilizers, chemicals for plant defense, aquaculture and agricultural machinery) the mechanization strategy will differ depending on the circumstances and resources of the region. The strategy for agricultural mechanization in the eastern U.P. because of landholding trends, the resources available in the area, the population dependent on farming, significant cropping systems being pursued in that area, the availability of agricultural energy and infrastructural facilities available for the promotion of agricultural machining and agro-processing programmers.

Devi *et al.* (2020) revealed that majority of the farmers with the farming experience of 10 to 30 years, cultivating major varieties viz., ASD 16, ADT 43 and Ponni. They also reported the total cost of production in mat nursery method is much less than the conventional method and it saves 59 per cent in cost of production when compared to conventional method. Increased yield, reduced cost of cultivation, more area coverage, labour drudgery reduction, less effort in nursery maintenance, reduced seed cost, efficient labour management and timely planting are the major merits of machine transplanting

Digambar *et al.* (2020) showed that selected farmers had primary to middle school level of education, respondents were having the medium size of family (5 to 8 members), and they

participated in Gram Panchayats, Co-operative societies. The respondent's hundred percent were involved in agriculture as occupation and then were engaged in animal husbandry as well as high experience (above 20 years). It is contacted with Rural Agriculture Extension Officers (RAEOs) and Krishak Mitra. The socio-economic profile of farmer's rice production technologies in medium risk orientation of the farmers.

Ahmed (2020) found that rice production in the study area is a profitable agricultural enterprise. majority of the farmers (69.15%) were male, 40.43% ranges between 41–50 years. The regression analysis established that years of farming experience, man-days of labour, education and farmers' age had positive and significant relationship with rice yield.

Veettil *et al.* (2021) studied on a gender differences in rice value chain participation and career preferences of rural youth in eastern India. The willingness to be involved in agriculture varies across region and gender, with the high readiness of female youths signalling a feminisation in agriculture. Involvement in value chain activities has a significant and positive impact on career choice. Youth policy needs to address the different preferences and facilitation requirements of male and female youth, in order to change youth's aspiration and be inclusive of both genders.

3.2 FARMER'S PREFERENCES

Joshi and Bauer (2006) showed that the key and significant variables affecting farmers' demand for rice variety are both production and consumption attributes valued by the households and farm and farmer characteristics. They are easy threshability, usage of rice grains for preparing special products, early maturity of the variety, less irrigation requirement, sources of seed, education and the experience of the farmers. Percentage share of different rice varieties are Radha (45.1%), Janaki (19.3%), Masuli (8.8%), Sarju-52 (6.1%), Radha types (6.5%) and Others (14.3%).

Efiuse *et al.* (2008) showed that the high preference for tall varieties among farmers in the upland and lowland rice ecologies also contrasted sharply with the model of dwarf rice varieties responsible for the green revolution in Asia. The implication of these findings for rice breeders is that different plant idiotypes complemented by effective drought management practices should target different ecologies to increase impact.

Suwannaporn *et al.* (2008) suggested that consumer's rice preferences differed greatly among nationalities. Rice exporters have to understand these different preferences in order to offer the right products to their customers. Assuming consumer preferences to be comparable to one's own country's preferences can cause new product failure. Traditional rice grain was still among the most accepted and preferred products for all consumers. However, preferences in terms of eating quality and cooking method may not be similar and require further investigation. Product differentiation should focus on offering more diversity such as aromatic rice, basmati rice, wild rice, american rice *etc*., more convenient cooking method and attractive packaging designs. Higher value-added rice products such as seasoned rice grain, which represented the grain variety concept, can be introduced to the variety seeking Asian consumers.

Manzanilla *et al.* (2010) found that farmers prefer rice cultivars that are tolerant of submergence, have early to medium maturity relative to their commonly grown varieties, are resistant to pests and diseases, and are resistant to lodging, among other traits. To enhance adoption, male and female farmers should be involved in the evaluation process. The results of this study can contribute to enhancing breeding programs to develop appropriate varieties that reduce production losses, improve income, and ultimately reduce poverty incidence in submergence-prone areas.

Bucheyeki *et al.* (2011) analysed perceptions on rice varieties and factors that leads to reduced yield in rice production in Nzega and Igunga Districts in Tabora region, Tanzania.

Twenty-one rice varieties with majority of farmers citing high yielding, good aroma, marketability, grain heaviness and disease and drought resistance as prime traits in rice variety selection. Five abandoned rice varieties *viz.* SARO 306, DAKAWA, Sukari, SUPA, Bishori, *etc*., due to low yield, disease susceptibility, high water demand, and late maturing were reported. Major rice production constraints were lack of improved varieties, diseases susceptibility, and seeds unavailability, drought and high input prices. Thirteen rice diseases existed in fields with grain rot, rice blast, and sheath brown rot as the most devastating diseases. Mean income from rice production was 5,446,217 TSh with male having higher income than female farmers.

Borthakur *et al.* (2014) revealed that farmers' preference of rice varieties based on varietal attributes showed that in case of most of the attributes, preference was heavily tilted towards HYVs. Also, high yielding varieties were outscoring traditional varieties even in case of attributes like 'Good taste' which were supposed to be strong points of traditional varieties. The only attribute constantly scoring less in case of HYVs were resistance to pests and diseases.

Mehar *et al.* (2015) examined their selection of rice varieties based on (i) variety types, *i.e.*, hybrid, traditional, modern, and stress-tolerant, and (ii) main reason, *i.e.*, high yield, cooking/taste, marketable/affordable and stress-tolerant. Since some farmers mix rice varieties from multiple categories, also find that female farmers are less likely to select hybrid rice than male farmers, and they select rice varieties because of their cooking quality and stress-tolerance. Risk-averse farmers are less likely to select varieties that are market-oriented. They also found that Swarna variety occupied 25.0% of the rice cultivated area, and more than 30.0% of the respondents cultivated it in the *Kharif* season. Swarna was released more than 30 years ago in 1979, and no other variety is comparable to it in terms of popularity in the region. The second popular variety was Mahsuri, which occupied 5.4% of the rice areas, and other varieties such as Moti, Arize 6444, Sarju-52, Sambha Mahsuri, Swarna Sub1, Lalat, Pooja, and MTU1001 occupied more than 1% of the rice areas individually.

Ghimire *et al.* (2016) observed that 68.0% of the sample households adopted new improved rice varities (NIRVs) and 29.0% of the households were headed by female. The average age of the household head was almost 45 years and economically active family members were 3 persons per household. Farmers, on average, had 8 years of formal schooling. The mean farm size of 0.51 hm^2 is also comparable to the national average of 0.60 hm^2 (MOAD, 2012). Farmers, on average, had 7 contacts with the extension agents during the previous year. Furthermore, 76.0% of the households reported to have income from off-farm employment. They also showed that the propensity to adopt NIRVs by farm households

increased with the level of education of household head. The result suggested that the more educated the farmer is, the more likely he/she will adopt NIRVs, possibly because he can process information more rapidly than others.

Tippe *et al.* (2017) studied on farmers' awareness, use, preference and adoption criteria of parasitic weed management practices in rain-fed rice production environments in Tanzania. They found parasitic weeds were more problematic than non-parasitic weeds. Though they mostly practise hand weeding, farmers were aware of a wide range of control options. Local access, affordability, ease of implementation and control efficacy were considered important criteria for adoption, whereas trade-offs, like lack of preferred grain quality traits in resistant varieties, were mentioned as an important break on adoption. The local variety Supa India, appreciated for its grain qualities and marketability, remained the preferred variety. For the control of *Striga asiatica* (weed), late planting was preferred, requiring a short-duration variety to minimize risk of drought stress during grain filling. The short-duration NERICA10 was most preferred, as it combined a favourable short cycle length with resistance to *S. asiatica* and good grain appearance.

Sharma *et al.* (2017) reported that nineteen important traits of crop varieties were identified by interviewing experts, extension scientists and identified farmers. The weighted score of all the nineteen traits was determined with the help of focused group discussion with the farmers. The preferences of the farmers were measured by using 'rice preference index (RPI)'. The farmers ranked improved varieties, in following order: i) Pusa Basmati 1509, ii) Pusa Basmati 1121, iii) Pusa Basmati 1, iv) Pusa 2511 and v) Pusa Rice Hybrid 10. Incorporation of farmers' preferences in development of rice varieties in breeding process would increase likelihood of adoption of the varieties.

Manan *et al*. (2018) reported that the highest grain yield of (76.5 q/ha) in Pusa 44 followed by PR 121 (74 q/ha) and PR 126 (71.0 q/ha). Gross return (Rs/ha) followed the above trend. This indicates that those farmers who are following paddy-wheat crop rotation, preferred to grow rice variety Pusa 44 and PR 121 (long duration varieties) compared to PR 126 (short duration variety). In paddy-wheat crop ration PR 121 and Pusa 44 are first preference of farmers because of higher productivity and good net returns.

Kundu *et al.* (2019) found that quality seeds hold key position as it alone contributes nearly 20-25 per cent more to the agricultural production. Seed replacement rate (SRR) of paddy was increased to 30.5 per cent in 2011-12. SRR, performance of desired variety, adoption level of farmers and price of seed and expansion of area are affects the seed

requirement. Irregular supply of seed, adverse climatic condition, market and transportation facilities, price of seed and expansion of area affects seed availability.

Pandey *et al*. (2020) studied on replacement rate of paddy seed in Chandauli District of Uttar Pradesh. In general, farmers of the district growing paddy under the irrigated condition and farmers were getting lower crop yield due to the non-adoption of improved agronomic practices for paddy production including less seed replacement. The seed replacement of crop can enhance the crop production by 10-20 per cent without any change of other inputs of crop production.

Hiremath *et al.* (2020) conducted to discern the formal and informal seed sector contributions in seed supply in Raichur district of Karnataka. The formal seed sector is contributing 78% to total seed supply whereas, informal seed sector is contributing 22% to seed supply in the present study. Nearly 80% of the farmers are using quality seeds i.e. certified seed and truthfully labeled seed and remaining 20% farmers are using farm saved seeds. Significant variation has been observed with respect to quality of farmer saved seeds. More percentage of seedlings with primary infection was noticed in the abnormal seedlings' category. 33% of the farmer saved seeds were below the Indian minimum seed certification standards for physical purity. There is no significant change in crops was observed during last ten years. Majority of the farmers are using jute bags for storing their farm saved seeds.

Fatondji *et al.* (2020) found that high yield combined with good grain quality (including good taste, softness after cooking, less starch, white pericarp, long grain length and swelling when cooked), medium maturing and tolerance to drought and flood were the most desired traits motivating farmers for growing rice cultivars. Taste and high yield were the paramount traits of IR 841, the most popular rice variety currently cropped in Benin followed by its fragrance. Drought constraints was reported as the most damaging abiotic stress across the villages surveyed with field lost estimated up to 100% at the flowering stage. Changing sowing date (80%), the use of irrigation systems (10%) and the cropping of early maturing cultivars (7%) were the most traditional strategies to reduce drought impacts. Needs for tolerant varieties were clearly expressed by farmers to mitigate drought effects on rice production in Benin. The results also showed the need for rice breeders to focus more on improving grain quality in addition to high yield potential and tolerance to abiotic stresses mainly drought.

Jin *et al.* (2020) revealed that potential yield, maturity, pest and disease resistance, and seed longevity, were the most preferred attributes of a rice variety. The least preferred attributes were ease of threshing, fertiliser response, and shattering. After applying a latent class model, farmers were found to align with six distinct classes: "majority farmers", "price sensitive",

"conservationists", "sustainable farmers", "output maximisers", and "subsistence". These classes showed differences in terms of the farmers' characteristics (e.g., sex, education, income, farm farming experience, and farmland size) and in the importance given to extrinsic factors (e.g., access to market, extension services, and membership in farmers' organisations).

Krishnankutty *et al.* (2021) found that farmers' decisions are influenced to a large extent by socioeconomic factors like holding size, education status and yield influenced cultivation decisions *etc*. Because of the value of traditional varieties to sustainable agriculture and on-farm conservation, innovative government support policies are counselled to strengthen and sustain the traditional rice system.

3.3 MARKET STRATEGY OF RICE SEEDS COMPANY

Gill (1995) in his study estimated the public sector accounts for approximately 60-65 per cent of the total turnover of Rs. 6500-7000 million by the seed agencies. The public sector was mainly engaged in seed business of self- and cross-pollinated crops while the private sector was handling high value and low volume crops like vegetable, flower and ornamental plants. The private companies also took the lead role in the development of planting material through biotechnology and tissue culture techniques.

Shiva and Crompton (1998) reported that seed industry may coalesce under the control of a few large companies as hybrid seed is produced principally by large companies and increasing use of transgenic crops in seed sector will further support only those companies which can meet the high development costs.

Venkateswarlu (2010) reported that the land area and production rates of multinationals Syngenta, Bayer, Monsanto, Bejo Sheetal, Advanta, US Agri and East West Seeds control more than 50% of the market share. Syngenta has a leading position in tomato hybrid seeds with nearly 15% of market share, followed by Nunhems and Namdhari. Syngenta also leads okra hybrid seed production and is followed by Mahyco, Namdhari and Nunhems. Together they have a market share of over 60%. Nunhems, Bejo Sheetal, Mahyco, Syngenta, Seminis and US Agriseeds are the leading companies in hot and sweet pepper seed production.

Bakshi and Gupta (2013) reported that advertisement through internet overtakes television, radio and newspaper advertisement. According to different business journals of America, internet is quicker as compared to radio, television or newspaper. With dramatic increase in online advertisement, company started to spend more on e-marketing rather than on television, radio or newspaper.

Sharma *et al.* (2013) suggested that the availability needs to be backed by availability at affordable price and adequate quality. The availability may be assured by production as well as reduction of wastage. The same applies to rice also. To remain competitive the rice processing unit needs to adopt the latest supply chain strategies. They need to focus on co-ordination, collaboration with farmers and customers for smooth flow of processed rice. Demand consolidation will help in inventory reduction. Focus has to be made on distribution channel design. It is essential to redesign the supply chain of rice for better performance of a company as well as better service to the customers. To remain competitive the rice processing unit needs to adopt the latest supply chain strategies. They need to focus on co-ordination, collaboration with farmers and customers for smooth flow of processed rice. Demand

consolidation will help in inventory reduction. Focus has to be made on distribution channel design. It is essential to redesign the supply chain of rice for better performance of a company as well as better service to the customers.

Afzal and Khan (2015) revealed that quality, design, content of advertisement, loyalty of consumer towards brand and previous buying experience of consumer are significant factors which influence consumer buying behaviour and effect the direct impact of online and conventional advertisement on consumer buying behaviour through their strong mediating effect. They also found that what they actually want to see in advertisement but also which advertising medium is better for the promotion of their product.

Netam *et al.* (2019) studied on analysis of paddy production with the objective to work out the cost of returns of paddy in Rajnandgaon district of Chhattisgarh, India. They revealed that on an average the per hectare cost of cultivation of paddy was calculated as Rs. 46295.99, on an average yield of paddy was observed 37.63 quintals and average cost of production per quintal of paddy is (Rs. 1227.39). The input-output ratio of paddy was (1:1.67).

Ramnath *et al*. (2019) evaluated traditional aromatic rice varieties in rice growing area of Bihar, where the varieties, like Katarni, Tulsi, Manjari, Badshahbhog, BR-9 and BR-10 are most common. Now a days Katarni rice is facing the threat of extinction, mainly due to declining irrigation facility, adoption of other high yielding rice varieties and adulteration by traders of non- aromatic rice grains with Katarni with the profit motto.

Pathak and singh (2020) reported that farmers prefer post-emergence as their key herbicides in paddy crop to eliminate weeds for plant growth and to get maximum yield. Most of the farmers have mixed level of awareness on the basis of price, availability and quality respectively, because of lack of awareness and proper promotion. The study was done to understand the awareness tactics used by Bayer Crop Science Ltd. for promoting its well-known herbicides named “Adora” among the farmer in Fatehpur District of Uttar Pradesh.

CHAPTER 4

METHODOLOGY

Research methodology is the description, explanation and justification of various methods of conducting research. The choice of a research method depends upon the researcher's judgment and resources available. The research methodology adopted for conducting the present study has been discussed under the following sub-headings:

4.1 Selection of locale study

4.2 Selection of variables

4.3 Data collection method

4.4 Analysis of data

4.1 Selection of locale of the study

The study was conducted at Kanke and Ormanjhi blocks of Ranchi district during kharif, 2020. It has the maximum awareness regarding hybrid paddy of VNR Seeds Pvt Ltd.

a. Selection of territories

The survey was done in two blocks of VNR Seeds Pvt Ltd in Ranchi namely as Kanke and Ormanjhi which were selected randomly for the purpose of study.

b. Selection of village

Four villages from each block were selected *i.e.*, Hauchar, Kumhariya, Khatanga, and Boreya villages from Kanke block- Pacha, Kucchu, Matatu and Chakla villages from Ormanjhi block of Ranchi district.

c. Selection of respondents

Fifteen farmers from each village of each block was selected randomly. Thus altogether 120 farmers constituted the sample for the purpose of study.

4.2 Selection of variables

The variables like- education, family type, Family size, size of holding, communication behaviour, technology adoption, occupation, income, farming experience and training exposure were selected as variables under the study. These were measured with the indices already developed or developed under the study.

1. **Education –** The education level was categorized as Illiterate, can read and write, Primary/Middle school, High school, Intermediate, Graduate and above which were scored as 0, 1, 2, 3, and 4, respectively.
2. **Family type –** Family type was categorised as nuclear and joint.
3. **Family size –** The family size was categorized as small (<4 members), medium (4-6 members) and large family (>6 Members).
4. **Size of holding –** The government of India categorised size of holding as marginal (<1 ha), small (1 to 2 ha), semi–medium (2 to 4 ha), medium (4 to 10 ha) and large farmer (>10 ha) as per GOI norms.
5. **Communication behaviour –** It was categorised as Television, Radio, Newspaper, Mobile and Internet.
6. **Technology adoption** - It was categorised as adoption of hybrid variety, FYM/Compost, bio fertilizers, chemical fertilizers, pesticides, improved water management, water harvesting etc.
7. **Occupation –** Occupation was categorized as agriculture field crops, field crops + horticulture, field crop +animal husbandry, field crop + business, field crop + labour, field crop + service and others which are scored as 1, 2, 3, 4, 5, and 6.
8. **Income –** It was characterised into the following
   i.e., up to Rs. 50000, Between Rs. 50,000 to 1.0 lakh, Between Rs. 1.0 lakh to 1.5 lakh, Rs. 1.5 lakh to 2.0 lakh and more than Rs. 2.0 lakh.
9. **Farming Experience –** It was characterised into the following
   i.e., Low (up to 7 years), Medium (8 to 21 years), High (>21 years).
10. **Training exposure –** Training exposure was categorized as untrained, one day training, 2–3 day training, 5 – 7 day training and more than 7 days training attended.

4.3 Collection of data

Both primary and secondary data were collected as per the objectives of study. Primary data were collected through interview with farmers through questionnaire. The questionnaire is given in Appendix. Some of the photographs of interaction with farmers are given in Fig 4.1 to Fig 4.7. Secondary data were collected from VNR seeds Pvt Ltd, newspapers, reports, internet, journals, etc.

4.4 Data analysis

Data were analysed through frequency, percentage and other relevant statistical methods. Analysed data were interpreted on the basis of local situation and experimental findings which has been presented in the form of table, pie chart etc.

Fig. 4.1 Farmers showing VNR hybrid (2111) for cultivation of Rice at Pacha village of Ormanjhi Block (Ranchi)

Fig. 4.2 Interaction with farmers for knowing improved method of rice cultivation at Ormanjhi Block (Ranchi)

Fig. 4.3 Postering and Bannering at rice field in Khatanga village of Kanke block, Ranchi

Fig.4.4 Interaction with farmers in Kumahariya village of Kanke block, Ranchi

Fig. 4.5 Farmer of Matatu village (Block- Ormanjhi) showing his rice field (Hybrid- 2111) (Don-III)

Fig. 4.6 Field Day of Rice (Hybrid - 2355) of VNR Seeds at Matatu village of Kanke Block, Ranchi at Don-I

Fig. 4.7 Field Day of Rice (Hybrid - 2245) of VNR Seeds at Boreya Village of Kanke Block, Ranchi at Don-II

CHAPTER 5

RESULTS AND DISCUSSION

The present chapter encompasses results and discussion based on the objectives set forth for the study and has been discussed under the following selections.

5.1 Socio-economic profile of rice growing farmers

5.2 Farmers preferences with respect to duration, grain type and yield of rice

5.3 Market strategy of VNR seeds and access sale potential

5.1 Socio-economic profile of rice growing farmers.

Socio-economic profile of rice growing farmers comprises education, occupation, size of land holding, housing pattern, family size, family type, communication behaviour, farming experience, training exposure and technology adoption

5.1.1 Education level of respondents of Kanke and Ormanjhi blocks of Ranchi

Table 5.1.1 Block wise frequency distribution of the respondents according to education level

Sl. No.	Category	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Illiterate	10	16.7	14	23.3	24	20.0
2	Can Read and Write	5	8.3	2	3.3	7	5.8
3	Primary School	9	15.0	7	11.7	16	13.4
4	Middle School	16	26.7	19	31.7	35	29.2
5	High School	12	20.0	13	21.7	25	20.8
6	Intermediate	6	10.0	3	5.0	9	7.5
7	Graduate and above	2	3.3	2	3.3	4	3.3

***** Sixty respondents taken from each block

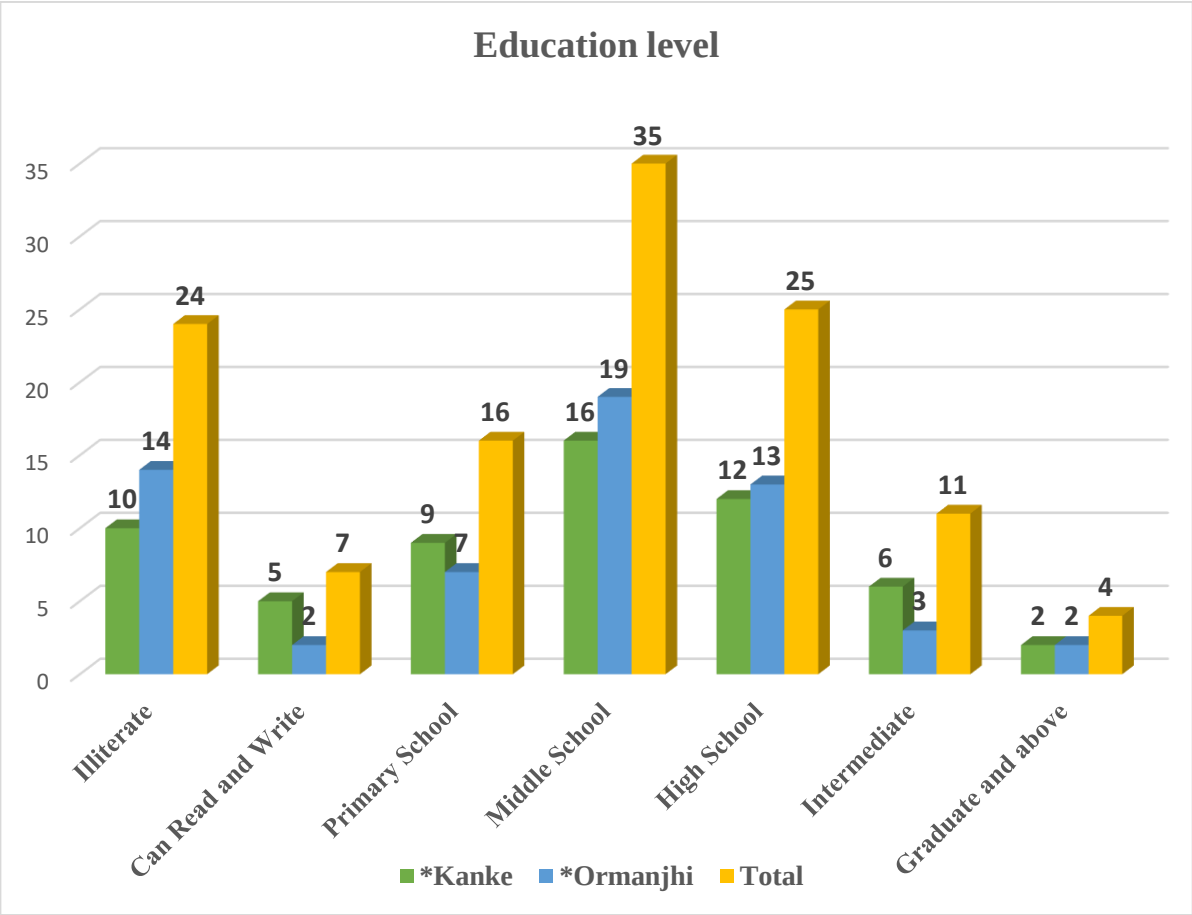

Fig. 5.1.1 Block wise frequency distribution of the respondents according to education level

Education level of Kanke and Ormanjhi blocks of Ranchi district varies as shown in Table 5.1.1. Illiterate percentage of Kanke (16.7%) and Ormanjhi (23.3%) blocks were recorded. Whereas, illiterate total respondent percentage of 20.0%. Majority of farmers were middle school pass *i.e.*, 26.7% and 31.7% from Kanke and Ormanjhi blocks respectively. This table also shows that total education level of respondents of 29.2% which were middle school pass. Further, the education level of total literate farmer in descending order were high school (20.8%), primary school (13.4%), intermediate (7.5%), can read and write (5.8%) and graduate and above (3.3%).

The reason for illiteracy may be attributed to poor educational facilities in rural areas, restriction in the family for the girls to be inside four walls of house and absence of school in the villages.

5.1.2 Occupation of the respondents of Kanke and Ormanjhi blocks of Ranchi

Table 5.1.2 Block wise frequency distribution of the respondents according to occupation level

S. No	Category	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Field crops (FC)	24	40.0	20	33.3	44	36.7
2	FC + Horticulture (Hort.)	16	26.7	17	28.3	33	27.5
3	FC + Hort. + Animal husbandry (AH)	5	8.3	8	13.3	13	10.8
4	FC + Hort+ AH + Business (B)	4	6.7	3	5.0	7	5.8
5	FC + Hort. + AH + Labour (L)	8	13.3	11	18.3	19	15.8
6	FC + Service and Others	3	5.0	1	1.7	4	3.4

* Sixty respondents taken from each block

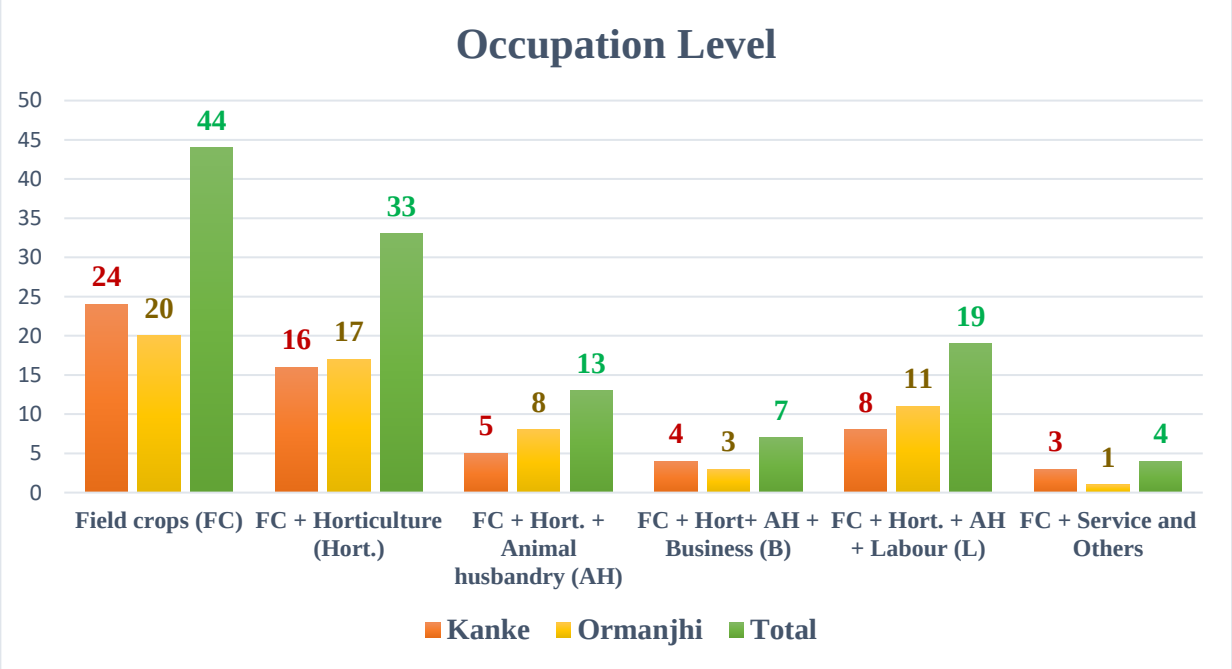

Fig. 5.1.2 Block wise frequency distribution of the respondents according to occupation level

The frequency distribution of the respondents according to occupation is presented in Table 5.1.2. Shows that the majority total of the farmers (36.7%) take field crops as their occupation followed by field crops and horticulture (27.5%), field crops + horticulture + animal husbandry + labour (15.8%), field crops + horticulture + animal husbandry (10.8%), field crops + horticulture + animal husbandry + business (5.8%) and field crops + service and others (3.4%). Hence, the field crops were seen as an important occupation in the study area. It could be concluded that field crops alone not giving sufficient income or employment to the farmers. That's why 63.3% of the respondents are not fully dependent on field crops they are engage in other employment options.

5.1.3 Annual income of the respondents of Kanke and Ormanjhi blocks of Ranchi

Table 5.1.3 Frequency distribution of respondents according to annual income of farmers of Kanke and Ormanjhi blocks of Ranchi district

S. No.	Category	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Up to Rs. 50000	12	20	5	8.3	17	14.2
2	>Rs. 50000 to Rs. 1 lakh	26	43.3	24	40.0	50	41.6
3	>Rs. 1 lakh to Rs. 1.5 lakh	16	26.7	18	30.0	22	18.3
4	>Rs. 1.5 lakh to Rs. 2 lakhs	4	6.7	11	18.3	15	12.5
5	More than Rs. 2 lakhs	2	3.3	2	3.3	4	3.3

***** Sixty respondents taken from each block

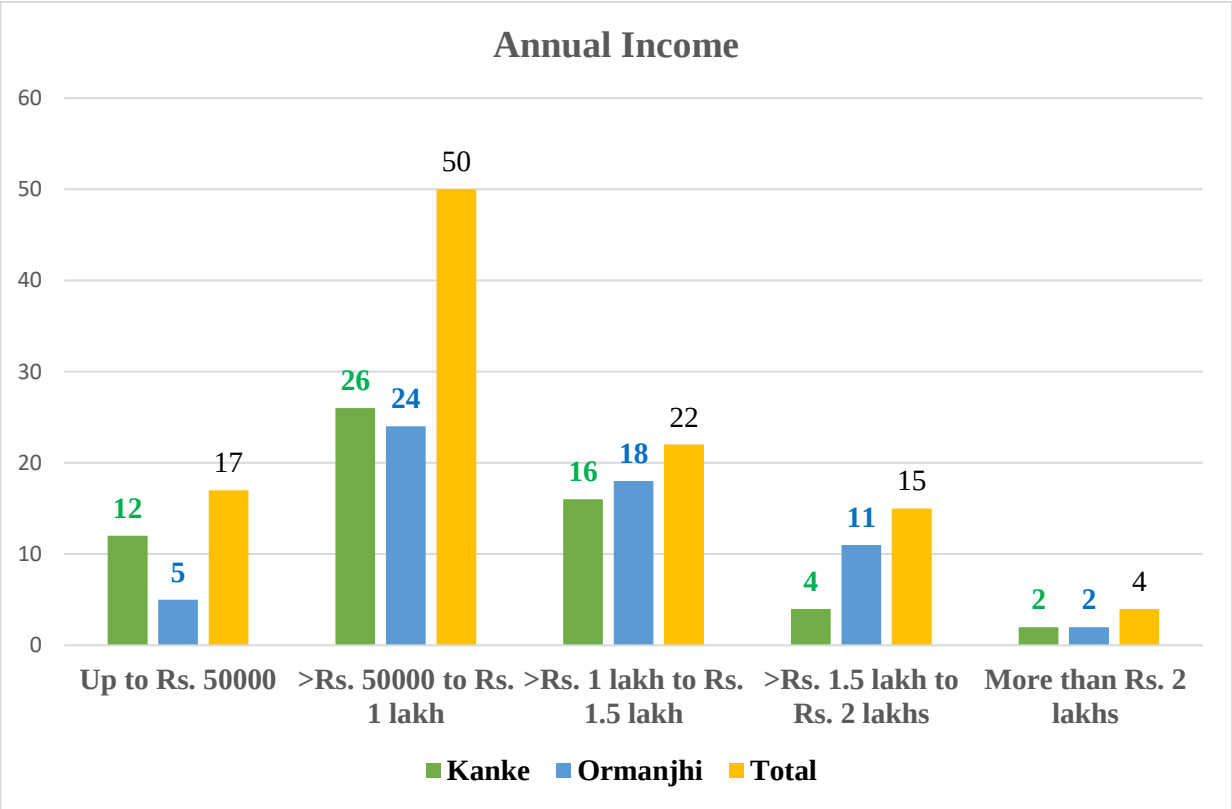

Fig 5.1.3 Frequency distribution of respondents according to annual income of farmers of Kanke and Ormanjhi blocks of Ranchi

The frequency distribution of the respondents according to annual income is presented in Table 5.1.3. The table reveals that majority of the farmers (43.3%) of Kanke block had annual income range of more than Rs. 50,000 to 1 lakh followed by more than Rs. 1 lakh to 1.5 lakh (26.7%), up to Rs. 50,000 (20.0%), more than Rs. 1.5 lakh to 2 lakhs (6.7%) and more than Rs. 2 lakhs (3.3%). It is a matter of satisfaction that the 36.7% farmers have annual income of above Rs. 1 lakh whereas, only 63.3% farmers had annual income less than Rs. 10,0000/-

The table also reveals that majority of the farmers (40.0%) of Ormanjhi block had annual income range of Rs. 50,000 to Rs. 1 lakh followed by more than Rs. 1 lakh to 1.5 lakh (30.0%), more than Rs. 1.5 lakh to 2 lakhs (18.3%), up to Rs. 50,000 (8.3%) and more than Rs. 2 lakhs (3.3%). It is a matter of satisfaction that the 51.6% farmers have annual income of above Rs. one lakh whereas, rest of the farmers had annual income less than up to one lakh rupees.

Total of both blocks shows majority of the farmers (41.6%) had annual range of Rs. 50,000 to Rs. 1 lakh followed by more than Rs. 1 lakh to Rs. 1.5 lakh (18.3%), up to Rs. 50,000 (14.2%), more than Rs. 1.5 lakh to Rs. 2 lakhs (12.5%) and more than Rs. 2 lakhs (3.3%). It is a matter of satisfaction that the annual income of (44.1%) farmers is above Rs. 1 lakh and only (14.2%) farmers had income up to Rs. 50,000. This shows that the income of farmers can be increased through other employment options with Field crops.

5.1.4 Family type of the respondents

Table 5.1.4 Block wise frequency distribution of respondents according to family type

S. No.	Family type	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Nuclear family	35	58.3	38	63.3	73	60.8
2	Joint family	25	41.7	22	36.7	47	39.2

* Sixty respondents taken from each block

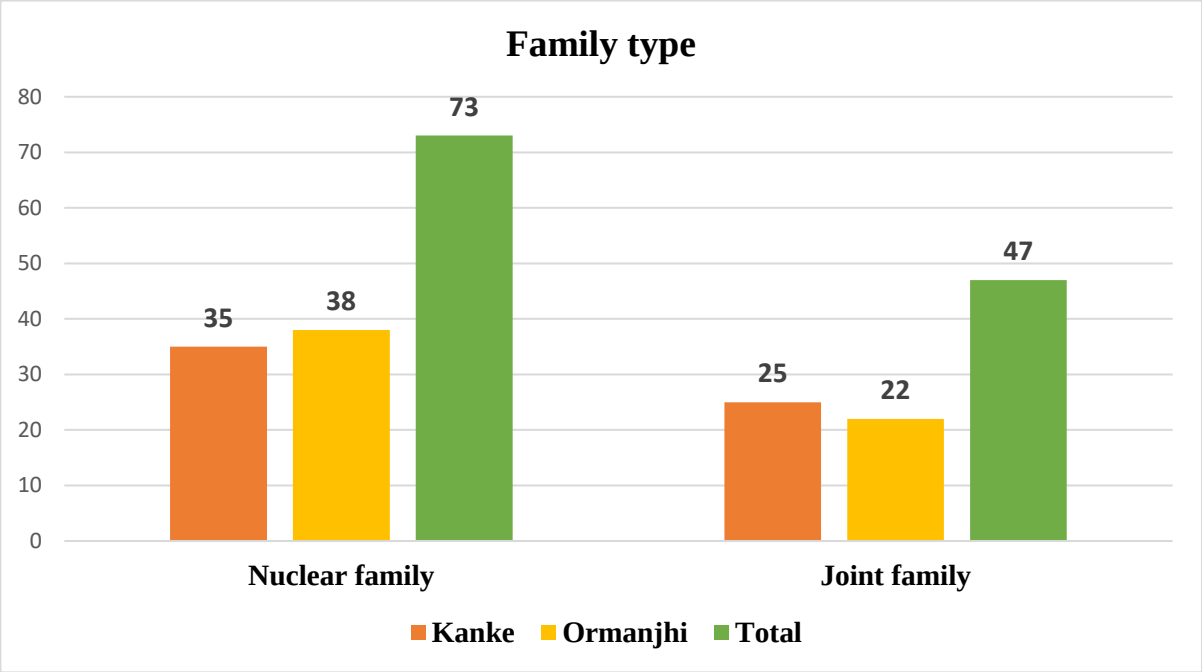

Fig. 5.1.4 Block wise frequency distribution of respondents according to family type

The frequency distribution of the respondents according to family type is presented in Table 5.1.4. It is indicated by the table that majority percentage of the farmers from both blocks *i.e.*, Kanke (58.3%) and Ormanjhi (63.3%) blocks belong to nuclear family while the rest farmers of Kanke (41.7%) and Ormanjhi (36.7%) belong to joint family. The total respondent percentage of 60.8% are nuclear family, while 39.2% are in joint family. Hence, there is dominance of nuclear family system is there.

5.1.5 Family size of the respondents

Table 5.1.5 Block wise frequency distribution of respondents according to family size

S. No	Family size	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Small (<4 members)	30	50.0	27	45.0	57	47.5
2	Medium (4 to 6 members)	20	33.3	21	35.0	41	34.2
3	Large (>6 members)	10	16.7	12	20.0	22	18.3

* Sixty respondents taken from each block

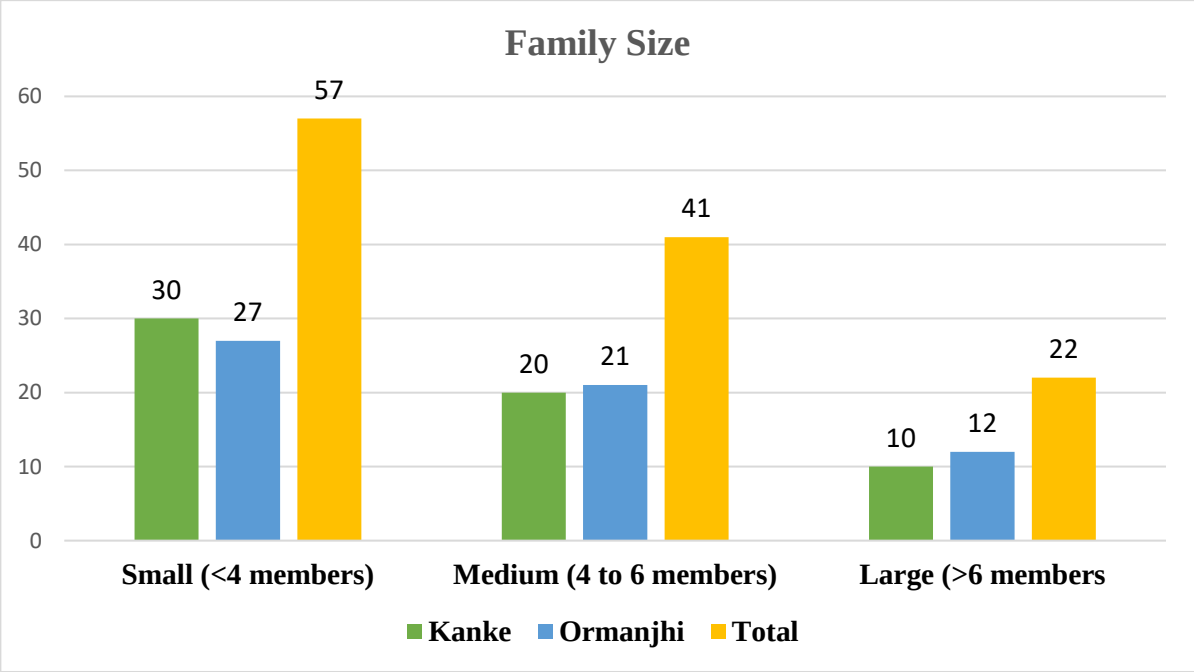

Fig. 5.1.5 Block wise frequency distribution of respondents according to family size

The frequency distribution of the respondents according to family size is presented in Table 5.1.5. The table shows that the family size of majority of the farmers was small family of 50% at Kanke and 45.0% at Ormanjhi blocks, followed by medium family size at Kanke (33.3%) and Ormanjhi (35.0%). Large family size of Kanke and Ormanjhi blocks were 16.7% and 20.0%, respectively. Whereas, the total respondent percentage of both blocks shows that majority of farmers had small family size (47.5%). Hence, it may be concluded that small size family was found dominant in the region.

5.1.6 Housing pattern of the respondents

Table 5.1.6 Block wise frequency distribution of respondents according to housing Pattern

S. No.	Type of house	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Kaccha	30	50.0	19	31.7	49	40.8
2	Mixed	14	23.3	17	28.3	31	25.8
3	Pucca	16	26.7	24	40.0	40	33.4

* Sixty respondents taken from each block

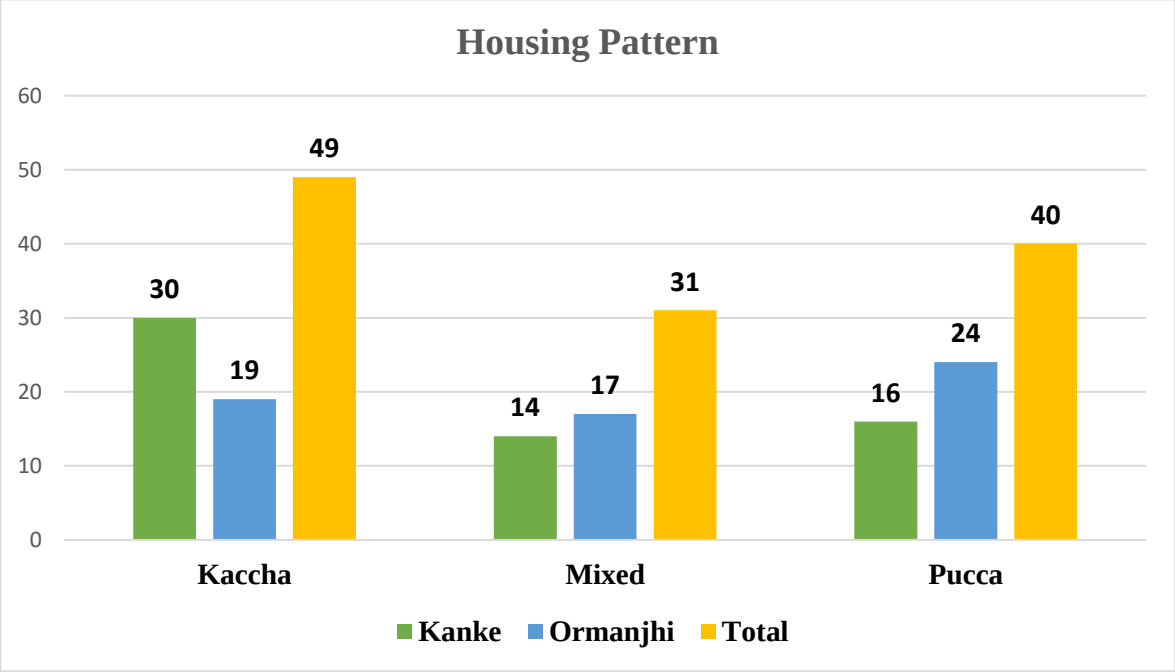

Fig. 5.1.6 Block wise frequency distribution of respondents according to housing pattern

The frequency distribution of the respondents according to housing pattern is presented in Table 5.1.6. It is revealed from the table that farmers of Kanke having pucca house of 26.7%, mixed house of 23.3% and kaccha house of 50.0% whereas, farmers of Ormanjhi block having pucca house of 40.0%, mixed house of 28.3% and kaccha house of 31.7%.

Total respondent percentage of 40.8% having kaccha house, 25.8% respondents have mixed house and 33.4 % have pucca house. The changing life style of rural people is attracting them towards pucca house but it was costly enough for them to build pucca house in one go.

5.1.7 Size of holding possessed by the respondents

Table 5.1.7 Block wise frequency distribution of respondents according to size of holding

S. No	Size of holding	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Marginal (< 1 ha)	15	25.0	16	26.7	31	25.8
2	Small (1-2 ha)	26	43.3	27	45.0	53	44.2
3	Semi-medium (2-4 ha)	15	25.0	11	18.3	26	21.7
4	Medium (4-10 ha)	4	6.7	5	8.3	9	7.5
5	Large (> 10 ha)	0	0	1	1.7	1	0.8

* Sixty respondents taken from each block

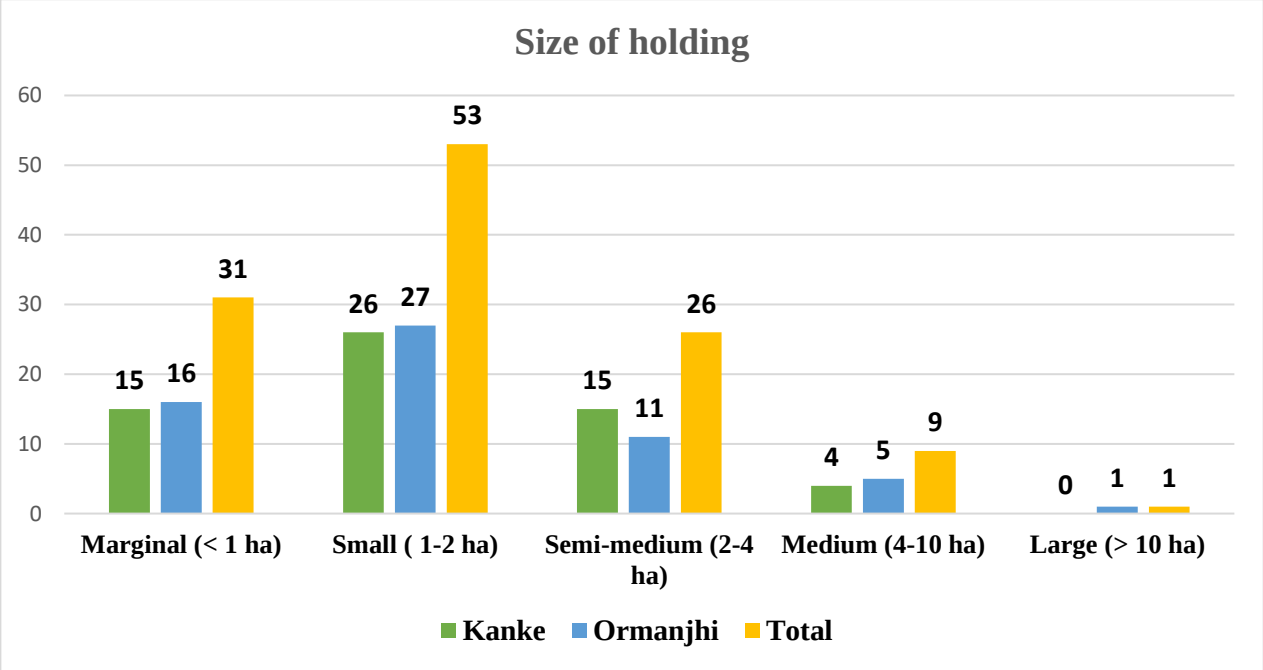

Fig. 5.1.7 Block wise frequency distribution of respondents according to size of holding

The frequency distribution of the respondents according to size of holding is presented in Table 5.1.7. The table reveals that majority respondent's percentage of Kanke block was small farmers (43.3%) followed by marginal farmers (25.0%), semi-medium farmers (25.0%) and medium farmers (6.7%). The large farmers were not found in Kanke block study area. whereas,

majority percentage of the respondents of Ormanjhi block were small farmers (45.0%) followed by marginal farmers (26.7%), semi-medium farmers (18.3%), medium farmers (8.3%) and large farmers (1.7%). The majority total respondent percentage of both blocks had small farmers (44.2%) followed by marginal farmers (25.8%). Thus, it may be concluded that majority of the respondents had either 1 – 2 ha agricultural land *i.e.*, small farmers or marginal farmers (< 1 ha agricultural land). This might be due to fragmentation of holding due to continued division in joint family.

5.1.8 Communication behaviour

Table 5.1.8.1 Frequency distribution of respondents according to communication behaviour of farmers of Kanke block

S. No	Particulars	Most often		Often		Sometime		Never	
		F	%	F	%	F	%	F	%
1	Television	28	46.7	20	33.3	5	8.3	7	11.7
2	Radio	7	11.7	15	25.0	13	21.7	25	41.7
3	News paper	8	13.3	10	16.7	20	33.3	22	36.7
4	Agricultural University	15	25.0	10	16.7	15	25.0	20	33.3
5	Internet	32	53.3	5	8.3	13	21.7	10	16.7

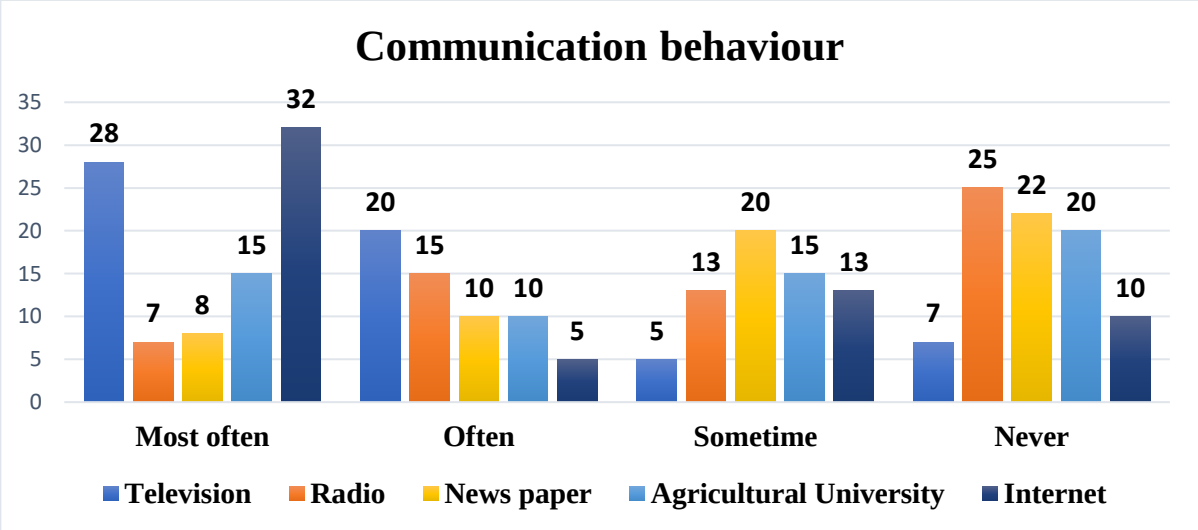

Fig. 5.1.8.1 Frequency distribution of respondents according to communication behaviour of Kanke block farmers

The frequency distribution of the respondents according to communication behaviour is presented in Table 5.1.8.1. It is apparent from the table that internet is most often used by

respondents of Kanke block *i.e.*, 53.3% which is followed by television (46.7%), agricultural university (25.0%), newspaper (13.3%) and radio (11.7%) whereas, in contrarily, 41.7% of the respondents never used radio which was followed by newspaper (36.7%), agricultural university (33.3%). It is worth mentioning that 53.3% of the respondents are most often used internet. Hence, it could be concluded that for promotion of hybrid rice through mobile internet should be used as communication media.

Table 5.1.8.2 Frequency distribution of respondents according to communication behaviour of Ormanjhi block farmers

S. No.	Particulars	Most often		Often		Sometime		Never	
		F	%	F	%	F	%	F	%
1	Television	26	43.3	20	33.3	5	8.3	9	15.0
2	Radio	8	13.3	13	21.7	15	25.0	24	40.0
3	Newspaper	10	16.7	5	8.3	25	41.7	20	33.3
4	Agricultural University	10	16.7	8	13.3	20	33.3	22	36.7
5	Internet	30	50.0	13	21.7	8	13.3	9	15.0

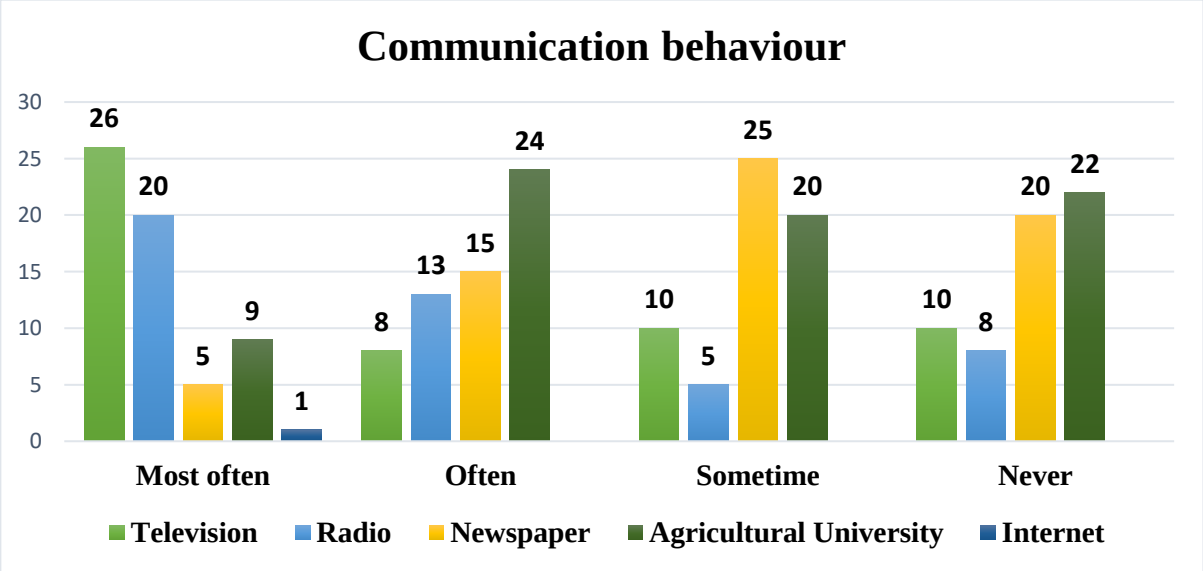

Fig. 5.1.8.2 Frequency distribution of respondents according to communication behaviour of Ormanjhi block farmers

The frequency distribution of the respondents according to communication behaviour is presented in Table 5.1.8.2. Internet is most often used as a communication behaviour by

respondents of Ormanjhi block (50.0%) followed by television (43.3%), agricultural university (16.7%), newspaper (16.7%) and radio (13.3%). Contrarily, forty per cent of the respondents never used radio which was followed by newspaper (33.3%), agricultural university (36.7%). It is worth mentioning that 50.0% of the respondents are most often used internet. Hence, it could be concluded that for promotion of hybrid rice through mobile internet should be used as communication media.

5.1.9 Part of any farmer's group or self-help group (SHG)

Table 5.1.9 Frequency distribution of respondents according to participation of respondents in farmers' group or SHG

S. No	Part of any farmers' group or SHG	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Yes	9	15.0	13	21.7	22	18.3
2	No	51	85.0	47	78.3	98	81.7

* Sixty respondents taken from each block

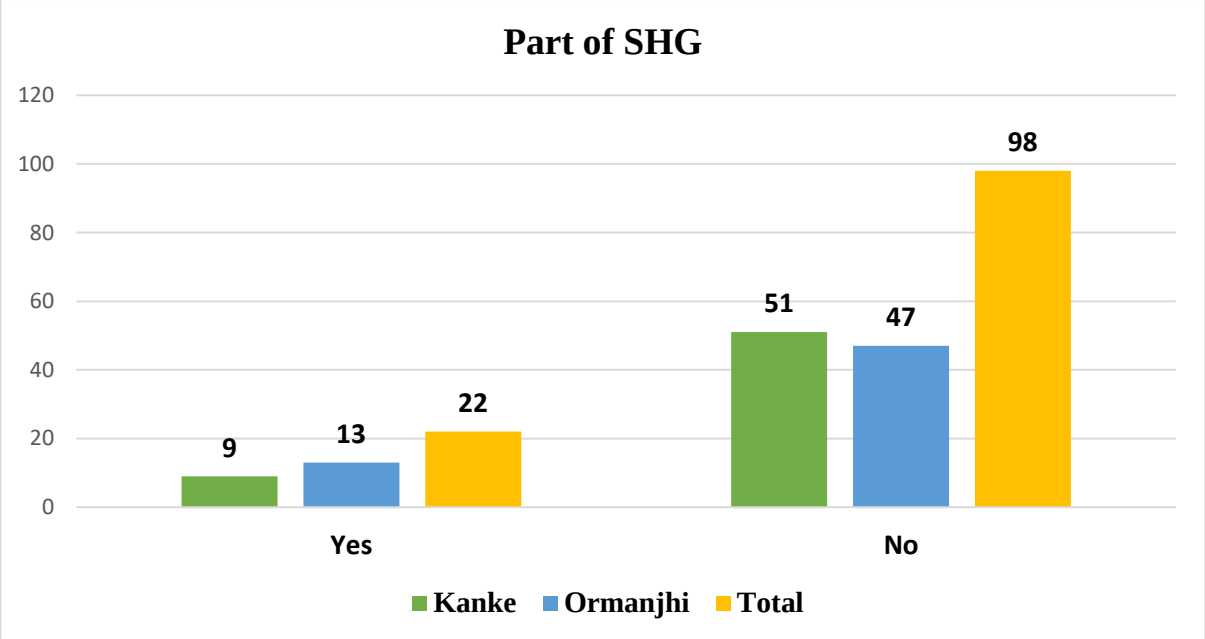

Fig. 5.1.9 Frequency distribution of respondents according to participation in farmers' group or SHG

The frequency distribution of the respondents according to part of self-help group (SHG) is presented in Table 5.1.9. The table indicates that only 15.0% of the respondents from Kanke

block are part of any farmers group or SHG. while, 21.7% of the respondent from Ormanjhi block are part of SHG. Whereas, 85.0% respondents from Kanke and 78.3% respondents from Ormanjhi are not part of any farmer's group or SHG. The total respondent percentage of both blocks shows that 81.7% farmers are not part of any farmers group or SHG. This may be because of no awareness regarding SHG or the importance of farmers association or SHG for dealing with common issues.

5.1.10 Training exposure of the respondents

Table 5.1.10 Frequency distribution of respondents according to training exposure

S. No.	Training exposure	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Untrained	41	68.3	34	56.7	75	62.5
2	1 day training	14	23.3	16	26.7	30	25.0
3	2-3 days training	5	8.3	7	11.7	12	10.0
4	5-7 days training	0	0.0	3	5.0	3	2.5
5	More than 7 days training	0	0.0	0	0.0	0	0.0

*Sixty respondents taken from each block

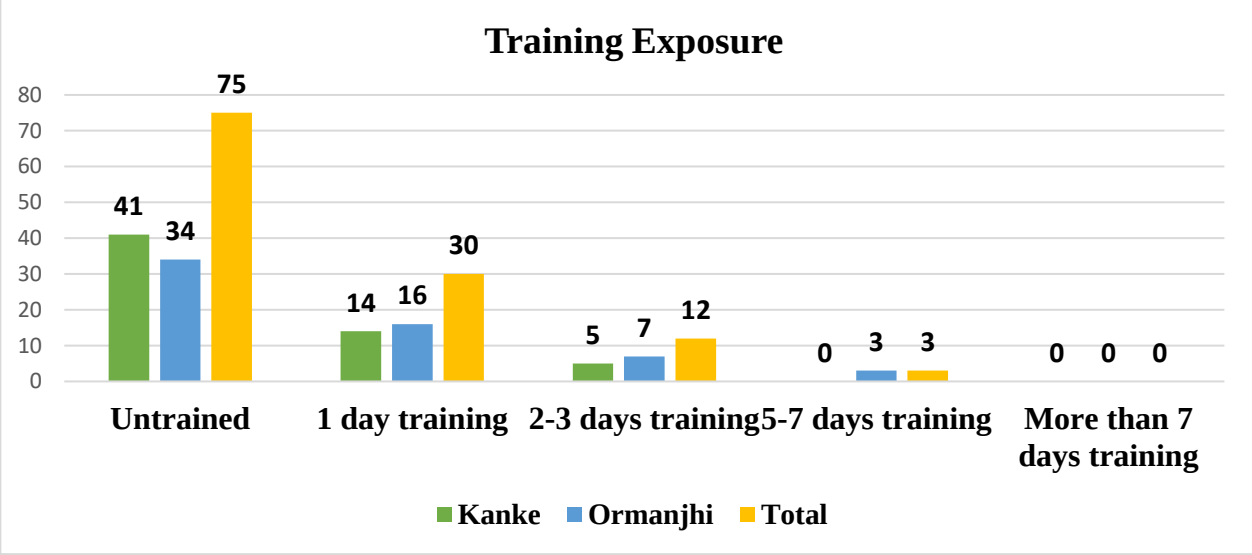

Fig. 5.1.10 Frequency distribution of respondents according to Training exposure

The frequency distribution of the respondents according to training exposure is presented in Table 5.1.10. It is indicated from the table that in Kanke block, majority of the farmers (68.3%) were untrained followed by one day training (23.3%) and 2-3-days training (8.3%). While, in Ormanjhi block, 56.7% of the farmers were untrained which is followed by one day training (26.7%) and 2-3-days training (11.7%). Whereas, total respondent percentage the majority of the farmers were untrained (62.5%). The reason behind this, may be due to lack of training programmes organized by different government organization as well as non- government organization (NGOs).

5.1.11 Technology adoption by the respondents

Table 5.1.11.1 Frequency distribution of respondents according to adoption technology of Kanke block farmers

S. No.	Particulars	Nil adoption		Partial adoption		Full adoption	
		F	%	F	%	F	%
1	Hybrid variety	20	33.3	17	28.4	23	38.3
2	FYM/Compost	15	25.0	27	45.0	18	30.0
3	Bio fertilizers	51	85.0	8	13.3	1	1.7
4	Chemical fertilizers	1	1.7	21	35.0	38	63.3
5	Pesticides	10	16.7	43	71.7	7	11.7
6	Improved water management	55	91.7	3	5.0	2	3.3
7	Water Harvesting	29	48.3	24	40.0	7.0	11.7

***** Sixty respondents taken from each block

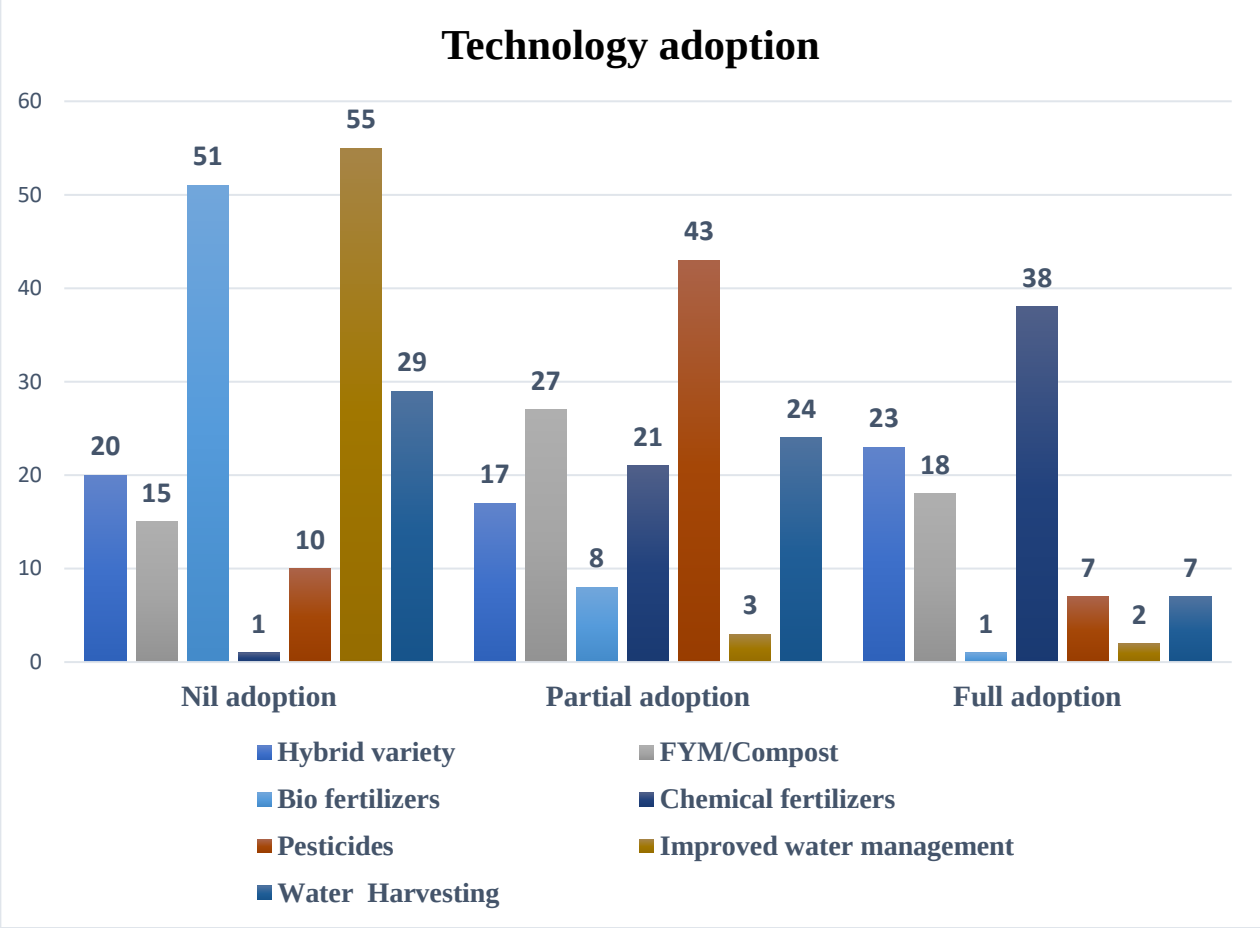

Fig. 5.1.11.1 Distribution of respondents according to technology adoption of Kanke block farmers

It is revealed from the table that highest percentage of respondents (63.3%) had full adoption of chemical fertilizers which was followed by hybrid variety (38.3%), FYM/Compost (30.0%), pesticides (11.7%), improved water management (3.3%) and biofertilizers (1.7%). Contrarily, majority of the respondents had nil adoption of technology like- Improved water management (91.7%) biofertilizers (85.0%), water harvesting (48.3%), hybrid variety (33.3%), FYM/Compost (25.0%), pesticides (16.7%) and chemical fertilizers (1.7%). It could be concluded that field crop or horticultural crops is promoting chemical fertilizers and pesticides which in long run will have negative impact.

Table 5.1.11.2 Frequency distribution of respondents according to adoption technology of Ormanjhi block farmers.

S. No.	Particulars	Nil adoption		Partial adoption		Full adoption	
		F	%	F	%	F	%
1	Hybrid variety	14	23.3	19	31.7	27	45.0
2	FYM/Compost	9	15.0	31	51.7	20	33.3
3	Bio fertilizers	46	76.7	10	16.7	04	6.7
4	Chemical fertilizers	2	3.3	25	41.7	33	55.0
5	Pesticides	16	26.7	40	66.7	04	6.7
6	Improved water management	46	76.7	8	13.3	6	10.0
7	Water harvesting	35	58.3	21	35.0	4	6.7

***** Sixty respondents taken from each block

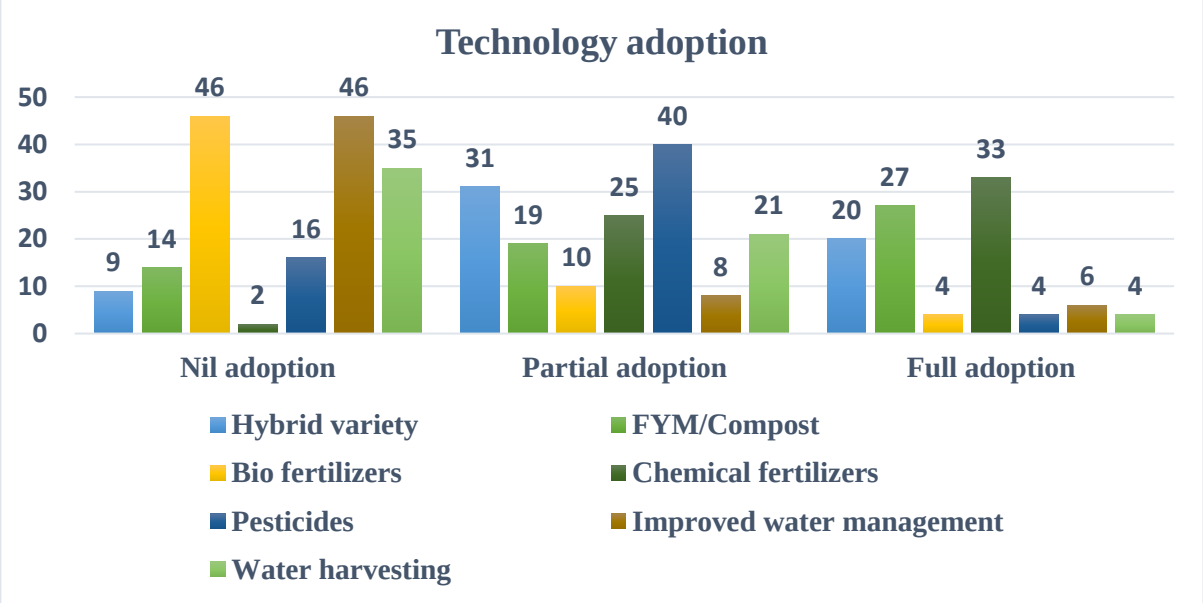

Fig. 5.1.11.2 Distribution of respondents according to technology adoption of Ormanjh block farmers

It is revealed from the table that highest respondent percentage (55.0%) had full adoption of chemical fertilizers which was followed by hybrid variety (45.0%), FYM/Compost (33.3%) and improved water management (10.0%). Contrarily, majority of the respondents had nil adoption of technology like improved water management (76.7%), biofertilizers (76.7%), water harvesting (58.3), pesticides (26.7), hybrid variety (23.3%), FYM/Compost (15.0%) and

chemical fertilizers (3.3%). It could be concluded that field crop and horticultural crops (hybrid) are promoting high use of chemical fertilizers and pesticides which in long run will have harmful effect to environment, health hazardous to animal and human.

5.2 Farmer's preferences

Farmer's preferences of rice growing farmers with respect to grain type, duration, purchase trend, reason for purchase and variety preference

5.2.1 Preference of respondents on the basis of rice maturity

Table 5.2.1 Frequency distribution of respondents according to their preferences over maturation of rice of Kanke and Ormanjhi blocks farmers

S. No	Particulars	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Long duration (>130 days)	14	23.3	8	13.3	22	18.3
2	Medium duration (111-130 days)	30	50.0	35	58.3	65	54.2
3	Short duration (90-110 days)	13	21.7	12	20.0	25	20.8
4	Extra-short duration (< 90days)	3	5.0	5	8.3	8	6.7

* Sixty respondents taken from each block

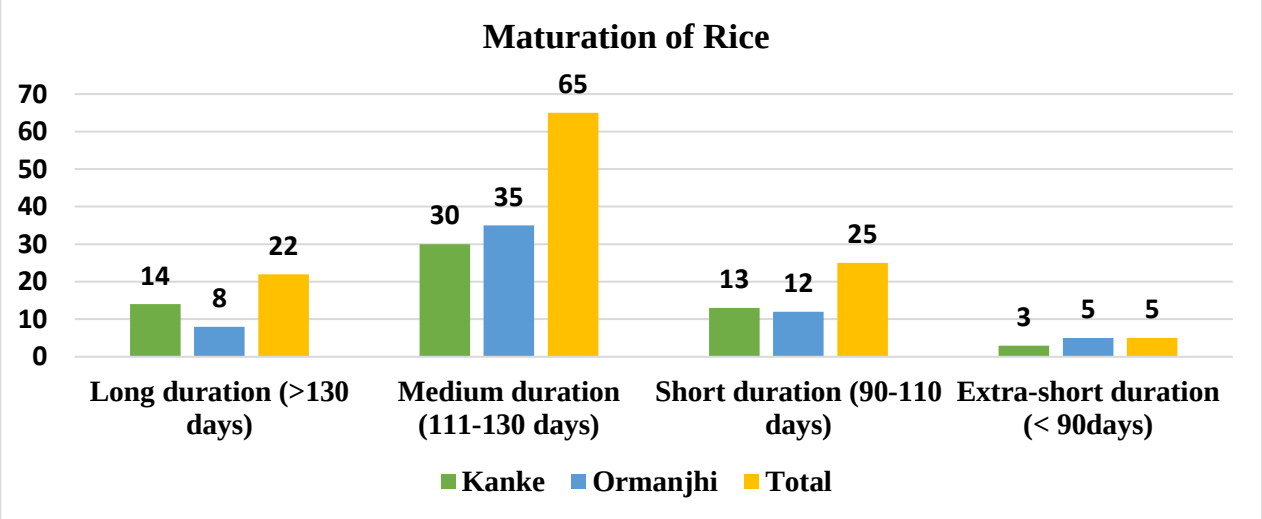

Fig. 5.2.1 Distribution of respondents according to their preferences over maturation of paddy

The frequency distribution of the respondents according to duration of rice is presented in Table 5.2.1. In Kanke block, majority of farmers like to grow medium duration rice (50%) which is followed by long duration (23.3%), short duration (21.7%) and extra short duration 5% and in Ormanjhi block 58.3% of the farmers grow medium duration rice which is followed by long duration (13.3%), short duration (20.0%) and extra short duration (8.3%). Whereas total majority respondent grows 54.2% farmers grow medium duration rice followed by short duration rice

5.2.2 Preference of rice grains farmers

Table 5.2.2 Frequency distribution of the respondents according to their preference of rice grain

S. No.	Type of grains	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Fine	1	1.7	4	6.7	5	4.1
2	Medium	24	40.0	32	53.3	56	46.7
3	Coarse	35	58.3	24	40.0	59	49.2

* Sixty respondents taken from each block

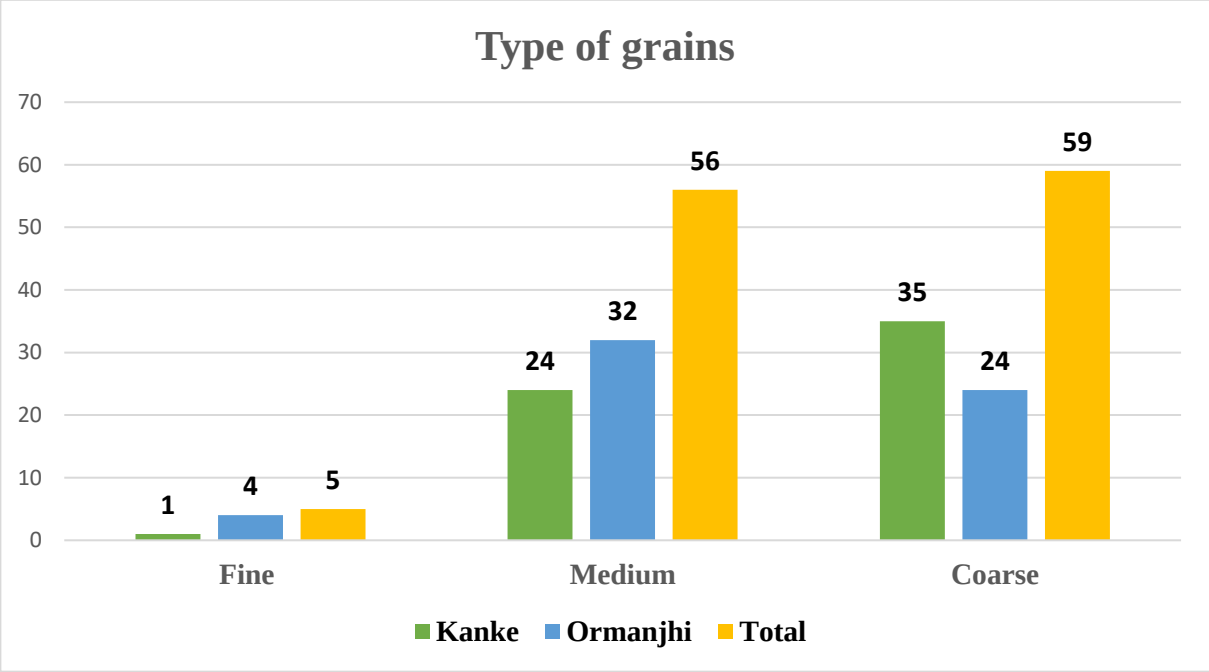

Fig. 5.2.2 Distribution of the respondents according to their preference of paddy grain

The frequency distribution of the respondents according to type of rice grains is presented in Table 5.2.2. The table revealed that Maximum farmers (58.3%) preferred coarse rice grains in

Kanke block followed by medium grains (40%) and fine grains (1.7%) farmers. Whereas, in Ormanjhi block 53.3% farmers preferred medium grains followed by coarse grains (40%), fine grains (6.7%). The majority of the total respondents (49.2%) preferred coarse grains which is followed by medium grains (46.7%).

5.2.3 Amounts of hybrids of different company used by farmers

Table 5.2.3 Amounts of hybrids of different company used by farmers of Kanke and Ormanjhi block

S. No.	Company	*Kanke	*Ormanjhi
		Quantity (Kg)	Quantity (Kg)
1	VNR	50	75
2	Arize	105	130
3	Pioneer	130	180
4	Tata	25	30
5	Advanta	60	50
6	Dhania	15	20
7	Others	23	35

***** Sixty respondents taken from each block

Distribution of the rice seeds companies according to quantity of purchase is presented in Table 5.2.3. The table indicates that pioneer is the leading rice seeds company in both Kanke (130 Kg) and Ormanjhi (180 Kg) blocks. While In Kanke Arize is the second leading company (105 Kg) followed by Advanta (60 Kg), VNR (50 Kg), Tata (25 Kg), Dhania (15 Kg) and others (23 Kg). In Ormanjhi block Arize (130 Kg) is the second most preferred hybrid rice seeds which is followed by VNR (75 Kg), Tata (30 Kg), Advanta (50 Kg), Dhania (20 Kg) and others (35 Kg).

5.2.4 Rice variety/ hybrids grown by farmers of Kanke and Ormanjhi blocks

Table 5.2.4 Area for hybrid and open pollinated rice cultivation at Kanke and Ormanjhi blocks

S. No.	Type of seed	*Kanke			*Ormanjhi			Mean		
		Area (ha)	Area (%)	Quantity of seeds (Kg)	Area (ha)	Area (%)	Quantity of seeds (Kg)	Area (ha)	Area (%)	Quantity of seeds (Kg)
1	Open pollinated	49.2	58.8	2340.0	45.2	54.9	1888.0	47.2	56.9	2214.0
2	Hybrid	34.5	41.2	408.0	37.1	45.1	450.0	35.8	43.2	429.0
Total		83.7	100	2748.0	82.3	100	2338.0	83.0	100	2643.0

***** Sixty respondents taken from each block

Area for hybrid and open pollinated rice cultivation at Kanke and Ormanjhi blocks is presented in Table 5.2.4. The total area of rice cultivation of sixty farmers in Kanke and Ormanjhi blocks are 83.7 ha and 82.3 ha respectively. The area of hybrid cultivation at Kanke and Ormanjhi blocks were 34.5 ha and 37.1 ha respectively. The hybrid area % of Kanke and Ormanjhi blocks of Ranchi were the area % 41.2% and 45% respectively, whereas open pollinated rice cultivation was 58.8% and 54.9% respectively.

The total quantity of open pollinated and hybrid seeds used by farmers of Kanke block were 2340 kg and 403 kg whereas the total quantity of open pollinated and hybrid seeds used by farmers of Ormanjhi block were 1888 kg and 450 kg.

5.3 Market Strategy and Sale Potential of VNR Seeds

Market strategy of VNR seeds comprises most effective advertisement technique, good criteria about VNR seeds, duration of using VNR seeds and sale potential of popular variety of VNR hybrid rice seed 2111 for mid land in Kanke and Ormanjhi blocks of Ranchi district during Kharif, 2020.

5.3.1 Advertisement technique used by company for attracting towards farmers for purchasing of rice hybrids

Table 5.3.1 Block wise frequency distribution of respondents according to most preferred advertisement technique by farmers for purchasing of rice hybrids

S. No.	Advertisement technique	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Village level meeting	23	38.3	24	40	47	39.2
2	Print and mass media	3	5	4	6.7	7	5.8
3	Crop show	16	26.7	13	21.7	29	24.2
4	Mic campaign	8	13.3	6	10	14	11.7
5	Banner/poster	4	6.7	5	8.3	9	7.5
6	Hoarding/pamphlet	6	10	8	13.3	14	11.7

* Sixty respondents taken from each block

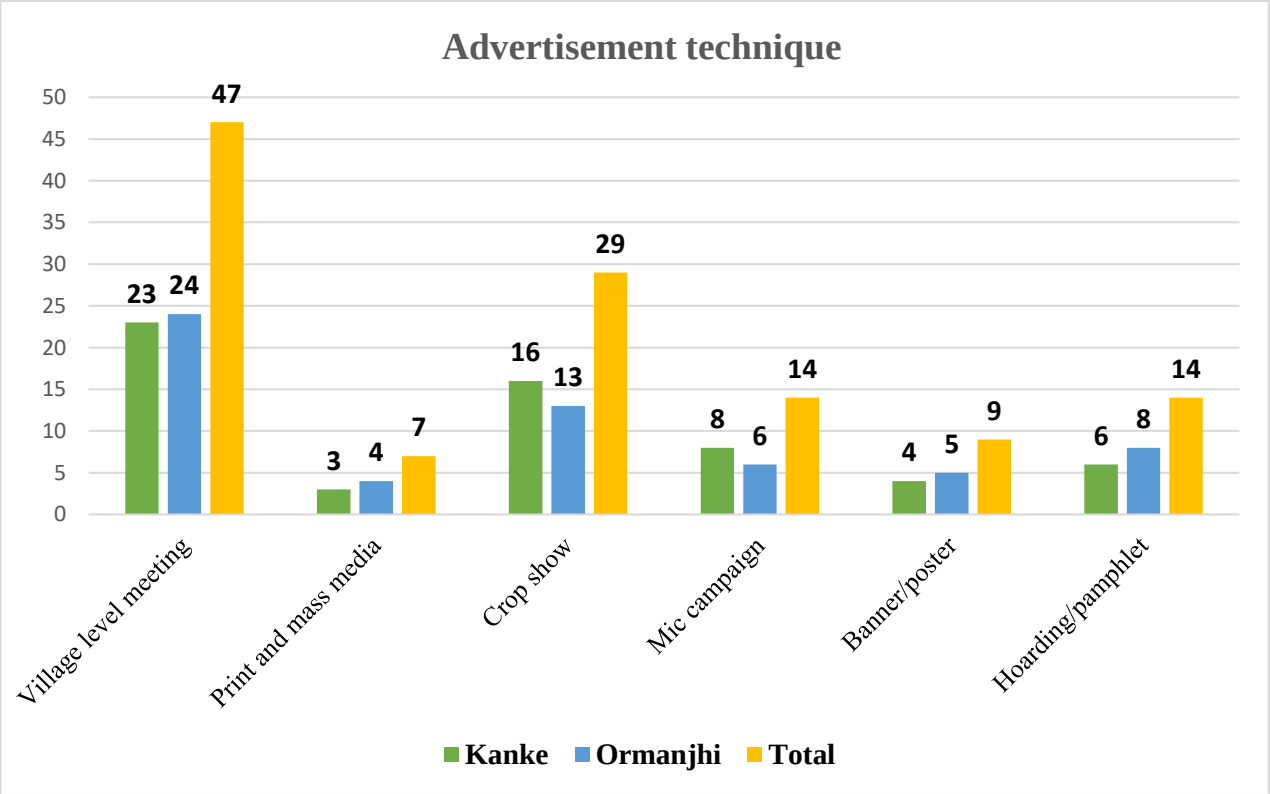

Fig. 5.3.1 Frequency distribution of respondents according to most effective advertisement technique

The frequency distribution of the respondents according to advertisement technique used by different companies for sale of hybrids rice is presented in Table 5.3.1. The table revealed that village level meeting is the most effective tools for purchase of hybrid rice in Kanke (38.3%) and Ormanjhi (40.0%). This is followed by crop show (26.7%), Mic campaign (13.3%), hoarding/pamphlet (10%), banner/poster (6.7%) and print and mass media (5%) at Kanke block.

Whereas in Ormanjhi block, crop show of (21.7%) was next effective tools for purchase of hybrid rice hoarding/pamphlet (13.3%), Mic campaign (10.0%), banner/poster (8.3%) and print and mass media (6.7%).

The table also reveals that majority of the total respondent's percentage is village level meeting of 39.2%. From the table it is clear that majority of the respondents agreed that village level meeting is the most effective advertisement technique of sale of hybrid rice. It may be concluded that personal meetings with buyers attracts them more.

5.3.2 Knowing about VNR rice seeds

Table 5.3.2 Frequency distribution of the respondents for knowing about VNR hybrid rice seeds during kharif, 2020

S. No.	Duration (Year)	*Kanke		*Ormanjhi		Total	
		No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)	No. of Respondent	Respondent (%)
1	Never	45	75	35	58.3	80	66.7
2	One	2	3.3	3	5	5	4.2
3	Two	3	5	3	5	6	5.0
4	Three	4	6.7	9	15	13	10.8
5	> 3 Years	6	10.0	10	16.7	16	13.3

* Sixty respondents taken from each block

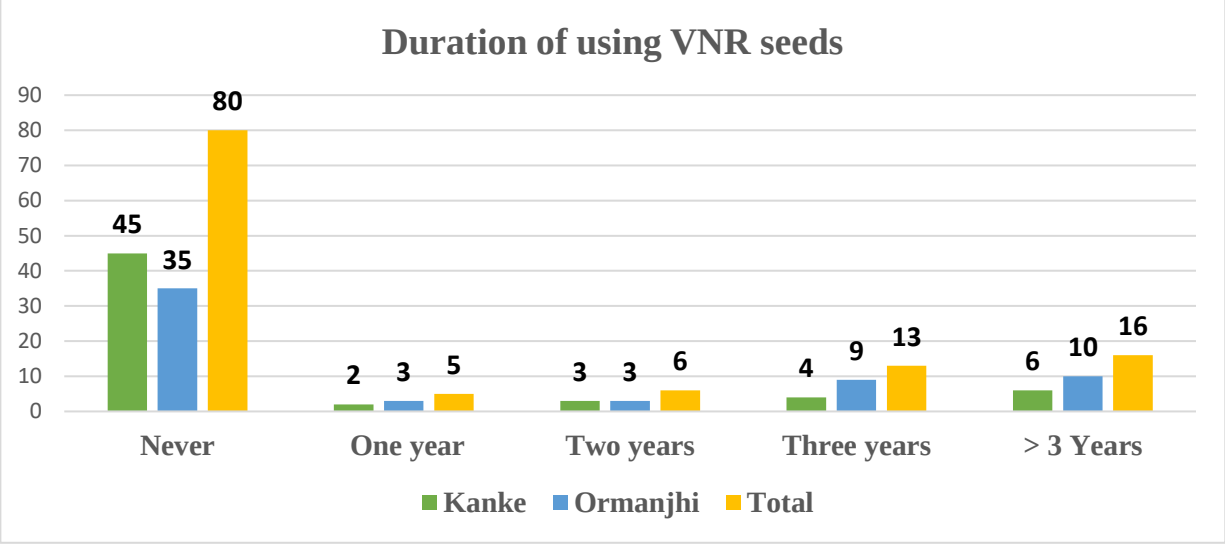

Fig. 5.3.2 frequency distribution of the respondents according to knowing of rice hybrid seeds of VNR during kharif, 2020

The frequency distribution of the respondents according to knowing of rice hybrid seeds of VNR during kharif, 2020 is presented in Table 5.3.2. The table reveals that in Kanke block respondents of 75.0% were never used VNR seeds and only 25.0% of the respondents are using VNR hybrid Rice seeds for cultivation. Whereas in Ormanjhi block, 58.3% farmers have never preferred to grow VNR rice seeds while 41.7% of the farmers using VNR hybrid rice seeds. So, there are 40 farmers from both blocks are using hybrid seeds of VNR. In which Kanke block 3.3% of the respondents are using VNR seeds from one Year which is followed by 5.0% (2 Years), 6.7% (3 Years) and 10.0% (more than 3 Years). While, in Ormanjhi block 5.0% farmers are using from 1 Year which is followed by 5.0% (2 Years), 15.0% (3 Years) and 16.7% (more than 3 Years). The reason behind this, it may be the release of new hybrid variety by the VNR hybrid rice seed company each year.

5.3.3 Respondents who are using/adopted VNR rice seeds

Table 5.3.3 Frequency distribution of the respondents according to who are using/adopted VNR rice seeds

S. No.	Particulars	No. of respondent	Respondent %
1	Price	4	10.0
2	Quality	2	5.0
3	Advertisement	14	35.0
4	Higher yield	17	42.5
5	Seed packaging	3	7.5
Total		40	100

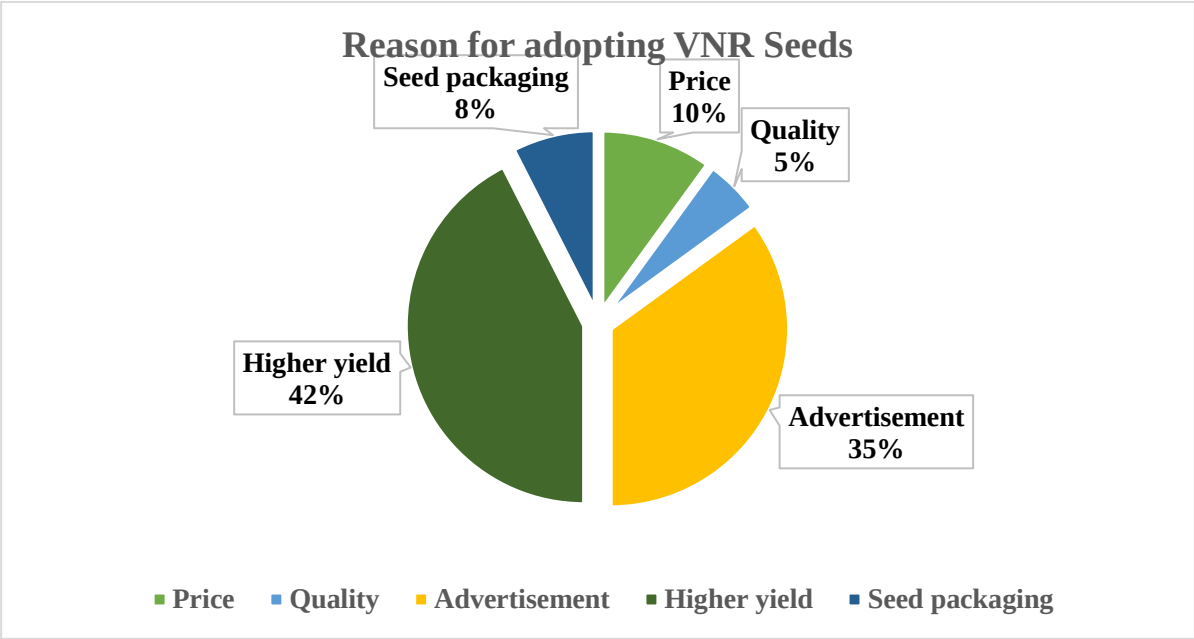

Fig. 5.3.3 Frequency distribution of the respondents according to preference for adoption of rice hybrids of VNR Seeds of Kanke and Ormanjhi blocks

Frequency distribution of the respondents according to preference for adoption of rice hybrids of VNR Seeds of Kanke and Ormanjhi blocks is presented in Table 5.3.3. It is clear from the above table that only 40 number of respondents from Kanke and Ormanjhi were taken for growing VNR hybrid rice. Majority of the farmers (42.5%) agreed that Higher yield is the main criteria for purchasing VNR seeds which is followed by advertisement (35.0%), price (10.0%), seed packaging (7.5%) of hybrids.

5.3.4 Sale potential of rice hybrids of VNR Seeds in different land situation

Table 5.3.4.1 Sale potential of VNR mid land rice hybrids at Kanke and Ormanjhi blocks during *Kharif*, 2020

Particulars	Kanke	Ormanjhi	Total
Total land under rice cultivation (ha)	10897	11845	22742
Mid land under rice cultivation (ha)	4249	3554	7803
Seed rate of hybrid rice (kg/ha)	15	15	15
Total sale of VNR rice seeds for mid land (kg)	3000	9000	12000
Total area covered of mid land for rice cultivation by VNR seeds (ha)	200	600	800
Total midland area uncovered by VNR seeds (ha)	4049	2954	7003
Total seeds for uncovered area of midland by VNR seeds (kg)	60735	44310	105045
Total seeds for uncovered area of midland by VNR seeds (ton)	60	44	104
Sale potential of VNR seeds (ton)	63	53	116

Sale potential of VNR hybrid rice seeds (VNR 2111 and VNR 2228) for mid land at Kanke and Ormanjhi blocks of Ranchi district is presented in Table 5.3.4.1. The table reveals that total rice cultivatable area are 10897 ha and 11845 ha at Kanke and Ormanjhi blocks, respectively. Total mid land area of 4249 ha and 3554 ha under rice cultivation was observed at Kanke and Ormanjhi blocks respectively. Total sale of VNR hybrid rice seeds for mid land at Kanke was three ton while in Ormanjhi 9 tons during Kharif, 2020, which covers 200 ha and 600 ha area under mid land VNR hybrid seeds cultivation at Kanke and Ormanjhi blocks respectively.

So, it may be concluded that 4049 ha and 2954 ha mid land are not covered by VNR hybrid rice seeds at Kanke and Ormanjhi blocks, respectively. It also shows that 60.0 ton VNR hybrid rice seeds are required for mid land of Kanke where VNR hybrid rice could not be grown. Whereas, 44.0 ton VNR hybrid rice seeds is required for mid land of Ormanjhi block where VNR hybrid rice could not be grown during Kharif, 2020. In this way it may be concluded that the total sale potential of VNR hybrid seeds will be 63.0 and 53.0 ton at Kanke and Ormanjhi blocks, respectively.

Table 5.3.4.2 Sale potential of VNR low land rice hybrids at Kanke and Ormanjhi blocks during *Kharif*, 2020

Particulars	Kanke	Ormanjhi	Total
Total land under rice cultivation (ha)	10897	11845	22742
Low land under rice cultivation (ha)	2288	4738	7026
Seed rate of hybrid rice (kg/ha)	15	15	15
Total sale of VNR (kg)	2100	4000	6100
Total area (ha) covered of low land for rice cultivation by VNR seeds	140	266	406
Total lowland area uncovered by VNR seeds	2148	4472	6620
Total seeds for uncovered area of lowland by VNR seeds (kg)	32220	67080	99300
Total seeds for uncovered area of lowland by VNR seeds (ton)	32	67	99
Sale potential of VNR seeds (ton)	34	71	105

Sale potential of VNR hybrid rice seeds (VNR 2355 and VNR 2355 plus) for low land at Kanke and Ormanjhi blocks of Ranchi district is presented in Table 5.3.4.2. The table reveals that total rice cultivatable area are 10897 ha and 11845 ha at Kanke and Ormanjhi blocks, respectively. Total low land area of 2288 ha and 4738 ha under rice cultivation was observed at Kanke and Ormanjhi blocks respectively. Total sale of VNR hybrid rice seeds for low land at Kanke was

2.1 ton while in Ormanjhi 4 tons during Kharif, 2020, which covers 140 ha and 266 ha area under low land VNR hybrid seeds cultivation at Kanke and Ormanjhi blocks respectively. So, it may be concluded that 2148 ha and 4472 ha low land are not covered by VNR hybrid rice seeds at Kanke and Ormanjhi blocks, respectively. It also shows that 32.0 ton VNR hybrid rice seeds are required for low land of Kanke where VNR hybrid rice could not be grown. Whereas, 67.0 ton VNR hybrid rice seeds is required for low land of Ormanjhi block where VNR hybrid rice could not be grown during *Kharif*, 2020. In this way it may be concluded that the total sale potential of VNR hybrid seeds will be 34.0 and 71.0 ton at Kanke and Ormanjhi blocks, respectively.

CHAPTER 6

CONCLUSIONS

Conclusions may be drawn after comparing the results of both the blocks and presented here under:

- Majority of the farmers were middle school pass *i.e.*, 26.7% and 31.7% from Kanke and Ormanjhi blocks respectively.
- Field crops is the major source of occupation in both blocks 40.0% farmers from Kanke blocks and 33.3% from Ormanjhi block farmers are fully dependent on field crops for occupation
- Majority of the farmers had annual income range of more than Rs. 50000 to Rs. 1 lakh of both blocks 43.3% in Kanke block and 40.0% in Ormanjhi block.
- Majority percentage of the farmers from both blocks *i.e*., Kanke (58.3%) and Ormanjhi (63.3%) blocks belong to nuclear family while the rest farmers of Kanke (41.7%) and Ormanjhi (36.7%) belong to joint family.
- Majority respondent percentage of Kanke block was small farmers (43.3%) followed by marginal farmers (25.0%), semi-medium farmers (25.0%) and medium farmers (6.7%). The large farmers were not found in Kanke block study area. whereas, majority percentage of the respondents of Ormanjhi block were small farmers (45.0%) followed by marginal farmers (26.7%), semi-medium farmers (18.3%), medium farmers (8.3%) and large farmers (1.7%).
- Internet is most often used by respondents of Kanke block *i.e*., 53.3% which is followed by television (46.7%), agricultural university (25.0%), newspaper (13.3%) and radio (11.7%) whereas in Ormanjhi block internet is most often used as a communication behaviour by respondents of Ormanjhi block (50.0%) followed by television (43.3%), agricultural university (16.7%), newspaper (16.7%) and radio (13.3%).
- Highest percentage of respondents (63.3%) had full adoption of chemical fertilizers which was followed by hybrid variety (38.3%), FYM/Compost (30.0%), pesticides (11.7%), improved water management (3.3%) and biofertilizers (1.7%). In Ormanjhi block highest respondent's percentage (55.0%) had full adoption of chemical fertilizers which was followed by hybrid variety (45.0%), FYM/Compost (33.3%) and improved water management (10.0%). It could be concluded that field crop and horticultural crops (hybrid) are promoting high use of chemical fertilizers and pesticides which in long run will have harmful effect to environment, health hazardous to animal and human.

- In Kanke block, majority of farmers like to grow medium duration paddy (50%) which is followed by long duration (23.3%), short duration (21.7%) and extra short duration 5% and in Ormanjhi block 58.3% of the farmers grow medium duration paddy which is followed by long duration (13.3%), short duration (20.0%) and extra short duration (8.3%).
- Maximum farmers (58.3%) preferred coarse rice grains in Kanke block followed by medium grains (40%) and fine grains (1.7%) farmers. Whereas, in Ormanjhi block 53.3% farmers preferred medium grains followed by coarse grains (40%), fine grains (6.7%).
- Pioneer is the leading rice seeds company in both Kanke (130 Kg) and Ormanjhi (180 Kg) blocks. While In Kanke Arize is the second leading company (105 Kg) followed by Advanta (60 Kg), VNR (50 Kg), Tata (25 Kg), Dhania (15 Kg) and others (23 Kg). In Ormanjhi block Arize (130 Kg) is the second most preferred hybrid rice seeds which is followed by VNR (75 Kg), Tata (30 Kg), Advanta (50 Kg), Dhania (20 Kg) and others (35 Kg).
- Majority of the farmers (42.5%) agreed that Higher yield is the main criteria for purchasing VNR seeds
- The total sale potential of VNR hybrid rice seeds for mid land will be 63.0 and 53.0 ton at Kanke and Ormanjhi blocks, respectively.
- The total sale potential of VNR hybrid rice seeds for low land will be 34.0 and 71.0 ton at Kanke and Ormanjhi blocks, respectively.

CHAPTER 7

SUGGESTIONS

Following suggestions are proposed based on the survey work of the project:

- The company should focus more on promotional activities in order to create awareness among farmers regarding availability of new hybrids in the market and its benefits to them.
- Different methodologies/approaches for farmers of varied educational levels should be adopted in order to improvise brand positioning.
- The company should focus on progressive farmers of their respective villages as this would help the company in making their promotional activities more effective.
- The company should target the village level dealers as most of the farmers purchase seed from village dealers as it is easily accessible and also time saving.
- As more farmers participate in demonstration programmes (Krishi melas) and demo plots, the company should promote its products more effectively in these types of farmer meetings.
- The company should increase the dealer's margin and extend the credit period so as to convince the dealers to push company's products.
- The company field staff should contact farmers personally or through phone calls to build relationship and trust with farmers which will position the brand better in the farmers" minds.
- Price of seeds should be reduced so that cost of cultivation can be decreased by farmers.
- Customer care cell should be developed and work effectively.
- Seeds to be provided to farmers for trial, it may serve for as a better tool for promotion of seed varieties.
- The seed companies should arrange training programme for farmers on cultivation of paddy and other cereal crops.

BIBLIOGRAPHY

Anonymous (2017). Food and Agriculture Organization of the United Nations, Rome, Italy

Afzal, S. and Khan, J. R. (2015). Impact of online and conventional advertisement on consumer buying behaviour of branded garments. *Asian Journal of Management Sciences and Education* **4**(1): 125-135.

Ahmed, M.A. (2020). Profitability and socio- economic analysis: Evidence from rice production in lake Geriyo of Adamawa State, Nigeria. *FUW Trends in Science and Technology Journal* **5**(2): 360-363.

Ananthnag, K., Mahatabali, K.M. and Kumar, V. (2014). A study on socio-economic status of farmers practising organic farming in eastern dry zone of Karnataka. *Online Journal of Bioscience and Informatics* **1**(2): 17-25.

Bakshi, G. and Gupta, S.K. (2013). Advertising and its impact on consumer buying behaviour. *International Journal of Research in Finance and Marketing* **3**(1): 21-30.

Bihari, B., Kumar, R., Prasad, K. and Sundarambal, P. (2012). Role, performance and knowledge level of tribal women farmers in Meghalaya. *Indian Research Journal of Extension Education* **12(**1): 60-63.

Borthakur, S., Mishra, P. and Bortamuly, D. (2014). Farmer's preferences of rice varieties based on varietal attributes recommended by Assam Agricultural University, Jorhat. *Journal of Academia and Industrial Research* **2**(10): 556-558.

Bucheyeki, T.L., Shennkalwa, E., Kadadi, D. and Lobulu, J. (2011). Assessment of rice production constraints and farmers preferences in Nzega and Igunga Districts. *Journal of Advances in Development Research* **2**(1): 30-37.

Dahare, R., Nishad, K.T. and Sahu, B. (2019). Evaluation of some physical and engineering properties of Chattisgarh popular paddy varieties for suitability of flaked rice. *International Journal of Current Microbiology and Applied Sciences* **8**(3): 1506-1513.

Devi, M.N., Harisudan, C., and Arunachalam. R. (2020). Impact study of machine transplantation in rice and its socio-economic comparison with conventional method in Cauvery Delta region of Tamil Nadu, India. *International Journal of Current Microbiology and Applied Sciences* **9**(6): 977-983.

Digambar, B.M., Khan, M.A. and Singh, A. (2020). Socio economic profile of farmers on rice production technology in Rajnandgaon District of Chattisgarh. *Journal of Pharmacognosy and Phytochemistry* **9**(2): 137-140.

Efiuse, A., Tongoona, P., Derera, J., Langyintua, A., Laing, M. and Ubi, B. (2008). Farmers perceptions on rice varieties in Sikasso region in Mali and their implications for rice breeding. *Journal Agronomy and Crop Science* **198**: 393-400.

Fatondji, B.Y., Sagbadja, H.A., Sognigbe, N., Gandonou, C. and Vodouhe, R.S. (2020). Farmer's preferences for varietal traits, their knowledge and perceptions in traditional management of drought constraints in rice cropping in Benin: Implications for rice breeding. *Journal of Agricultural Sciences* **12**(11): 56-76.

Ghimre, R., Wen-chi, H. and Shrestha, R.B. (2015). Factors affecting adoption of improved rice varieties among rural farm house holds in Central Nepal. *Rice Sciences* **22**(1): 35-43.

Singh, G.S. (1995). Seed production and marketing in Asia and the Pacific, country paper presented at a national seminar organised by the Asian Productivity Organisation held on 14-23 September, 1995 at Jakarta.

Hiremath, U., Gowda, B., Ganiger, B.S. and Lokesh, G.Y. (2020). Role of formal and informal seed sector in augmenting seed replacement rate in Raichur District of Karnataka, India. *International Journal of Current Microbiology and Applied Sciences* **9**(6): 1852-1861.

Jena and Somu. (2020). A prediction on rice production in India through multivariate regression analysis. *Journal of Business and Management Sciences* **3**(1): 26-31.

Joshi, G. and Bauer, S. (2006). Farmer's choice of the modern rice varieties in the rainfed ecosystem of Nepal. *Journal of Agriculture and Rural Development in the Tropics and Subtropics.* **107**(2): 129-138.

Krishnakutty, J., Blakeney, M., Raju, R.K. and Siddique, K.H.M. (2021). Sustainability of traditional rice cultivation in Kerala, India- A socio-economic analysis. *Sustainability* **13**: 980 (1-16).

Kundu, K.K, Singh, B. and Sumit (2019). An economic analysis of factor affecting seed purchase, requirement and availability of major principal crops in Haryana. *Journal of Pharmacognosy and Phytochemistry* **8**(5): 2133-2137.

Mallesh, S., and Yadav, B., (2020). Farm mechanization level for paddy production in Uttar Pradesh. *The Pharma Innovation* **9**(8): 114-118.

Manan, J., Sharma, M. and Jaidka, M. (2018). Factors affecting the adoption of paddy varieties in Kapurthala District of Punjab, India. *International Journal of Current Microbiology and Applied Sciences* **7**(9): 3014-3020.

Manzanilla, D.O., Paris, T.R., Vergara, G.V., Ismail, A.M., Pandey, S., Labios, R.V., Chi, T.T.N. and Mackill, D.J. (2011). Submergence risks and farmers preferences: Implications for breeding sub-1 rice in South East Asia. *Agricultural Systems* **104**: 335-347.

Nandi, A.K., Das, B., and Sable, M. (2013). Production and marketing strategy of seeds for developing countries. *Journal of Crop and Weed*. **9**(1): 32-35

Neethi, B., Sailaja, A., and Soumya, B. (2014). A study on utilisation pattern of information sources by the farmers of Mahbubnagar District in Andhra Pradesh. *International Journal of Scientific Research* **3**(8):15-18.

Netam, K.O., Pathak, H. and Chandrakar, M.R. (2019). Economic analysis of paddy cultivation in Rajnandgaon District of Chattisgarh, India. *Journal of Pharmacognosy and Phytochemistry* **8**(6): 1358-1361.

Pandey, G.K., Chaturvedi, A., Singh, R. and Kumari, R. (2020). A study on replacement rate of paddy seed in Chandauli District of U.P. *International Journal of Chemical Studies* **8**(1): 4000-4002.

Pathak, A.K., and Singh, T.S. (2020). Product awareness tactics used by Bayer Crop Science LTD. for Adora in Fatehpur District, U.P. *Journal of Pharmacognosy and Phytochemistry* **9**(1): 1939-1943

Phukan, P., Boura, S. and Barman, U. (2013). Communication behaviour of winter vegetable cultivators of Jorhat District of Assam. *Journal of Academia and Industrial Research* **1**(8): 464-466

Prabhavathi, K., Kanakadurga, K., Pradeep, T. and Rao, R.G.S. (2020). Survey on seed sources and quality seed availability in Telangana Districts. *Current Journal of Applied Sciences and Technology* **39**(24): 116-122

Ray, K.R., Wadhwani, K.M., Rahaman, M. and Sinha, P. (2019). Constraint analysis in production and marketing of Katarni rice in Bihar, India. *International Journal of Current Microbiology and Applied Sciences* **8**(9): 2801-2807

Ray, S.K., Sabur, S.A. and Kamruzzaman, M. (2001). Vegetable seed marketing system in some selected areas of Bangladesh, *Asian Network for Scientific Information* **6:** 534-528.

Reddy, G.S., Gangisetty, N. and Reddy, T.N. (2015). A study on socio economic conditions of farmers in Kurnool District. *International Journal of Social Sciences and Management* **2**: 281-288.

Roy, M.L., Chandra, N. Kharbikar, H.L., Joshi, P. and Jethi, R. (2013). Socio-economic status of hill farmers: An exploration from Almora District in Uttarakhand, *International Journal of Agriculture and Food Science Technology*. **4(**4): 353-358.

Sharma, N., Sharma, A., Sharma, J.P., Dubey, S.K., Dabas, J.P.S., Singh, B.K., Kumar, A., Ahmad, N. and Dubey, A.V. (2017). Farmer's preferences to varietal attributes as an indicator for acceptance and adoption of aromatic rice varieties. *Indian Journal of Agricultural Sciences.* **87**(1): 51-55.

Sharma, V., Giri, S. and Rai, S.S. (2013). Supply chain management of rice in India: A rice processing company's perspective. *International Journal of Managing Value and Supply Chain.* **4**(1): 25-37.

Suwannaporn, P., Linnemann, A. and Chaveesuk, R. (2008). Consumer preference mapping for rice product concepts. *British Food Journal* **110**(6): 595-606.

Veettil, P.C., Raghu, P., Mohapatra, B. and Mohanty, S. (2021). Gender differences in rice value chain participation and career preferences of rural youth in India. *Development in Practice* **31**(1): 93-111.

FARMER'S QUESTIONNAIRE

1. General Information

Name			Caste	
Father's Name			Panchayat	
Mobile No.			Village	
Age			Block	
Marital status			District	

2. Education:

Illiterate	Can read and write	Primary school	Middle school	High school	Intermediate	Graduation or above

3. Source of income

Occupation	Primary	Secondary	Annual Income
Field crop			
Horticulture			
Animal Husbandry			
Business			
Labour			
Service			
Others			

If field crop then specify

Rice		

4. Family Type: a) Nuclear ☐ b) Joint ☐

5. Family Size

Member	**Number**
Small (<4 members)	
Medium (4 to 6 members)	
Large (>6 members)	

6. Housing Pattern

   i. Hut ☐

   ii. Kuccha ☐

   iii. Mixed ☐

   iv. Pucca ☐

7. Size of the Land Holdings and cultivation of rice

Land type	**Up land**		**Medium land**		**Low land**	
Practices	Other crops	Area under rice cultivation	Other crops	Area under rice cultivation	Other crops	Area under rice cultivation
Irrigated						
Unirrigated						

8. Communication behaviour

Sl. No.	**Source**	**Most often**	**often**	**Sometime**	**Never**
1.	Television				
2.	Radio				
3.	Newspaper				
4.	Internet				
5.	Agricultural Magazines				
6.	Agricultural university				
7.	Agricultural Websites				

9.Are you part of any farmer group or self-help group: Yes ☐ NO ☐

10. If yes, does your group perform any pre-season meeting related to agricultural inputs

Yes ☐ No ☐

11. Farming experience: ..... Years

12. Training Exposure - The training exposure refers to number of times a respondent has

undergone training.

Please specify how many times you have attended?

a) Untrained ☐
b) 1-day training ☐
c) 2-3 days training ☐
d) 5-7 days training ☐
e) > 7 days training ☐

13. Materials Possession

Agricultural Implements:

Sl. No.	Implements	Possession	Sl. No.	Implements	Possession
1.	Bullock		7.	Thresher	
2.	Tractor		8.	Kudal	
3.	Diesel Engine		9.	Desi Plough	
4.	Electric Motor		10.	Seed drill	
5.	Cultivator		11.	Rotavator	
6.	Combined harvester thresher		12.	Rice transplanter	

14.Transportation materials

Sl. No.	Vehicles	Possession	Sl. No.	Vehicles	Possession
1.	Bullock cart		5.	Car	
2.	Cycle		6.	Jeep	
3.	Trolley		7.	Truck	
4.	Bike/Scooter		8.	Others	

15.Technology adoption for rice cultivation

Sl. No.	Particulars	Partial	Full
1.	Hybrid variety/HYV		
2.	FYM/ compost		
3.	Bio fertilizers		
4.	Chemical fertilizers		
5.	Pesticides		
6.	Improved water management		
7.	Water harvesting		
8.	Others		

16. Which duration of paddy is liked by you. Please choose the appropriate options.

Particulars	Duration	Up land	Medium land	Low land
Long duration	>130 days			
Medium duration	111-130 days			
Short duration	90-110 days			
Extra short duration	<90 days			

17.How many crops taken in a calendar of year

Season	Yes/No	Major crop 1	Major crop 2	Major crop 3
Kharif				
Rabi				
Zaid				

18.From where do you get paddy seeds for sowing

Own Seeds ☐

Other farmers ☐

Purchase from Market ☐

Agricultural university ☐

Govt/NGO ☐

19 Which types of paddy grains is liked by you.

Particulars	✓
Fine	
Medium	
Coarse	

20. Which companies' paddy seed variety do you purchase from market

Sl. No	**Company**	**Quantity (in kg)**
1.	VNR	
2.	Bayer	
3.	Pioneer	
4.	Tata	
5.	Advanta	
6.	Dhania	
7.	Others	

21. Reason for your purchase of paddy seeds from company please tick.

Particulars	✓
Price	
High yielding	
Availability	
Advertisement	
Quality	
Any other	

22. Which company's Paddy seed variety are available at suitable period of season

…….

23. Which paddy variety do you prefer for farming?

Type of seed	**Pollinated**	**Hybrid**
Purchase		
Area		
Quantity		

24.Which is the most effective advertisement technique as per your opinion

Particulars	✓
Village level meeting	
Print and mass media	
Crop show	
Mic campaign	
Banner/poster	
Hoarding/pamphlet	

25.Have you used earlier any paddy seed of VNR seeds Pvt Ltd.

Yes ☐ No ☐

26.If yes, which varieties?

…….

27.How long have you been using seeds of VNR seeds Pvt Ltd.

before 2017 ☐ 2017 ☐ 2018 ☐ 2019 ☐

28.What are good criteria about VNR seeds as compared to other companies

Particulars	**Yes/No**	**Particulars**	**Yes/No**
Price		Seed viability	
Product		Seed productivity	
Advertisement		Seed packaging	
Placement		Seed purity	