A Study on Impact of NICRA (National Innovation of Climate Resilient Agriculture) Project on Adoption of Recommended Production Technology of chickpea, soybean and pigeon pea in Indore block, Indore district

THESIS

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Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya

In partial fulfillment of the requirements for the Degree of

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by

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Department of Agricultural Extension and Communication

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College of Agriculture

Indore (M.P.)

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CERTIFICATE-I

This is to certify that the thesis entitled "**A Study on Impact of NICRA (National Innovation of Climate Resilient Agriculture) Project on Adoption of Recommended Production Technology of chickpea, soybean and pigeon pea in Indore block, Indore district**" submitted in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE in Agricultural Extension and Communication of Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior is a record of the bona-fide research work carried out by Mr. Anil Singh under my guidance and supervision. The subject of the thesis has been approved by the Student's Advisory Committee and the Director of Instructions.

No part of the thesis has been submitted for any other degree or diploma or has been published. All the assistance and help received during the course of this investigation has been acknowledged by scholar.

Date:
Place: Indore

(Dr. Sandhya Choudhary)
Chairman of the Advisory Committee

MEMBER OF STUDENT'S ADVISORY COMMITTEE

(Chairman) Dr. Sandhya Choudhary **……...**

(Member) Dr. S.K. Jain **…….....**

(Member)Dr. K.S. Kumar **…….....**

CERTIFICATE-II

This is to certify that thesis entitled **"A Study on Impact of NICRA (National Innovation of Climate Resilient Agriculture) Project on Adoption of Recommended Production Technology of chickpea, soybean and pigeon pea in Indore block, Indore district"** submitted by Mr. Anil Singh to the Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior in partial fulfillment of the requirements for the degree of Master of Science in Agriculture in the Department of Agricultural Extension and Communication has been accepted after evaluation by the External Examiner and approved by the Student's Advisory Committee after an oral examination of the same.

Date:
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Head of the Section: ……

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Place : Indore

Date : / / **Anil Singh**

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CHAPTER - I

Introduction

Climate change has become an important area of concern for India to ensure food and nutritional security for growing population. The impacts of climate change are global, but countries like India are more vulnerable in view of the high population depending on agriculture. In India, significant negative impacts have been implied with medium-term (2010-2039) climate change, predicted to reduce yields by 4.5 to 9%, depending on the magnitude and distribution of warming. Since agriculture makes up roughly 16% of India's GDP, a 4.5 to 9% negative impact on production implies a cost of climate change to be roughly up to 1.5% of GDP per year. The Government of India has accorded high priority on research and development to cope with climate change in agriculture sector. The Prime Minister's National Action Plan on climate change has identified Agriculture as one of the eight national missions.

National Innovations on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched in February, 2011. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. The research on adaptation and mitigation covers crops, livestock, fisheries and natural resource management. The project consists of four components viz. Strategic Research, Technology Demonstration, Capacity Building and Sponsored/Competitive Grants.

Aim of NICRA is to make Indian agriculture resilient to climate change through development and application of adaptation and mitigation technologies. With objectives of Phenotypic, physiological evaluation and genetic improvement of irrigated crops (rice, wheat, chickpea) for heat and drought stresses, monitoring of GHG emissions through flux towers/field measurement in irrigated rice-wheat production system in the IGP (New Delhi) and rice-rice system in south-east peninsula (Aduthurai), adaptation and mitigation through improved crop management, enhanced water productivity and nutrient use efficiency; and carbon and nutrient budgeting in rice-wheat

system, strengthening real-time data capture on crop health through Satellite Data Reception System and integrate the output to agro-advisories, integrated crop modeling for wheat and rice for impact assessment and indentifying adaptation strategies at regional level for near and long-term downscaled scenario, technology demonstration on farmers fields and capacity building. The program was launched formally in all the villages by involving the state line department functionaries and leaders of the panchayats to ensure local ownership of the project from the beginning and convergence of related schemes currently in operation in the panchayats.

Soybean

The wonder crop 'soybean' (*Glycine max* L. Merrill) is a leguminous crop and belongs to family *leguminoaceae*with sub family *papillionaceae.* It is also known as "Golden Bean" of the 21st century. Improved varieties are JG 71, JG 315, JG 322, Pusa 391, Vishwas (Phule G 5), Vijay, Vishal, JG 218, JG 16, JG 130, JGG 1, JGK 1 and BGD 128(K).

Selection of Land: Soya bean can be grown in fertile well drained Sandy loam or loam soils of neutral reaction. Water logged areas should be avoided for Soybean.

Preparation of Land: The land should be prepared thoroughly by ploughing and harrowing to a fine tilth.

Seed Rate: About 70-75 Kg of Seed is required per hectare. For better performance Soya bean Seed should be treated with bacteria culture (Rhizobium culture) prior to sowing.

Time of showing: June-July in summer and August-September for winter plantation. Sowing in mid June in the higher region is found to be most suitable.

Spacing and method of showing: The treated seeds should be sown in lines at a spacing of 45 cm between rows and 5-10 cm from plant to plant. The seed should be sown in the field with sufficient moisture and is to be placed at a depth of 3.5 cm to 5 cm below the soil.

Manures and fertilizers: 3-5 tonne of compost or Farm Yard Manure should be applied at the time of preparation of the field.

1. Ammonium Sulphate ...100 Kg per hectare. Or Urea ...45 Kg per hectare.
2. Super Phosphate …250 Kg per hectare.
3. Muriate of Potash ....35 Kg per hectare.

Fertilizers should be applied as basal dose in the final ploughing of the field and should be mixed thoroughly with the soil.

Intercultural Operation: Two manual weeding at 15 and 35 days after sowing should be done.

Diseases:

Soybean is susceptible to yellow mosaic virus. The control measures of the disease is seed should be treated with Thiram at the rate of 3 gm per kg of seeds.

Insects- Pests:

1.) White ants or Termites and Soil Cricket: Treat the affected soil with Sevin 5% dust at the rate of 40 Kgs to 50 Kgs per hectare

2.) Grass Hopper: Dust 5% BHC or Sevin 5% at the rate of 45 Kg to 50 Kg per hectare.

3.) Leaf eating Caterpillar: Spray Sevin 50 W at the rate of 8 to 10 teaspoonful per kerosene tinful of water (18 litres)

Harvest and Yield: Harvest the crop when pods are brownish in colour and most of the leaves fall off. The yield is about 20 quintals per hectare.

Chickpea:

Chickpea (*Cicer arietinum* L.) is an important food legume crop. It is cultivated for food and fodder on a large scale in arid and semiarid regions.

Seed and Sowing: For peninsular India, first fort night of October is the best time for chick pea sowing. Delay beyond this period results in conspicuous reduction in yield. Under humid sub-tropical conditions of *Tarai*, which are characterized by shallow water table and relatively more winter rainfall, first fortnight of November is most suitable. Early sowing of chick pea results in excessive vegetative growth and poor setting of pods. The early sown crop suffers more from wilt owing to high temperature at that time. The crop may be sown by seed drill or local plough at a row spacing of 30-40 centimeters. A seed rate of 75-100 kg per hectare depending upon seed size may be

sufficient for one hectare. The seed should be placed 8-10 centimeters deep because the shallow be treated with 0.25 per cent. Thiram or Carbendazim (Bavistin) before sowing.

Manures and Fertilizers: Chick pea being a leguminous crop fulfills the major part of its nitrogen requirement (about 75%) through the process of symbolic nitrogen fixation which works effectively from three to four weeks after sowing. However, soils with low organic matter and poor nitrogen supply may require 20-25 kg per hectare of nitrogen as starter does which can meet plant requirement before the formation of nodules. Besides nitrogen, pulses respond very favorably to phosphorous application if the soils are deficient in phosphorous supply. If both nitrogen and phosphorous are required to be supplied then diammonium phosphate (18-46-0) at the rate of 100 to 150 kg per hectare should be applied uniformly before the last ploughing. Responses to potassium application have been inconsistent. It is better if all the fertilizers are drilled in furrows at a depth of 7-10 centimeters.

Water management: Chick pea is mostly sown as a rainfed crop. However, where irrigation facilities are available, give a pre-sowing irrigation. It will ensure proper germination and smooth crop growth. If winter rains fail, give one irrigation at pre-flowering stage and one at pod development stage.

Weed Control: Chick pea being a stature crop suffers severely by infestation of weeds. One hand weeding or inter culture with hand hoe or wheel hoe after 25-30 days and second if needed after 60 days of sowing may take care of weeds. Fluchloralin (Basalin) 1 kg per hectare in 800-1000 liters of water as pre-planting spray may be used as an effective herbicide. It should be well incorporated in the soil before sowing. In case Basalin is not available use Metribuzin or Prometrynen at the rate of 1.0-1.5 kg active ingredient in 800-1000 liters of water per hectare as pre-emergence spray. Hand weeding or inter culture with the help of hoe is always better than herbicides because inter culture operations improve aeration in the soil.

Diseases:

1. Wilt: Treat the seed with Benlate T or a mixture of Benlate of Thiram (1:1) at the rate of 2.5 g per kg of seed.

2. Sclerotinia Blight: Treat the soil with a mixture of fungicides like Brassicol and Captan at the rate of 10 kg per hectare.
3. Grey Mold: Spray the crop with 0.2% carbendazim (Bavistin).
4. Rust: spray the crop with 0.2% Mancozeb 75 WP followed by two more sprays at 10 days interval.
5. Ascochyta Blight: Before planting treat the seed with fungicides like Thiram or Carbendazim (Bavistin) at the rate of 2.5 g/kg of seed.

Insect Pests:

1. Cutworm: controlled by the application of Lindane 6% granules at the rate of 20-25 kg per hectare mixed in the soil.
2. Gram Pod Borer: Spray Monocrotophos (Nuvacron) 36 EC at the time of pod formation at the rate of 1 millilitre mixed in 1 liter of water. The amount of solution may vary from 600-800 liters per hectare.

Yield: A well-managed crop yields about 20-25 quintals of grain per hectare which is about three to four times higher than the national average.

Pigeon pea:

Pigeon pea or red gram (*Cajanus cajan L.)* is most important pulse crop of tropics and sub tropical region of the world. It ranks second important pulse crop next to the Bengal gram.

Climate:

Pigeon pea is predominantly a crop of tropical areas mainly cultivated in semi arid regions of India. Pigeon pea can be grown with a temperature ranging from 26^0C to 30^0C in the rainy season (June to October) and 17^0C to 22^0C in the post rainy (November to March) season.

Soil type and Field Preparation:

It is successfully grown in black cotton soils, well drained with a p H ranging from 7.0 - 8.5. Pigeon pea responds well to properly tilled and we ll drained seedbed. A deep ploughing with soil turning plough in fallow/waste lands, zero tillage sowing under intensive cropping system and Broad Bed Furrow/Ridge - furrow planting in low lying as well as intercropping areas is recommended. Raised Bed method of planting by dibbling at 2 inches depth with Row to Row distance 4 to 5 feet also 15 feet gap (2 pairs of Tur on bed) under

intercropping of soybean under transplanting (Dharwad method/SPI), 5 X 3 and 3 X 1.5 feet spacing is recommended.

Sowing Time and Method:

Early maturing varieties - First fortnight of June; medium & late maturing varieties - second fortnight of June. Line sowing by seed drill or desi plough or by dibbling on the ridge and beds, both are recommended as per the area.

Seed Rate and Spacing

Early Maturing Var. - 20 - 25 k g/ha (Row to Row - 45 - 60 cm & Plant to Plant - 10 - 15 cm)

Medium/Late Maturing Var. - 15 - 20 k g/ha (Row to Row - 60 - 75 & Plant to Plant - 15 - 20 cm).

Seed Treatment:

Fungicide: Thiram (2gm) + Carbendazim (1gm) or Thiram @ 3 gm or Tricodermavirdie 5 - 7 g / k g of seed;

Culture: Rhizobium and PSB culture 7 - 10 g / k g seed.

Method of Sowing:

Three systems of sowings are practiced for pigeon pea. The common is flat sowing, the other methods are broad bed - furrow (BBF) for extra - early group and ridge-and-furrow for the late maturity group. Bund cultivation of pigeon pea in rice fallow areas have also been adopted in Chattisgarh and MP and some rice fallow areas.

Cropping system

The space between the rows could be profitably utilized by growing short duration crops such as Black gram, Green gram, cowpea, etc. Important cropping systems followed are:

- Maize – Pigeon pea (Rabi)
- Pigeon pea – Black gram - Wheat
- Pigeon pea - Sugarcane
- Green gram + Pigeon pea - Wheat
- Pigeon pea (early) - Potato –Black gram

Inter-cropping

Pigeon pea is commonly intercropped with a wide range of crops. In India, it was estimated that 80 - 90 % of the pigeon pea were intercropped.

- With cereals (sorghum, maize, pearl millet, finger millet and rain-fed rice).
- With legumes (groundnut, cowpea, mung bean, black gram, soybean).
- With long-season annuals (caster, cotton, sugarcane, and cassava).

Fertilizer and Manure application:

The doses of fertilizers should be determined based on the results of soil test. All the fertilizers are drilled in furrows at a depth of 5 cm. and at the side of 5 cm. from seed. Apply 25 - 30 kg N, 40 - 50 k g P_2O_5 , 30 kg K_2O per ha area as Basal dose at the time of sowing. Secondary and Micro Nutrients used are Sulphur, Zinc, Iron.

Irrigation and Drainage: Being a deep rooted crop, it can to lerate drought. But in case of prolonged drought there is need of three irrigation.

- 1st at branching stage (30 DAS)
- 2nd one in flowering stage (70 DAS) and
- 3rd at the time of podding stage (110 DAS).

Weed control:

The first 60 days is very critical and harmful for the pigeon pea crop. Two mechanical weeding one at 20 - 25 days and another at 45 - 50 days after sowing but before flowering are required. The Pre-emergence application of Pendimethalin @ 0.75 - 1 Kg a.i. per ha in 400-600 liter of water kills the germinating seedlings of weeds and keep the field weed free for the first 50 days. If weed found from long time use Fluchloralin 50 % EC (Basaline) 1 kg of a.i. per ha in 800-1000 liter well incorporated in the soil before sowing or Alachlor 50 % EC (Laso) 2 - 2.5 kg a.i. per ha in 400-500 liter of water as pre-emergence.

Diseases:

1. Wilt: Seed Treatment with *Trichodermaviride* @ 10 g/kg of seed or Thirum (2 gm) +Carbendazim (1gm) / kg of seed.
2. Sterility mosaic disease: Spray Fenazaquin 10 EC (Magister) @ 1 ml/lit er of water on 45 and 60 DAS.
3. Phytophthora blight: Seed treated with Metalaxyl 35 WS @ 3 g/ kg of seed

4. Alternaria blight: Spray the crop with Mancozeb 75 WP @ 2 g/liter or Carbendazim 50 WP @ 1g/liter of water.

Insect-Pests:

1. Pod borers: Use H. armigera pheromone trap @ 12/ha
2. Tur Pod fly: Spraying Neem seed kernel extract (NSKE) 5 per cent at 50% flowering stage to manage the insect's populations.
3. Plume Moth: Apply the Neem oil 2%.
4. Pod-sucking bugs: Soil application of carbofuran 3G @ 15 kg/ha at sowing.

Harvesting & Threshing: With two third to three fourth pods at maturity judged by changing their colour to brown is the best harvesting time. The plants are usually cut with a sickle within 75 cm above the ground. Harvested plants should be left in the field for sun drying for 3-6 days depending on season. Threshing is done either by beating the pods with stick or using Pullman thresher. The proportion of seed to pods is generally 50 - 60%. The clean seeds should be sun dried for 3-4 days to bring their moisture content at 9-10% to safely store in appropriate bins.

Yield: With use of improved technology of agronomic practices pigeon pea may yield about 25-30 q/ha from irrigated condition and 15-20 q/ha from un-irrigated condition.

Under NICRA (National Innovation on Climate Resilient Agriculture) project of ICAR, DARP College of Agriculture Indore work on adoption of Chickpea, Soybean and Pigeon Pea production technology in Nignoti village of Indore block of Indore district with four sub headings –

1. Real time contingency plan implementation in participatory mode.
2. Rain water harvesting (*in situ* and *ex situ*) and efficient use.
3. Soil Health & Nutrient Management.
4. Alternate land use.

Keeping this in view the ongoing research will be design with following objectives to know the impact of NICRA project on Chickpea, Soybean and Pigeon Pea production technology in Nignoti village of Indore block of Indore district

Specific Objectives:

1. To study the socio personal, economic and psychological attributes of farmers.
2. To determine knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea.
3. To study the impact of knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea of beneficiaries and non-beneficiaries farmers.
4. To find out the relationship between different variables and extent of adoption about recommended crop production technology.
5. To determine the constraints and suggestions in relation to adoption of agricultural crop production technology.

Conceptual framework:-

Significance of study:

Thus the study will explore the new way to reach out among the farming community through dissemination of useful information about climate change. This will also help to policy maker to make appropriate plans and policies for strengthening the farmer's community with latest technology. The study would be useful to extension workers, administrators, communication experts, researchers and planners who are engaged in generating and disseminating improved cultivation technology, looking to the extent of effect of climate change on growing crops and way to suggest to mitigate the adversity of climate change.

Limitations of the study:

- The study was only confined to Indore block the Indore district of Madhya Pradesh.
- Due to lack of time and resources, it was not possible to cover large area in the study. Therefore, the data were based on the sample of 60 respondents only.
- The study was carried on limited number of respondents. Hence the findings may not be generalized and the results may be applicable to the research area only.

- The significant portions of finding are based on the expressed response of the respondent on re- call memory.

Organization of the study:

This investigation has been presented in five chapters, Chapter – I attempt to focus the need of the study with background, objective, importance, scope and limitations of the study. Chapter – II highlights the review of literature related to the study. Chapter – III elaborates the materials and method, sampling and technique of data collection & its analysis and operationalization of variables with their measurement. Chapter – IV deals with the results and discussion of the data and the last chapter is concerned with the summary, conclusion, and suggestions of the study.

Chapter – II

Review of Literature

After the problem has been decided upon it becomes necessary to look into the previous work done on the subject or topic through the review of literature. Review of literature helps to avoid duplication of the work already done earlier. Review of literature provides useful cause and effect relationship and helpful suggestions for the significant investigation. Hence, in this chapter an attempt has been made to assimilate the previous works within the framework of present study, which are helpful in interpretation of results obtained during the research on the basis of the objectives of the study. In present study following subheads were considered for review of literature.

1. Socio personal, economic and psychological attributes of farmers.
2. Knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea.
3. Impact of knowledge and adoption of recommended production technology of soybean, pigeon pea and chickpea of beneficiaries and non-beneficiaries farmers.
4. Relationship between different variables and extent of adoption about recommended crop production technology.
5. Constraints and suggestions in relation to adoption of agricultural crop production technology.

2.1: Socio personal variable:

Gupta (2011) reported that half of the respondents (49.16%) were in middle age category, i.e. 36 to 50 years of age, followed by 26.67% in above 55 years age category and rest belonged to up to 25 year age category.

Habiba *et al.* (2012) found that among 718 farmers of owner, owner-cum-tenant and tenant farmers of irrigated and non-irrigated villages at 14 upazila (sub-district) in both irrigated and non-irrigated areas of Bangladesh, majority of owner, owner-cum- tenant and tenant farmer's age lies between 26 and 50 years. Thus, indicated that the middle aged farmers were likely to be more active in applying farming experiences better in any adverse environment. They also reported a higher percentage of landless tenant farmers exist in both areas (i.e. Irrigated and non-irrigated) compared to other

farmers group. A very small variation is found between both areas considering marginal, small, medium and large farmers group.

Sarthi (2013) described that, the majority of the Farmer Field School did have trained farmers (33.33%) were having higher secondary level of education, followed by 26.67% were found under the category of high school level of education, 18.34% were above higher secondary level of education, 13.34% have middle level of education, 6.66% were having primary level of education and only 1.66% were illiterate.

2.2: Economic variable:

Singh and Singh (2012) reported that the majority (53.33%) of respondents who had medium socio-economic status, followed by 30% and 16.67% who had low and high socio-economic status, respectively.

Singh *et al.* (2014) concluded that more than half of the respondent was in medium to high socio- economic status in the study area.

Udmale *et al.* (2014) have reported that related to economic impacts of drought, 72–75% of respondents have answered that drought caused high to a very high reduction in employment opportunity and income. A typical rural house hold in India spends about 15% of its annual income on celebrating festivals. But, drought mostly affected the income of low income farmers forcing them to reduce their expenses on festivals, which has a negative impact on social life and mental health. Nearly 54% of respondents reported high to a very high reduction in their expenses on festival celebrations. About 60% of respondents reported high to very high food scarcity during the drought years as compared to the normal years and 52% of respondents said that drought has threatened their house- hold food security to a greater extent. Approximately 58% of respondents agreed that they have less to very less food grain choices for their daily consumption.

2.3: Psychological variable:

Katke (2011) observed that majority (67.50%) of respondents had ‘medium’ level of economic motivation and 17.50% of the respondents had ‘low’ economic motivation and 15.00% of the respondents had ‘high’ economic motivation.

Chahande (2012) noticed that less than half (46.66%) of the respondents had ‘medium’ economic motivation followed by ‘high’ (33.34%) and ‘low’ (20.00%) economic motivation.

Mandlik (2012) observed that majority (74.17%) of respondents had ‘medium’ level of economic motivation, where 11.67% and 14.16% of the respondents had ‘low’ level and ‘high’ level of economic motivation, respectively.

Mane (2012) indicated that a majority (60.00%) of the respondents were having ‘medium’ economic motivation, while 12.50% of them had ‘low’ economic motivation. Further it was found that 27.50% of the respondents had ‘high’ economic motivation.

2.4: Dependent variable:

Kulshrestha *et.al.* (2014) studied on Impact of Watershed Program in Madhya Pradesh, India. A study was conducted during 2009-10 to 2010-11 in Budhara watershed in Ambah block of Morena district to assess the impact of watershed program. Positive and significant effect of watershed program was noticed in the study. Area and productivity of remunerative crops like Pigeon Pea and Wheat significantly increased with a change in arable area, agricultural area, irrigated area, cropping intensity, and area of horticultural crops. However, the cattle population, major and micro soil nutrients and its availability was also increased as well as improved fodder availability.

Jasna (2015) studied on Impact of Climate Resilient Technologies in Rainfed Agro-Ecosystem. The present study was conducted in year 2015 in Gumla(Jharkhand) and Tumkur(Karnataka) district. NICRA farmers and Non-NICRA farmers were well aware on aspects of Climate Change but NICRA farmers had a higher level of awareness of Climate Resilience (78.83%) which was lacked by non-NICRA farmers (23.85%).

Charitha (2017) tudied on Impact of National Innovations on Climate Resilient Agriculture (NICRA) on the Rural Livelihood Security of Farmers of Chikkaballapura District. The overall mean impact index of beneficiaries was 76.35 as compared to non-beneficiaries, who got 61.25 which is significant. In respect of overall impact, nearly half of the (47.50 %) of the non-beneficiary

farmers belonged to the low overall impact category, whereas, 42.50% of beneficiary farmers comes under the high overall impact category. Uneven rainfall, financial constraints, lack of resources and lack of technical guidance were the major constraints in adoption of climate resilient practices.

Biswas *et al*. 2018) studied on Impact of NICRA Project through Analysis of Different Success Point. The present study was conducted in the Cooch Behar district of West Bengal in KVK Cooch Behar. The major highlighting points of above study that horizontal impact of the Project and attachment with the different line department with this project. The project extended it is impact through different farmers club, SHGs and district line department. KVK scientists perceived that the motivation and interest level of farmers of NICRA adopted Village (Cooch Behar) on agriculture were high compared to other village. The first and foremost objectives of the project which was perceived by scientist and farmer that adoption of new technology with changing of agro climatic, agro-ecology and demographic condition and ultimate aim to established the resilience agriculture system.

2.5 Relationship between independent and dependent variable:

Tripathi *et al.* (2006) studied on Knowledge Extent of Farmers about Chickpea Production Technology. The present study was conducted in the Unnao district of U.P. The study found that the maximum percentages of the respondents were found having medium level of knowledge, which the respondents were distributed accordingly to the knowledge categories viz. low, medium and high. Out of 12 agricultural practices of chickpea production, knowledge about field preparation was ranked at first (92%) followed by seed rate (90.00%) and harvest and post harvest (83.71%) ranked at second and third respectively. The poor extent of knowledge was reported for the practices viz. insects and pests control (28.22%), seed treatment (24.83%) and disease control (12.88%). The overall extent of knowledge was found to be 52.86%.

Simtowe *et al.* (2015) found that the sample adoption rate of improved pigeon pea is 36% while potential rate is estimated at 48%. The adoption gap resulting from the incomplete exposure to the improve pigeon pea is 12%. Adoption is prominent among farmers that close to the agriculture offices, and

among younger and wealthier farmer. The suggestion that there is scope for increasing pigeon pea adoption once the farmers are exposed to the new technologies.

Rahul Parmar *et al.* (2017) studied on Impact of Frontline Demonstration in Adoption of Chickpea Production Technology by the Farmers of Sehore District, Madhya Pradesh. In the present study an attempt has been made to examine the impact of frontline demonstration of chickpea in district Sehore where agricultural scientist had been conducted this programme at farm level. In case level of knowledge, as observed in low and medium category chickpea growers, found higher in non FLD adopter than FLD adopter whereas level of adoption, as observed in partial and incomplete category chickpea growers, found higher in non FLD adopter than FLD adopter.

Kothyari *et al.* (2018) studied on Impact of Trainings & Improved Transfer Technology on Chickpea Production. The present study was conducted in the Kota district of Rajasthan in Krishi Vigyan Kendra, Agriculture University, Kota (Rajasthan). The result revealed that the Trainings and improved technology under chickpea production technology gave higher Seed yield, net return with higher benefit cost ratio under demonstrated plot as compared to farmer's practices.

Rekha Parmar *et al*. (2018) studied on Adoption of Improved Varieties of Chickpea in Sehore District of Madhya Pradesh. The study found that the majority of chickpea growers (45.83%) adopted overall technology in chickpea cultivation by medium level followed by (27.50%) adopted overall technology in chickpea cultivation by low level and (26.67%) adopted overall technology in chickpea cultivation by high level respectively.

Sonune and Mane (2018) studied on Impact of climate resilient varieties on crop productivity in NICRA village. The impact of climate resilient varieties of crops was studied by KVK, Jalna during 2015-16 and 2016-17 in NICRA village which shows 75.23% yield increase in Pigeon pea due to introduction of short duration variety BDN-711 under protective irrigation. Improved variety of Soybean MAUS-71 given higher yield of 15% over traditional practice with use of BBF technology. The heat tolerant wheat

variety Netravati (NIAW-1415) in Rabi season contributed 27% higher yield over local check variety Lok-1. Rabi Sorghum variety Parbhani Moti and Digvijay variety of Bengal Gram contributed 91% and 30% yield increase respectively. (Annual Progress Report, 2016-17).

2.6: Problems faced by farmers

Andrew *et al.* (2009) suggested that the generation of knowledge for policy and adaptation should be based not only on syntheses of published studies, but also on a more synergistic and holistic research framework that includes: (i) reliable quantification of uncertainty; (ii) techniques for combining diverse modeling approaches and observations that focus on fundamental processes and (iii) judicious choice and calibration of models, including simulation at appropriate levels of complexity that accounts for the principal drivers of crop productivity, which may well include both biophysical and socio-economic factors.

Chakrabarthy *et al.* (2009) found that timely availability of high quality seeds of improved varieties, suitable to perform well in different growing environment, is a key component of agricultural production system. Hence, an effective seed production plan not only needs to take into account the overall commercial value of crop varieties, but also their potential to perform satisfactorily in respective agro-climatic regions, both under optimum and sub optimum conditions.

Singh *et al.* (2009-2010) studied on Constraints in Adoption of Soybean Production Technology. The study was conducted in Burhanpur district of Madhya Pradesh during the year 2009-2010. The finding of study reveals that the constraints related with personal matter farmers reported that lack of education (67.72%) and lacks of knowledge (54.05%) were the major constraint. Problem of non availability of credit at proper time and non availability of proper amount in credit were important socioeconomic constraints. Lack of social participation and lack of risk bearing capacity were major socio-psychological constraint. As far as the communicational constraints were concerned, lack of information at proper amount was found a major constraint followed Lack of information in proper time and non

availability of information media. It was observed about 91.72% respondents reported the lack of irrigation facility as the major constraints.

Sarthi (2013) revealed that, the majority of the FFS trained farmers (83.33%) suggested that extension agent or agency should convey right information at right time 21 and technical knowledge regarding use of IPM materials like Neem Seed Kernel Extract (NSKE) and pheromone traps etc.

Chapter- III

Materials & Methods

Every research that is to be carried out on scientific line should have a research design to be applied as per the stated problems. For this, in present study a design has been drawn for clarification of research method adopted. This chapter involves various steps applied to the study of the problem. Thus, the material and methods is described into following sub heads:

1. Sampling technique used
    - Locale of the study
    - Selection of the block
    - Selection of the villages
    - Selection of the respondents
    - Period of the study
2. Selection of variables, concept and operationalization
3. Hypotheses
4. Instruments and method of data collection
5. Presentation of data
6. Statistical analysis of data

3.1. Locale of the study area:

The study was conducted in Indore district of Madhya Pradesh. The geographical location of Indore is at - 22°43'North latitude and 75°49' East longitude.

Climate and rainfall:

The climate of the district is moderate. The average maximum temperature found to 41^{o}C in May and the minimum found to 8^{o}C in the month of January. The winter is commencing from last week of November up to February. Generally, the monsoon rains commence after 15th June. The average rainfall in the district found to about 1000 mm. the rains last up to the 2ndweek of October.

Soil and Main crops:

The type and depth of soil determine cropping pattern of the area. Generally, black cotton soil is found in the district which is quite fertile and

suitable for crop production. The major crops of the district are soybean, jowar, pigeon pea in kharif and wheat, gram in rabi season. Vegetable cultivation is also popular in the district.

Selection of block:

The proposed study was confined to Indore district of Madhya Pradesh which comprises 4 blocks namely Depalpur, Sanwer, Indore and Mhow. Out of these only one block i.e. Indore was selected purposively for present study because this district covered by DARP.

Selection of Village:

The Indore block constitutes 140 villages. Out of these only 01 village (Nignoti) was selected since NICRA project was implemented only in 1 village during year 2017-18.

Selection of the Respondent:

In village (Nignoti) 75 beneficiary farmers are benefitted under NICRA project. From this list of farmers all 75 beneficiary farmers were selected purposively and for this study 75 non beneficiary farmers were taken from the nearby villages on random basis for comparison.

Variables and their Measurements:

The relevant independent and dependent variables were taken under the study.

S.NO	**Independent Variables:**	**Measurement**
A) Socio personal variable		
1.	Age	Structural Schedule
2.	Education.	Structural Schedule
3.	Farming Experience	Structural Schedule
4.	Family size	Structural schedule
B) Economic variable		
5.	Size of land holding	Structural Schedule
6.	Annual income	Structural Schedule
7.	Material possession	Structural Schedule
C) Psychological variable		
8.	Economic motivation	Structural Schedule
Dependent Variable:		**Measurement**
Adoption of recommended production technology of Chickpea, Soybean and Pigeon pea		An Index on Agricultural crops production technology was developed according to recommendation of NICRA

Operationalization of variables

Social scientists hold the view that there exists a gap between theory and empirical research. The theorists use conceptual variables that are formulated at high level of abstraction. Most of the social scientists attempt to solve measurement problems by operationally defining the conceived variables and then by either using available measures or by designing one's own measure.

A number of terms and variables have been used in the present study with specific meaning. Obviously these terms require operationalization.

(A) Independent Variables:

1. Age:

Age refers to the number of years farmer have lived since their birth at the time of interview. Age of farmer was recorded by asking him what his age was. The score of age allotted on the basis of chronological method. The categorization of farmer on the basis of age was made as follows:.

S.No.	Categories	Weightage
1.	Up to 25 years	1
2.	26-55 years	2
3.	Above 55 years	3

2. Education status:

Education status refers to the number of years of formal education acquired by farmer at the time of interview. The score of educational status allotted on the basis of structural schedule method. The status of education was considered “illiterate and up to primary level”, “primary and middle education” and “higher education” with the help of mean ±S.D. of total score obtained by them:

S.No.	Category	Education	Weightage
1.	Illiterate, Up to primary level	Cannot read or write, Educated up to primary	1
2.	Up to middle level	Educated up to middle school	2
3.	High school& above level	Educated high school and above	3

3. Farming experience

It refers to the number of years actually spent in cultivation of crops by the respondents. The farming experience categories were made by using the Formula mean ± S.D. as below.

S. No.	Categories	Weightage
1.	Up to 10 years	1
2.	10 to 30 years	2
3.	Above 30 years	3

4. Family size:

Family size refers to the number of members in a family living together in a common house and having common place of cooking and eating. The scores have been assigned on the basis of structured schedule. The categorization of respondents as per their size of family was made as follows:

S. No.	Category	Characteristics	Weightage
1.	Small	Up to 2 members	1
2.	Medium	3-5 members	2
3.	Large	More than 5 members	3

5. Size of Land holding:

Land holding refers to the total land possessed by the respondent. The Government of Karnataka 1992-93 has prescribed norms for the categorization of land holding and the procedure as followed by Madhvareddy(2001) was used -

S. no.	Category	Size of land	Weightage
1.	Marginal farmers	Up to 2.5 ac	1
2.	Small farmers	2.5-5 ac	2
3.	Large farmers	Above 5 ac	3

6. Annual income:

It refers to the total income of the all members of a respondent's family obtained from farming and allied occupations. The respondents were classified into three categories on the basis of the following range of income.

S. No.	Categories	Annual income	Weightage
1.	Low	Up to Rs. 70,000	1
2.	Medium	Rs. 70,001 to 100,000	2
3.	High	Above Rs. 100,000	3

7. Material possession:

It refers to the material possess by respondent for household and agriculture farming purpose. The categories for measurement of material possession were made by using the Formula mean $\pm$ S.D. as below.

S. No.	Categories	Material possession	Weightage
1.	Low	Mean $\pm$ S.D.	1
2.	Medium	Mean $\pm$ S.D.	2
3.	High	Mean $\pm$ S.D.	3

8. Economic motivation:

It refers to occupational success in terms of profit maximization and their relative value of an individual places on economic ends. The total scores indicated the degree of economic motivation on an individual. On the basis of maximum and minimum obtained scores, the respondents were categorized as below.

S. No.	Categories	Economic motivation	Weightage
1.	Low	Mean $\pm$ S.D.	1
2.	Medium	Mean $\pm$ S.D.	2
3.	High	Mean $\pm$ S.D.	3

B. Dependent variables:

1. Knowledge:

It refers to the acquisition of information relating to package of practices of soybean, chickpea and pigeon pea. It was measured in terms of scores and responses were recorded on three –points continuum as high level of knowledge, medium level of knowledge and low level of knowledge were assigned to each question and were given 3, 2, and 1 scores, respectively. A respondent can obtain a minimum 10 and maximum 30 score On the basis of range of minimum and maximum obtainable scores, the respondents were categorized into low, medium, and high groups.

S.No.	Category	Score
1.	Low	Mean –S.D
2.	Medium	Mean ±S.D.
3.	High	Mean +S.D.

2. Adoption:

To understand the extent to which the respondents aware of the information about the climate change index was developed with the help of using available literature and expert guidance from concerned scientist. This attribute have 10 statements. The responses of the respondents were obtained on 3 point continuum i.e. complete, medium and low. The scoring was done in the order of 3, 2 and 1 respectively. The individual score was obtained by summing up the scores for all the statements and on the basis of mean ± SD it was categorized into three categories as below:

S.No.	Category	Score
1.	Low adoption	Mean –S.D
2.	Medium adoption	Mean ±S.D.
3.	Complete adoption	Mean +S.D.

3.3. Hypotheses:

Selected profiles are not significantly related with adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.

Sub-hypotheses:

1. There is no relation between age and adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.
2. There is no relation between education and adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.
3. There is no relation between farming experience and adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.
4. There is no relation between family size and adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.

5. There is no relation between size of land holding and adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.
6. There is no relation between annual income and adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.
7. There is no relation between material possession and adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.
8. There is no relation between economic motivation and adoption of recommended production technology of Chickpea, Soybean and Pigeon pea.

3.4. Instrument of the data collection:-

The data was collected with the help of interview schedule, which was prepared on the basis of objectives of the study. Before the actual collection of data, the interview schedule was subjected to pre-test.

Method of data collection:

The data was collected personally by the researcher with a structured interview schedule. The researcher personally approaches the respondent farmers and explained to them about the purpose of this study. After establishing intimacy with the farmers, they interviewed and their responses were recorded in the interview schedule.

3.5. Presentation of data:-

The data was transformed into normal score for tabulation. Both independent and dependent variables were categorized as low, medium and high or the term applicable so far on the basis of score obtained. The results of study as per the objectives were presented in the form of table and charts.

3.6. Analysis of data:-

As per the objectives of the study and to reach a rational conclusion, statistical test i.e. percentage, mean, Karl Pearson's correlation coefficient test were used for analyzing and interpretation of the data.

Operationalization of Dependent Variable:

The major parameters to evaluate the impact of NICRA will be taken in following crop as follows-

1. Yield /production
2. Knowledge
3. Adoption

Sum of Score = Obtainable Score ÷ Obtained Score × 100

Statistical tools:

The data was transformed into table form and the results of study as per the objectives were presented in the form of table and charts. Keeping in view the objectives of the study and to draw logical conclusion, statistical test i.e. percentage, mean, standard deviation and correlation coefficient, t test will be used for analyzing and interpreting the data.

i. Percentage

The term 'percentage' means a fraction whose denomination is 100 and the numeration of the fraction is called percentage. For calculating percentage frequency was multiplied by 100 and divided by total respondents.

$$P = \frac{X}{N} \times 100$$

Where,

P = percentage

X = frequency of respondents

N = total no. of respondents

ii. Mean

Mean was obtained by dividing the sum of the scores by the total number of cases involved. The formula for determining mean is

$$\text{Mean} = \frac{\sum_{i=0}^{n} X}{n} \quad [i = 1, 2, 3 \ldots n]$$

Where,

$\overline{X}$ = mean

$\sum_i X$ = sum of scores

n = no. of cases

iii. Standard deviation

Standard deviation is a quantity expressing by how much the members of a group differ from the mean value for the group. The formula for determining standard deviation is

$$S = \sqrt{\frac{\Sigma (X-\overline{X}}{n-1}}$$

Where,

S = standard deviation

X = each value in data set

$\overline{X}$ = mean

n = no. of cases

The relation between dependent and independent variables was studied by using Karl Pearson's correlation coefficient as follows:

iv. Karl Pearson's correlation coefficient (r):

To find out the degree of linear relationship between dependent and independent variables correlation coefficients will be worked out by using the following formula:

$$r = \frac{\Sigma\, xy}{\sqrt{(\Sigma x^2)(\Sigma y^2)}}$$

Where,

r = Coefficient of correlation

x = X - $\overline{X}$

y = Y - $\overline{Y}$

v. 't' test : Student's t test was used for testing the significant difference of mean score of two categories of the respondents in relation to their scientific temperament. For calculating 't', following formula was used.

$$t = \frac{|\overline{x_1} - \overline{x_2}|}{\frac{s^2}{n_1} + \frac{s^2}{n_2}}$$

$$s^2 = \frac{(n_1 - 1)\, s_1^{\,2} + (n_2 - 1)\, s_2^{\,2}}{n_1 + n_2 - 2}$$

Discussion with farmers

Data collection for the completion of questionnaire

CHAPTER- IV
RESULTS

1. To study the socio personal, economic and psychological attributes of farmers.
2. To determine knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea.
3. To study the impact of knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea of beneficiaries and non-beneficiaries farmers.
4. To find out the relationship between different variables and extent of adoption about recommended crop production technology.
5. To determine the constraints and suggestions in relation to adoption of agricultural crop production technology.

4. 1 socio personal, economic and psychological attributes of farmers:

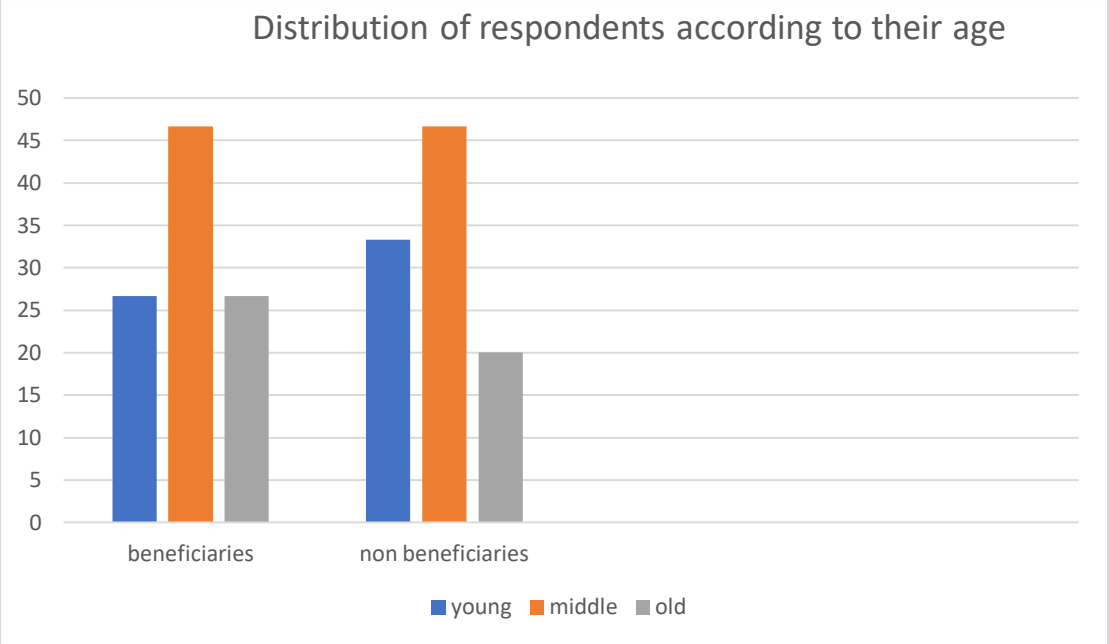
4.1.1 Age:

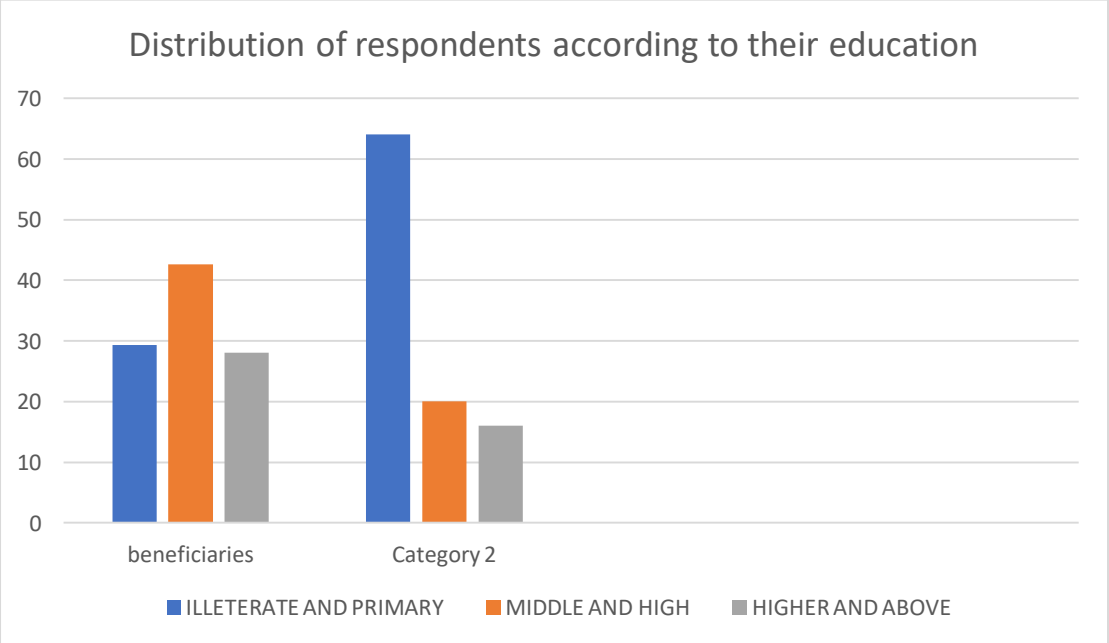
Table 4.1: Distribution of beneficiaries and non-beneficiaries according to their age: (n=150)

S. no.	Categories	beneficiaries		Non- beneficiaries	
		Frequency	Per cent	Frequency	Per cent
1.	Up to 25 year	20	26.66	25	33.33
2.	26-55 years	35	46.66	35	46.66
3.	Above 55 years	20	26.66	15	20
	Total	75	100.00	75	100.00

The data in Table 4.1 shows the distribution of beneficiaries and non-beneficiaries of NICRA project according to their age. In case of beneficiaries of NICRA project, 26.66% belonged to up to 25 year age group, 46.66% belonged to 26-55 years age group and 26.66% belonged to above 55 years age group. Similarly, in case of non-beneficiaries of NICRA, 33.33% belonged to up to 25 year age group 46.66% belonged to 26-55 years age group and 20.00% belonged to above 55 years age group.

Thus in both beneficiaries and non-beneficiaries of NICRA majority belonged to 26-55 years age group.


Distribution of respondents according to their age
50
45
40
35
30
25
20
15
10
5
0
beneficiaries
non beneficiaries
young
middle
old


Distribution of respondents according to their education
70
60
50
40
30
20
10
0
beneficiaries
Category 2
ILLETERATE AND PRIMARY
MIDDLE AND HIGH
HIGHER AND ABOVE

4.1.2 Education:

Table 4.2: Distribution of beneficiaries and non- beneficiaries according to their education: (n=150**)**

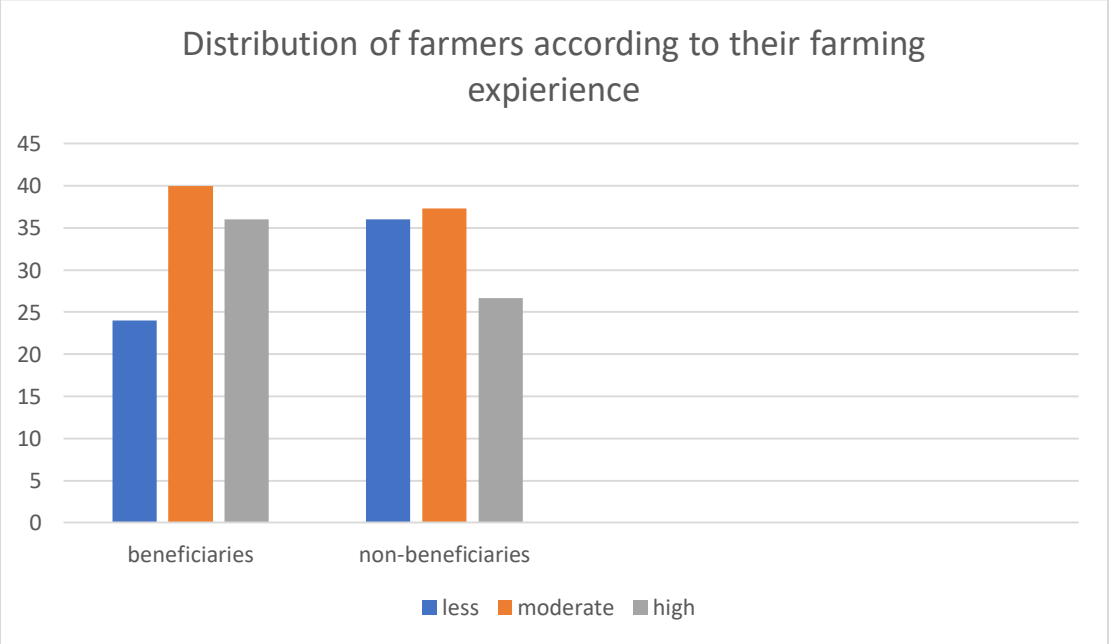
S. no.	Categories	NICRA beneficiaries		Non beneficiaries	
		Frequency	Per cent	Frequency	Per cent
1.	Illiterate & Primary passed	22	29.33	48	64.00
2.	Middle & high passed	32	42.66	15	20.00
3.	Higher secondary school & above graduation	21	28.00	12	16.00
	Total	75	100.00	75	100.00

Table 4.2 shows the education level of beneficiaries and non beneficiaries of NICRA. In case of beneficiaries of NICRA project, 29.33% of the respondents had low education and up to primary school, 42.66% had education up to middle & high school passed, 28.00% higher secondary school education and above graduation passed. Similarly, in case of non-beneficiaries of NICRA, 64.00% of the respondents had low education and up to primary school, 20.00% had education up to middle & high school passed, 16.00% higher secondary school education and above graduation passed. Majority of NICRA beneficiaries had education up to middle school, while in case of non beneficiaries majority had education up to primary school.

4.1.3 Farming experiences:

Table 4.3: Distribution of NICRA beneficiaries and non beneficiaries according to their farming experiences: (n=150)

S. No.	Categories	NICRA beneficiaries		Non beneficiaries	
		Frequency	Per cent	Frequency	Per cent
1.	Less	18	24.00	27	36.00
2.	Moderate	30	40.00	28	37.33
3.	High	27	36.00	20	26.66
	Total	75	100.00	75	100.00


Distribution of farmers according to their farming expierience
45
40
35
30
25
20
15
10
5
0
beneficiaries
non-beneficiaries
less
moderate
high

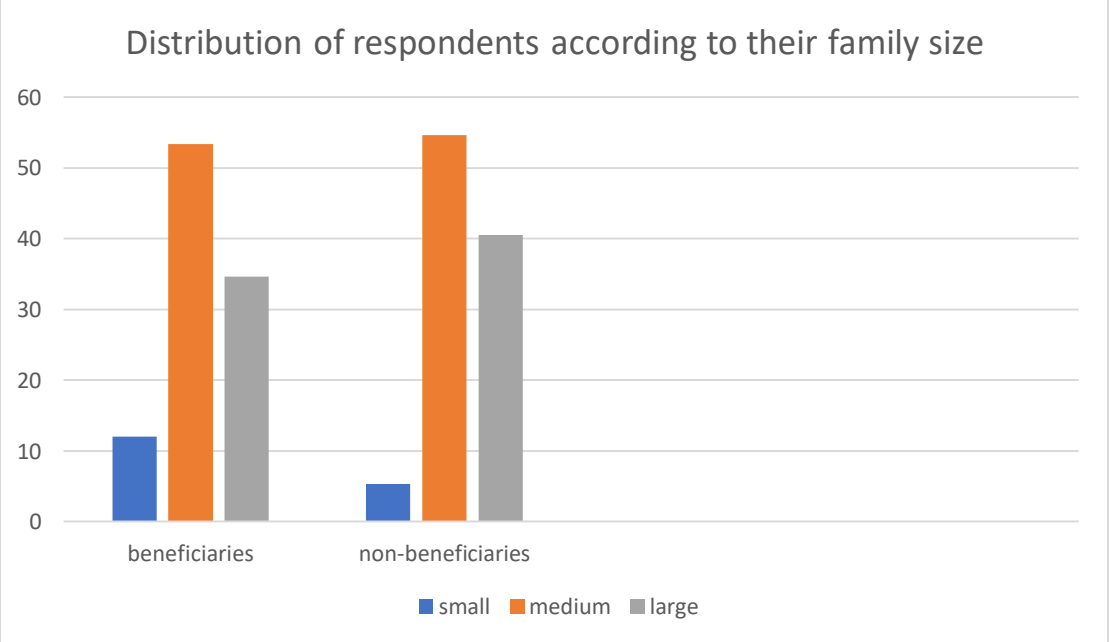

Distribution of respondents according to their family size
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
small
medium
large

Table 4.3 shows the distribution of beneficiaries according to their farming experience. In case of beneficiaries of NICRA project 18.00% were having less farming experience, while 30.00% were having moderate and about 27.00% were high farming experience. Similarly, in case of non beneficiaries of NICRA project 36.00% were having less farming experience, while 37.33% were having moderate and about 26.66% were high farming experience. Thus in both beneficiaries and non beneficiaries of NICRA, majority had moderate farming experience.

4.1.4 Family size:

Table 4.4: Distribution of NICRA beneficiaries and non beneficiaries according to their family size: (n=150)

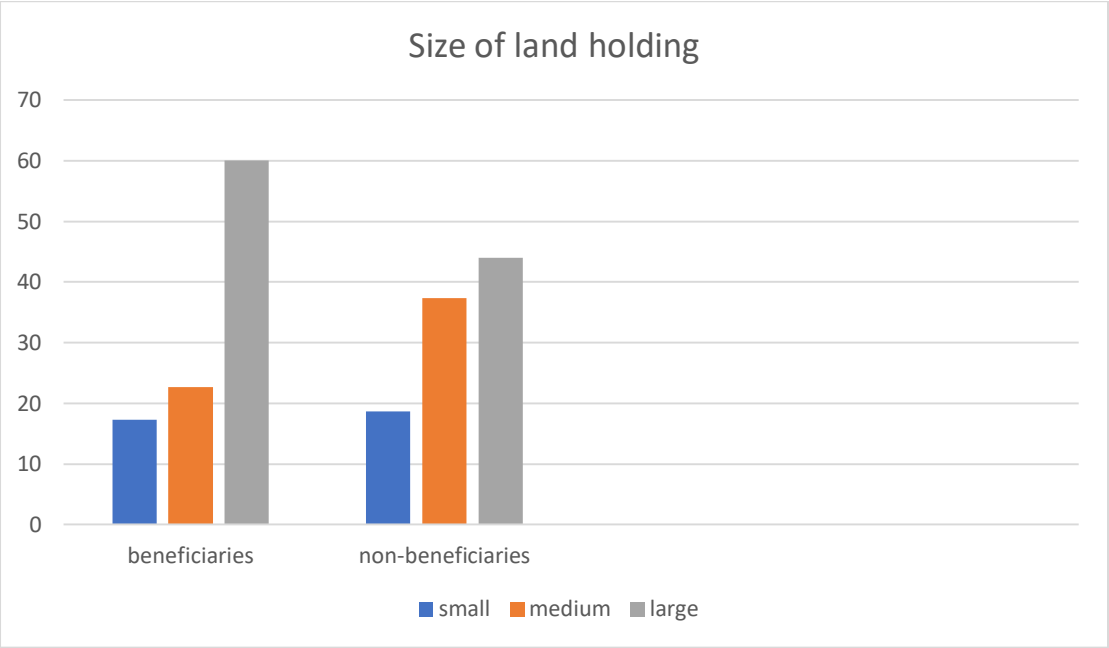
S. no.	Categories	NICRA beneficiaries		Non beneficiaries	
		Frequency	Per cent	frequency	Per cent
1.	Small	09	12.00	04	5.33
2.	Medium	40	53.33	41	54.66
3.	Large	26	34.66	30	40.54
	Total	75	100.00	75	100.00

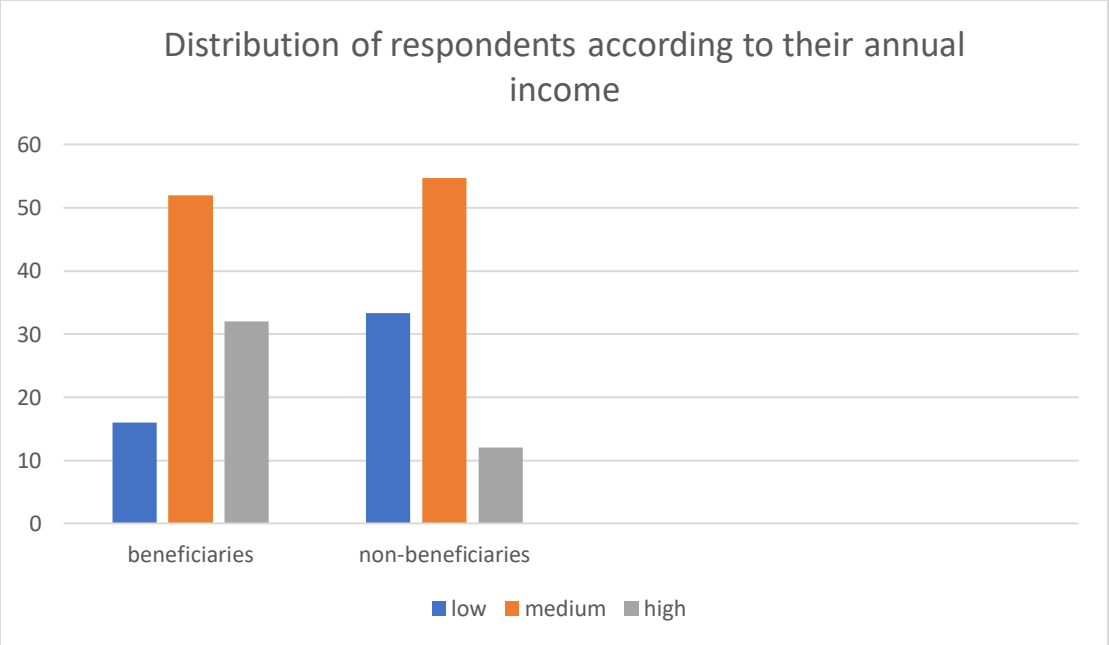
Table 4.4 presents the percentage distribution of beneficiaries and non-beneficiaries of NICRA according to their family size. In case of beneficiary farmers of NICRA project, 12.00% had small size of family, while 40.00% had medium and 36.00% had large size of family. Similarly, in case of non-beneficiaries, 5.33% had small size family, while 54.66% had medium and 40.54% had large size of family.Thus in both beneficiaries and non beneficiaries of NICRA, majority had medium family size.

4.1.5 Size of land holding:

Table 4.5: Distribution of NICRA beneficiaries and non-beneficiaries according to their size of land holding: (n=150)

S No.	Categories	NICRA beneficiaries		Non beneficiaries	
		Frequency	Per cent	Frequency	Per cent
1.	Small	13	17.33	14	18.66
2.	Medium	17	22.66	28	37.33
3.	Large	45	60.00	33	44.00
	Total	75	100.00	75	100.00


Size of land holding
70
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
small
medium
large


Distribution of respondents according to their annual income
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
low
medium
high

The data presented in table 4.5 shows the percentage distribution of NICRA beneficiaries and non-beneficiaries according to their size of land holding. In case of beneficiaries of NICRA project, 17.33% had small size of land holding, 22.66% had medium and 37.33% had large size of land holding. Similarly, in case of non-beneficiaries, 18.66% had small size of land holding, 37.33% had medium and 44.00% had large size of land holding.

Therefore majority of NICRA beneficiaries and non beneficiaries had large size of land holding.

4.1.6 Annual incomes:

Table 4.6: Distribution of NICRA beneficiaries and non-beneficiaries according to annual incomes: (n=150)

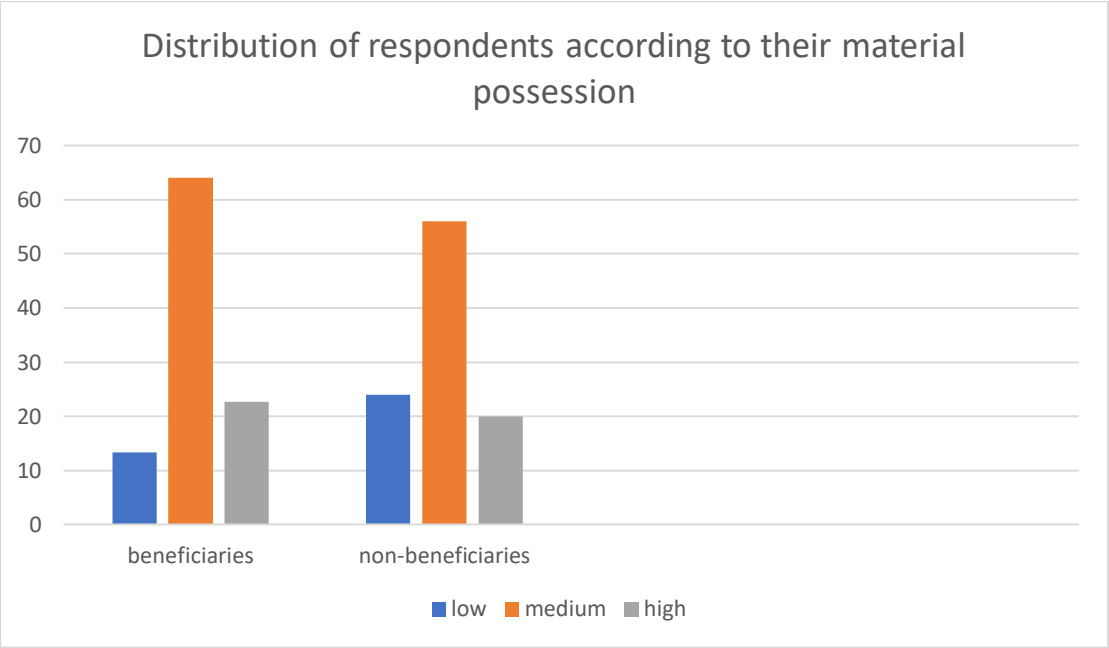
S. no.	Categories	NICRA beneficiaries		Non beneficiaries	
		Frequency	Per cent	Frequency	Per cent
1.	Low	12	16.00	25	33.33
2.	Medium	39	52.00	41	54.66
3.	High	24	32.00	09	12.00
	Total	75	100.00	75	100.00

The data in table 4.5 reveals that out of total respondents. Regarding beneficiaries of NICRA project, 16.00% had low annual income, 52.00% had medium annual income and, 32.00% had high annual income, Similarly, as regarding the non-beneficiaries of NICRA, 33.33% low annual income, 54.66% had medium annual income and, 12.00% had high annual income. Therefore majority of both beneficiaries and non-beneficiaries of NICRA had medium annual income.

4.1.7 Material possession:

Table 4.7: Distribution of NICRA beneficiaries and non beneficiaries according to their Material possession: (n=150)

S. no.	Categories	NICRA beneficiaries		Non beneficiaries	
		Frequency	Per cent	Frequency	Per cent
1.	Low	10	13.33	18	24.00
2.	Medium	48	64.00	42	56.00
3.	High	17	22.66	15	20.00
	Total	75	100.00	75	100.00


Distribution of respondents according to their material possession
70
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
low
medium
high

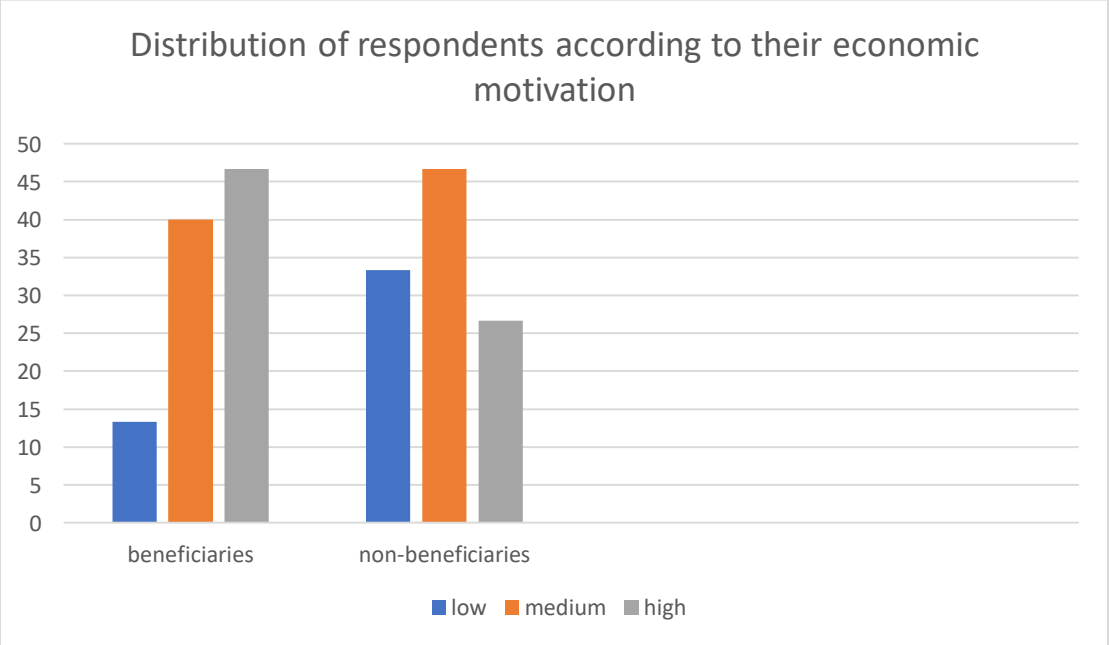

Distribution of respondents according to their economic motivation
50
45
40
35
30
25
20
15
10
5
0
beneficiaries
non-beneficiaries
low
medium
high

Table 4.7 indicates the distribution of beneficiaries and non-beneficiaries of NICRA according to their material possession. In case of NICRA beneficiaries 13.33% were having low material possession, 64.00% were having medium material possession, while 22.66% have high material possession. Regarding non beneficiaries of NICRA program 24.00% were having low material possession, 56.00% were having medium material possession, while 20.00% have high material possession.

Therefore majority of NICRA beneficiaries and non-beneficiaries had medium material possessions.

4.1.8 Economic motivation:

Table 4.8: Distribution of NICRA beneficiaries' non beneficiaries according to their economic motivation:

(n=150)

S.no.	Categories	NICRA beneficiaries		Non beneficiaries	
		Frequency	Per cent	Frequency	Per cent
1.	Low	10	13.33	25	33.33
2.	Medium	30	40.00	35	46.66
3.	High	35	46.66	20	26.66
	Total	75	100.00	75	100.00

Table 4.8 shows the distribution of beneficiaries and non-beneficiaries of NICRA according to their economic motivation. Regarding the beneficiaries of NICRA project 13.33% were having low economic motivation, 40.00% were having medium economic motivation, while 46.66% were having high economic motivation. In case of non beneficiaries 33.33% were having low economic motivation, 46.66% were having medium economic motivation, while 26.66% were having high economic motivation.

Therefore majority of NICRA beneficiaries had high economic motivation, while majority of non-beneficiaries had medium economic motivation.

4.2 Knowledge and adoption of recommended production technology of soybean, pigeon pea and chickpea.

Table: 4.9 Distribution of NICRA beneficiaries and non-beneficiaries according to their Knowledge of recommended production technology of soybean:

S. No.	Practices	Beneficiaries level of knowledge						Non-beneficiaries level of knowledge					
		High		Medium		Low		High		Medium		Low	
		F	%	F	%	F	%	F	%	F	%	F	%
1.	Ploughing by cultivators or bukhars before sowing.	19	76	4	16	2	08	5	20	10	40	10	40
2.	Prepared the field by Pata.	18	72	5	20	2	08	4	16	12	48	9	36
3.	Deep plowing once out of three years	15	60	8	32	2	08	3	12	9	36	13	52
4.	Undergone soil testing	12	48	9	36	4	16	2	16	8	32	15	60
5.	Sowing from third week of June to first week of July.	19	76	3	12	3	12	5	20	11	44	9	36
6.	The method of sowing in queues at a distance of 30-45 cm by the ridge and furrow method.	17	68	4	16	4	16	3	12	11	44	11	44
7.	Seed rate - 70-100 kg	14	56	9	36	2	08	3	12	10	40	12	48
8.	Seed treatment - (Seeds per kg) 2gmThiram + 1gm Carbendazim and 5gm Rhizobium + 5gm PSB Culture.	10	40	10	40	5	20	1	04	5	20	19	76
9.	adopted the recommended improved varieties	18	72	6	24	1	04	3	12	7	28	15	60
10.	Adopted the recommended intercropping of pigeon pea and soybean.	18	72	5	20	2	08	4	16	6	24	15	60
11.	Nutrition management - 5 ton / hac organic manure N: P: K: S = 20: 60: 20: 20 kg / hac	13	52	7	28	5	20	2	8	8	32	15	60
12.	Weed management - 1. Weeding on 15-20 days and 30-40 days And Weed management by recommended weedicides	19	76	5	20	1	04	3	12	14	56	8	32
13.	Disease management: Management of diseases by recommended fungicides.	16	64	6	24	3	12	2	08	10	40	13	52
14.	Pest Management done through recommended pesticides and remedies.	16	64	5	20	4	16	3	12	11	44	11	44
15.	Harvested when 10% legumes turn brown.	9	36	10	40	6	24	1	04	5	20	19	76

4.2.1 Knowledge of recommended production technology of soybean:

The perusal of data presented in table 4.9 revealed distribution of beneficiaries and non-beneficiaries of NICRA according to their knowledge of recommended production technology of soybean.

In “Ploughing by cultivators or bukhars before sowing” the beneficiaries of NICRA project 76.00% were having High knowledge, 16.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 20.00% were having high knowledge, 40.00% were having medium knowledge, while 40.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had equal no. of medium and low knowledge.

In “Prepared the field by Pata.” the beneficiaries of NICRA project 72.00% were having high knowledge, 20.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 16.00% were having high knowledge, 48.00% were having medium knowledge, while 36.00% were having knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had medium knowledge.

In “Deep plowing once out of three years” the beneficiaries of NICRA project 60.00% were having high knowledge, 32.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 36.00% were having medium knowledge, while 52.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Undergone soil testing” the beneficiaries of NICRA project 48.00% were having high knowledge, 36.00% were having medium knowledge, while 16.00% were having low knowledge. In case of non beneficiaries 16.00% were having high knowledge, 32.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Sowing from third week of June to first week of July” the beneficiaries of NICRA project 76.00% were having high knowledge, 12.00% were having medium

knowledge, while 12.00% were having low knowledge. In case of non beneficiaries 20.00% were having high knowledge, 44.00% were having medium knowledge, while 36.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had medium knowledge.

In “The method of sowing in queues at a distance of 30-45 cm by the ridge and furrow method.” the beneficiaries of NICRA project 68.00% were having high knowledge, 16.00% were having medium knowledge, while 16.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 44.00% were having medium knowledge, while 44.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had equal no. of medium and low knowledge.

In “Seed rate - 70-100 kg” the beneficiaries of NICRA project 56.00% were having high knowledge, 36.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 40.00% were having medium knowledge, while 48.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Seed treatment - (Seeds per kg) 2 gm Thiram + 1gm Carbendazim and 5gm Rhizobium + 5gm PSB Culture.” the beneficiaries of NICRA project 40.00% were having high knowledge, 40.00% were having medium knowledge, while 20.00% were having low knowledge. In case of non beneficiaries 04.00% were having high knowledge, 20.00% were having medium knowledge, while 76.00% were having low knowledge.

Thus, it may be inferred equal no. of NICRA beneficiaries had high and medium knowledge, while majority of non- beneficiaries had low knowledge.

In “adopted the recommended improved varieties” the beneficiaries of NICRA project 72.00% were having high knowledge, 24.00% were having medium knowledge, while 04.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 28.00% were having medium knowledge, while 16.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Adopted the recommended intercropping of pigeon pea and soybean.” the beneficiaries of NICRA project 72.00% were having high knowledge, 20.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 16.00% were having high knowledge, 24.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Nutrition management - 5 ton / hac organic manure 1 N: P: K: S = 20: 60: 20: 20 kg / hac” the beneficiaries of NICRA project 52.00% were having high knowledge, 28.00% were having medium knowledge, while 20.00% were having low knowledge. In case of non beneficiaries 08.00% were having high knowledge, 32.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Weed management - 1. Weeding on 15-20 days and 30-40 days And Weed management by recommended weedicides” the beneficiaries of NICRA project 76.00% were having high knowledge, 20.00% were having medium knowledge, while 04.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 56.00% were having medium knowledge, while 32.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had Medium knowledge.

In “Disease management: Management of diseases by recommended fungicides.” the beneficiaries of NICRA project 64.00% were having high knowledge, 24.00% were having medium knowledge, while 12.00% were having low knowledge. In case of non beneficiaries 08.00% were having high knowledge, 40.00% were having medium knowledge, while 52.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Pest Management done through recommended pesticides and remedies.” the beneficiaries of NICRA project 64.00% were having high knowledge, 20.00% were having medium knowledge, while 16.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 44.00% were having medium knowledge, while 44.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had equal no. of Medium and low knowledge.

In “harvested when 10% legumes turn brown.” the beneficiaries of NICRA project 36.00% were having high knowledge, 40.00% were having medium knowledge, while 24.00% were having low knowledge. In case of non beneficiaries 04.00% were having high knowledge, 20.00% were having medium knowledge, while 76.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had medium knowledge, while majority of non- beneficiaries had low knowledge.

Table 4.10: Mean, S.D. and t-value for knowledge between NICRA beneficiaries and non beneficiaries:

Respondents	Mean	S.D.	t value
Beneficiaries	21.00	19.44	
Non- beneficiaries	13.33	03.68	1.93**

**=significant at 0.01 probability level

The calculated t value for knowledge in NICRA beneficiaries and non-beneficiaries was 1.93 which was found to be significant at 0.01 probability level. Thus the earlier stated null hypothesis that there is low difference between the knowledge of the NICRA beneficiaries and non- beneficiaries is rejected. Hence it can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.

Table: 4.11 Distribution of NICRA beneficiaries and non beneficiaries according to their Knowledge of recommended production technology of pigeon pea.

S. No.	Practices	Beneficiaries level of knowledge						Non-beneficiaries level of knowledge					
		High		Medium		Low		High		Medium		Low	
		F	%	F	%	F	%	F	%	F	%	F	%
1.	Once ploughing the soil with plough and 2-3 plow from Bukhar or desi plough.	19	76	4	16	2	08	5	20	10	40	10	40
2.	Made irrigation channels.	18	72	6	24	1	04	3	12	7	28	15	60
3.	Sowing from last week of June to first week of July.	18	72	5	20	2	08	4	16	6	24	15	60
4.	Seed 15 kg / hac adopted.	13	52	7	28	5	20	2	08	8	32	15	60
5.	Seed treatment - (seeds per kg) 2gm Thiram + 1gm Carbendazim and 5gm Rhizobium + 5gm P.S.B. Culture	19	76	5	20	1	04	3	12	14	56	8	32
6.	N: P: K: S Ratio 20: 50: 20: 20 kg per hac adopted.	16	64	6	24	3	12	2	08	10	40	13	52
7.	Weed Management - Use of pendimethalin 1kg / hac for weeding.	16	64	5	20	4	16	3	12	11	44	11	44
8.	Pest control (i) 2ml / lit water of Quinalphos 25EC (ii) 2ml / lit water of Popenophos 50EC	18	72	6	24	1	04	3	12	7	28	15	60
9.	Disease control done using recommended measures and fungicides.	18	72	5	20	2	08	4	16	6	24	15	60
10.	Harvesting was done at proper humidity.	18	72	5	20	2	08	4	16	6	24	15	60
11.	Storage = Drying up to 10% moisture.	13	52	7	28	5	20	2	08	8	32	15	60

The perusal of data presented in table 4.11 revealed distribution of beneficiaries and non-beneficiaries of NICRA according to their knowledge of recommended production technology of pigeon pea.

In “Once plowing the soil with plough and 2-3 plough from Bukhar or desi plough” the beneficiaries of NICRA project 76.00% were having high knowledge, 16.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 20.00% were having high knowledge, 40.00% were having medium knowledge, while 40.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had equal no. of medium and low knowledge.

In “Made irrigation channels” the beneficiaries of NICRA project 72.00% were having high knowledge, 24.00% were having medium knowledge, while 04.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 28.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Sowing from last week of June to first week of July.” the beneficiaries of NICRA project 72.00% were having high knowledge, 20.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 16.00% were having high knowledge, 24.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Seed 15 kg / hac adopted” the beneficiaries of NICRA project 52.00% were having high knowledge, 28.00% were having medium knowledge, while 20.00% were having low knowledge. In case of non beneficiaries 08.00% were having high knowledge, 32.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Seed treatment - (seeds per kg) 2gm Thiram + 1gm Carbendazim and 5gm Rhizobium + 5gm P.S.B. Culture” the beneficiaries of NICRA project 76.00% were having high knowledge, 20.00% were having medium knowledge, while 04.00%

were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 56.00% were having medium knowledge, while 32.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had medium knowledge.

In “N: P: K: S Ratio 20: 50: 20: 20 kg per hac adopted”the beneficiaries of NICRA project 64.00% were having high knowledge, 24.00% were having medium knowledge, while 12.00% were having low knowledge. In case of non beneficiaries 08.00% were having high knowledge, 40.00% were having medium knowledge, while 52.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Weed Management - Use of pendimethalin 1kg / ha for weeding.” the beneficiaries of NICRA project 64.00% were having high knowledge, 20.00% were having medium knowledge, while 16.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 44.00% were having medium knowledge, while 44.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had equal no. of medium and low knowledge.

In “Pest control (i) 2ml / lit water of Quinalphos 25EC (ii) 2ml / lit water of Popenophos50EC” the beneficiaries of NICRA project 72.00 were having high knowledge, 24.00% were having medium knowledge, while 04.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 28.00% were having medium knowledge, while 60.00% were having low knowledge

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Disease control done using recommended measures and fungicides”, 72.00% were having high knowledge, 20.00% were having medium knowledge, while 08.00% having low knowledge. In case of non beneficiaries 16.00% were having high knowledge, 24.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had medium knowledge, while majority of non- beneficiaries had low knowledge.

In “Harvesting was done at proper humidity”, 72.00% were having high knowledge, 20.00% were having medium knowledge, while 08.00% having low knowledge. In case of non beneficiaries 16.00 were having high knowledge, 24.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had medium knowledge, while majority of non- beneficiaries had low knowledge.

In “Storage = Drying up to 10% moisture” the beneficiaries of NICRA project 52.00% were having high knowledge, 28.00% were having medium knowledge, while 20.00% were having low knowledge. In case of non beneficiaries 08.00% were having high knowledge, 32.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

Table 4.12: Mean, S.D. and t-value for knowledge between NICRA beneficiaries and non beneficiaries:

Respondents	Mean	S.D.	t value
Beneficiaries	20.33	17.74	
Non- beneficiaries	13.00	2.94	2.036**

**=significant at 0.01 probability level

The calculated t value for knowledge in NICRA beneficiaries and non-beneficiaries was 2.036 which was found to be significant at 0.01 probability level. Thus the earlier stated null hypothesis that there is low difference between the knowledge of the NICRA beneficiaries and non- beneficiaries is rejected. Hence it can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.

Table: 4.13 Distribution of NICRA beneficiaries and non beneficiaries according to their Knowledge of recommended production technology of chickpea:

S. No.	Practices	Beneficiaries level of knowledge						Non-beneficiaries level of knowledge					
		High		Medium		Low		High		Medium		Low	
		F	%	F	%	F	%	F	%	F	%	F	%
1.	After Bakkhar, prepare the field by Pata.	19	76	5	20	1	04	3	12	14	56	8	32
2.	Seed rate 70-100kg / hac adopted.	16	64	6	24	3	12	2	08	10	40	13	52
3.	Spacing- 30x10crn adopted	16	64	5	20	4	16	3	12	11	44	11	44
4.	Seed treatment. (i) 2gm Thiram + 1gm Carbendazim (ii) 5gm Rhizobium + 5gm PSB Cultures + 1gm ammonium molibded	18	72	6	24	1	04	3	12	7	28	15	60
5.	Sowing between 15 oct to 15 nov	18	72	5	20	2	08	4	16	6	24	15	60
6.	Fertilizer ratio N: P: K: S - 15-20: 40-50: 20: 60 adopted.	18	72	5	20	2	08	4	16	6	24	15	60
7.	Adopted recommended measures for non-irrigated farming.	18	72	6	24	1	04	3	12	7	28	15	60
8.	Water conservation and water promotion - (i) Soil water conservation through deep plowing. (ii) By use of subsoiler. (iii) rainwater harvesting (iv) Used mulch.	18	72	5	20	2	08	4	16	6	24	15	60
9.	Irrigated before flowering and filling stage.	13	52	7	28	5	20	2	08	8	32	15	60
10.	Weed control by using pandimethylene 1lit / hac.	19	76	5	20	1	04	3	12	14	56	8	32
11.	Disease management by recommended measures and use of medicines.	16	64	6	24	3	12	2	08	10	40	13	52
12.	Pest management by use of recommended pesticides and remedies.	16	64	5	20	4	16	3	12	11	44	11	44

4.2.3 Knowledge of recommended production technology of chickpea.

The perusal of data presented in table 4.13 revealed distribution of beneficiaries and non-beneficiaries of NICRA according to their knowledge of recommended production technology of chickpea.

In “After Bakkhar, prepare the field by Pata” the beneficiaries of NICRA project 76.00% were having high knowledge, 20.00% were having medium knowledge, while 04.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 56.00% were having medium knowledge, while 32.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non- beneficiaries had low knowledge.

In “Seed rate 70-100kg / hac adopted.” the beneficiaries of NICRA project 64.00% were having high knowledge, 24.00% were having medium knowledge, while 12.00% were having low knowledge. In case of non beneficiaries 08.00% were having high knowledge, 40.00% were having medium knowledge, while 52.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Spacing- 30x10crn adopted.” the beneficiaries of NICRA project 64.00% were having high knowledge, 20.00% were having medium knowledge, while 16.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 44.00% were having medium knowledge, while 44.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Seed treatment (i) 2gm Thiram + 1gm Carbendazim (ii) 5gm Rhizobium + 5gm PSB Cultures + 1gm ammonium molibded” the beneficiaries of NICRA project 72.00% were having high knowledge, 24.00% were having medium knowledge, while 04.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 28.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Sowing between 15 oct to 15 nov” the beneficiaries of NICRA project 72.00% were having high knowledge, 20.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 16.00% were having high knowledge, 24.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Fertilizer ratio N: P: K: S - 15-20: 40-50: 20: 60 adopted.” the beneficiaries of NICRA project 72.00% were having high knowledge, 20.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 16.00% were having high knowledge, 24.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Adopted recommended measures for non-irrigated farming.” the beneficiaries of NICRA project 72.00% were having high knowledge, 24.00% were having medium knowledge, while 04.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 28.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Water conservation and water promotion - (i) Soil water conservation through deep plowing. (ii) By use of subsoiler. (iii) rainwater harvesting (iv) Used mulch.” the beneficiaries of NICRA project 72.00% were having high knowledge, 20.00% were having medium knowledge, while 08.00% were having low knowledge. In case of non beneficiaries 16.00% were having high knowledge, 24.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Irrigated before flowering and filling stage.” the beneficiaries of NICRA project 52.00% were having high knowledge, 28.00% were having medium knowledge, while 20.00% were having low knowledge. In case of non beneficiaries 08.00% were having high knowledge, 32.00% were having medium knowledge, while 60.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Weed control by using pandimethylene 1lit / ha.” the beneficiaries of NICRA project 76.00% were having high knowledge, 20.00% were having medium knowledge, while 04.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 56.00% were having medium knowledge, while 32.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had medium knowledge.

In “Disease management by recommended measures and use of medicines” the beneficiaries of NICRA project 64.00% were having high knowledge, 24.00% were having medium knowledge, while 12.00% were having low knowledge. In case of non beneficiaries 08.00% were having high knowledge, 40.00% were having medium knowledge, while 52.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

In “Pest management by use of recommended pesticides and remedies” the beneficiaries of NICRA project 64.00% were having high knowledge, 20.00% were having medium knowledge, while 16.00% were having low knowledge. In case of non beneficiaries 12.00% were having high knowledge, 44.00% were having medium knowledge, while 44.00% were having low knowledge.

Thus, it may be inferred majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had medium or low knowledge.

Table 4.14: Mean, S.D. and t-value for knowledge between NICRA beneficiaries and non beneficiaries:

Respondents	Mean	S.D.	t value
Beneficiaries	21.33	13.66	1.456**
Non- beneficiaries	13.66	4.64	

**=significant at 0.01 probability level

The calculated t value for knowledge in NICRA beneficiaries and non beneficiaries was 1.456 which was found to be significant at 0.01 probability level. Thus the earlier stated null hypothesis that there is low difference between the knowledge of the NICRA beneficiaries and non beneficiaries is rejected. Hence it

can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.

4.2.4 Overall extent of knowledge:

Table 4.15: Distribution of beneficiaries and non-beneficiaries of NICRA according to their overall extent of knowledge:

Respondents	Beneficiaries						Non beneficiaries					
Crop	Low	%	Medium	%	high	%	Low	%	Medium	%	High	%
Soybean	3	12	6	24	16	64	13	52	9	36	3	12
Pigeon pea	4	16	6	24	15	60	14	56	8	32	3	12
Chickpea	3	12	5	20	17	68	12	48	10	40	3	12
Total	10	13.33	17	22.66	48	64	39	52	27	36	9	12

According to overall extent of knowledge Regarding the beneficiaries of NICRA project 13.33% were having low knowledge, 22.66% were having medium knowledge, while 64.00% were having high knowledge. In case of non beneficiaries 52.00% were having low knowledge, 46.66% were having medium knowledge, while 12.00% were having high knowledge.

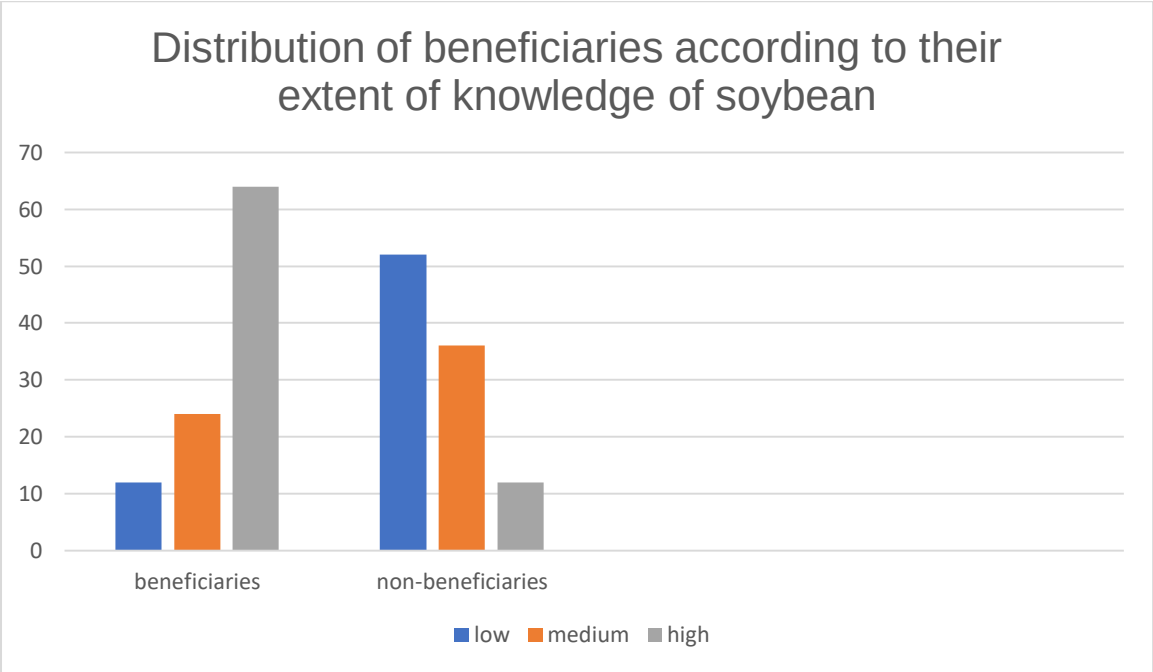
Therefore majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

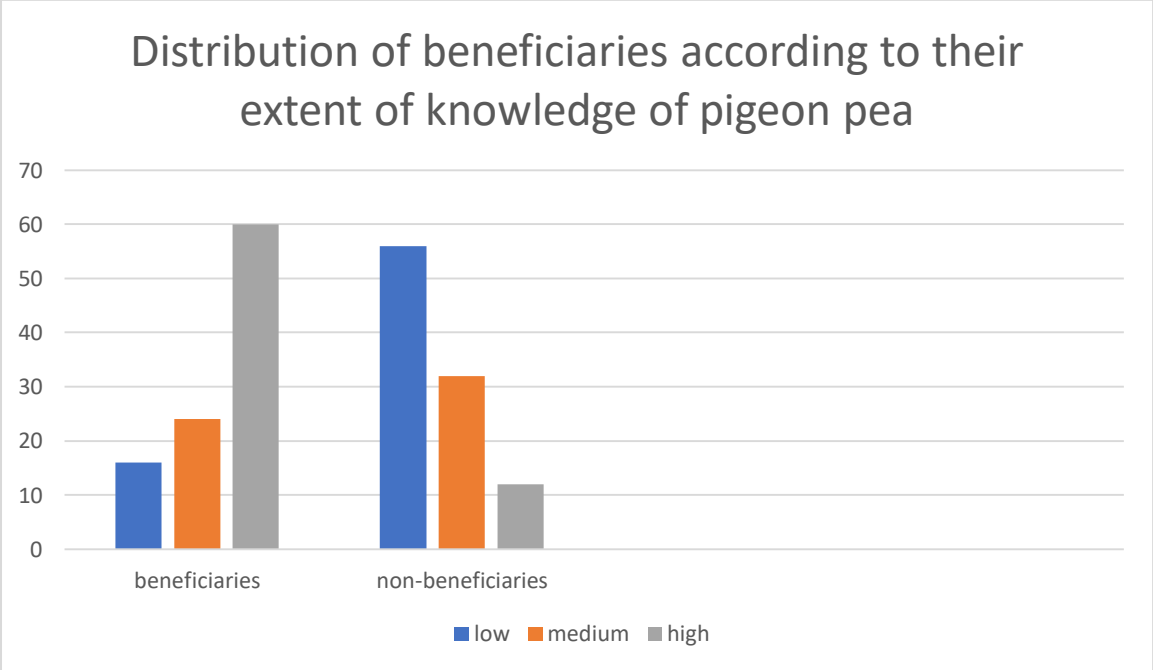
Table 4.16: Mean, S.D. and t-value for knowledge between NICRA beneficiaries and non beneficiaries:

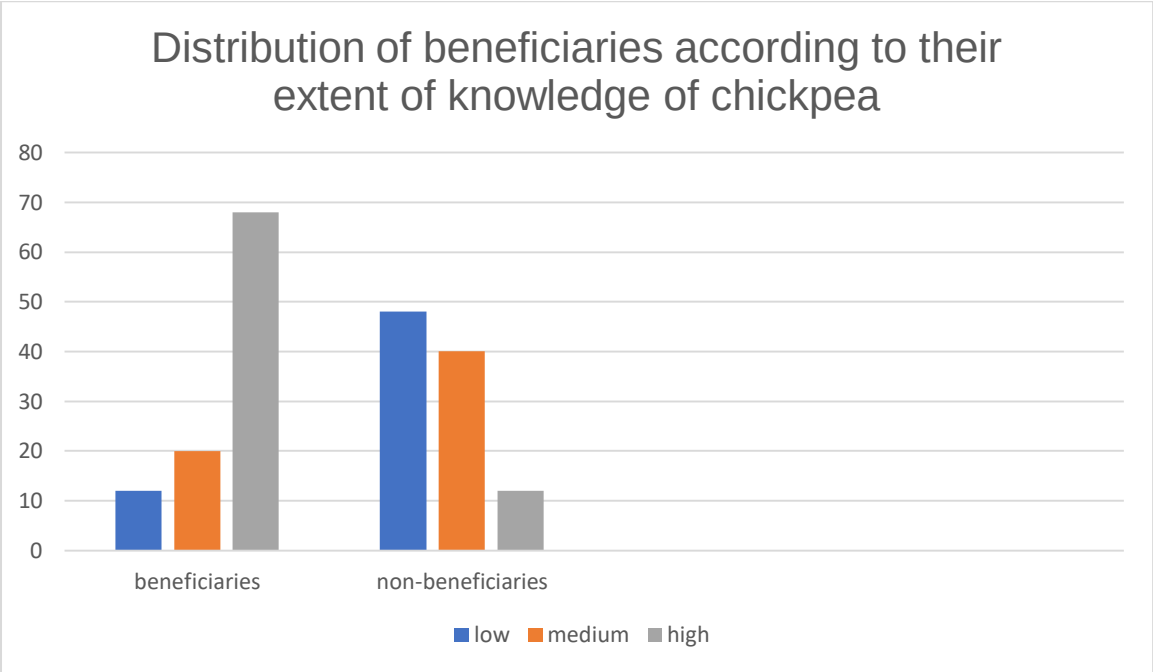
Respondents	Mean	S.D.	t value
Beneficiaries	62.66	58.33	
Non- beneficiaries	40	11.04	3.306**

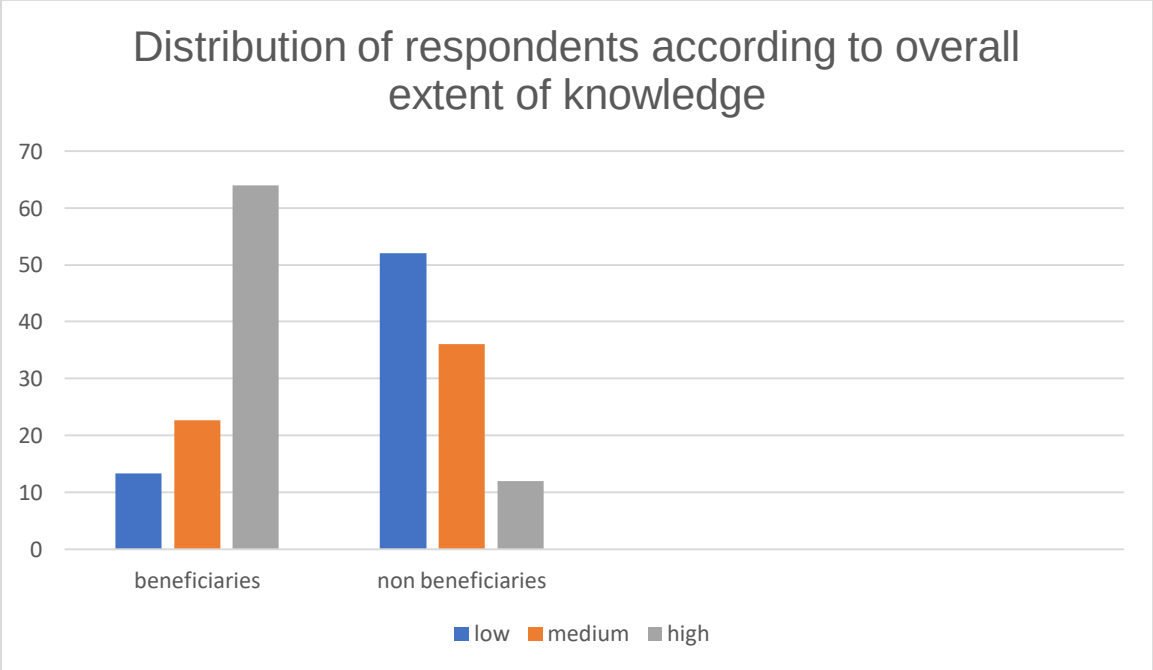
**=significant at 0.01 probability level

The calculated t value for knowledge in NICRA beneficiaries and non beneficiaries was 3.306 which was found to be significant at 0.01 probability level. Thus the earlier stated null hypothesis that there is low difference between the knowledge of the NICRA beneficiaries and non beneficiaries is rejected. Hence it can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.


Distribution of beneficiaries according to their extent of knowledge of soybean
70
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
low
medium
high


Distribution of beneficiaries according to their extent of knowledge of pigeon pea
70
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
low
medium
high


Distribution of beneficiaries according to their extent of knowledge of chickpea
80
70
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
low
medium
high


Distribution of respondents according to overall extent of knowledge
70
60
50
40
30
20
10
0
beneficiaries
non beneficiaries
low
medium
high

4.3: Adoption of recommended production technology of Soybean, Pigeon pea and Chickpea:

Table: 4.17Distribution of NICRA beneficiaries and non beneficiaries according to their adoption of recommended production technology of soybean.

S.No.	Practices	Beneficiaries level of adoption						Non-beneficiaries level of adoption					
		High		Medium		Low		High		Medium		Low	
		F	%	F	%	F	%	F	%	F	%	F	%
1.	Ploughing by cultivators or bukhars before sowing.	19	76	5	20	1	04	3	12	14	56	8	32
2.	Prepared the field by Pata.	16	64	6	24	3	12	2	08	10	40	13	52
3.	Deep plowing once out of three years.	16	64	5	20	4	16	3	12	11	44	11	44
4.	Soil testing done.	18	72	6	24	1	04	3	12	7	28	15	60
5.	Sowing from third week of June to first week of July.	18	72	5	20	2	08	4	16	6	24	15	60
6.	The method of sowing in queues at a distance of 30-45 cm by the KudhMedh method.	19	76	5	20	1	04	3	12	14	56	8	32
7.	adopted seed rate-70-100kg.	16	64	6	24	3	12	2	08	10	40	13	52
8.	Seed treatment - (per kg seed) 2gm Thiram + 1 gm Carbendazim and 5 gm Rhizobium + 5 gm PSB Culture	16	64	5	20	4	16	3	12	11	44	11	44
9.	Adopted recommended improved varieties	16	64	6	24	3	12	2	08	10	40	13	52
10.	Adopted intercrop of pigeon pea and soybean.	16	64	5	20	4	16	3	12	11	44	11	44

11.	Nutrition Management 5 ton / hac organic fertilizer and N: P: K: S = 20: 60: 20: 20 kg / hac	17	68	4	16	4	16	3	12	11	44	11	44
12.	Weed Management –hand weeding 15-20 days and 30-40 days after sowing Recommended weedicide.	14	56	9	36	2	08	3	12	10	40	12	48
13.	Disease Management - Management of diseases by recommended fungicides.	19	76	5	20	1	04	3	12	14	56	8	32
14.	Pest Management - Pest management done by recommended pesticides and remedies.	16	64	6	24	3	12	2	08	10	40	13	52
15.	Harvested when 10% beans are turned brown.	16	64	5	20	4	16	3	12	11	44	11	44

In “Ploughing by cultivators or bukhars before sowing” the beneficiaries of NICRA project 76.00% were having high adoption, 20.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 56.00% were having medium adoption, while 32.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Prepared the field by Pata” the beneficiaries of NICRA project 64.00% were having high adoption, 24.00% were having medium adoption, while 12.00% were having low adoption. In case of non beneficiaries 08.00% were having high adoption, 40.00% were having medium adoption, while 52.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Deep plowing once out of three years.” the beneficiaries of NICRA project 64.00% were having high adoption, 20.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Soil testing done.” the beneficiaries of NICRA project 72.00% were having high adoption, 24.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 28.00% were having medium adoption, while 60.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Sowing from third week of June to first week of July.” the beneficiaries of NICRA project 72.00% were having high adoption, 20.00% were having medium adoption, while 08.00% were having low adoption. In case of non beneficiaries 16.00% were having high adoption, 24.00% were having medium adoption, while 60.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “The method of sowing in queues at a distance of 30-45 cm by the Ridge and furrow method.” the beneficiaries of NICRA project 76.00% were having high adoption, 20.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 56.00% were having medium adoption, while 32.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “adopted seed rate-70-100kg” the beneficiaries of NICRA project 64.00% were having high adoption, 24.00% were having medium adoption, while 12.00% were having low adoption. In case of non beneficiaries 08.00% were having high adoption, 40.00% were having medium adoption, while 52.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Seed treatment - (per kg seed) 1. 2gm Thiram + 1 gm Carbendazim and 5 gm Rhizobium + 5 gm PSB Culture.” the beneficiaries of NICRA project 64.00% were having high adoption, 20.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Adopted recommended improved varieties.” the beneficiaries of NICRA project 64.00% were having high adoption, 24.00% were having medium adoption, while 12.00% were having low adoption. In case of non beneficiaries 08.00% were having high adoption, 40.00% were having medium adoption, while 52.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Adopted intercrop of pigeon pea and soybean.” the beneficiaries of NICRA project 64.00% were having high adoption, 20.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Nutrition Management 5 ton / hac. organic fertilizer and N: P: K: S = 20: 60: 20: 20 kg / hac” the beneficiaries of NICRA project 68.00% were having high adoption, 16.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Weed Management – hand weeding 15-20 days and 30-40 days two sowing and Recommended weed management chemicals weed.” the beneficiaries of NICRA project 56.00% were having high adoption, 36.00% were having medium adoption, while 08.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 40.00% were having medium adoption, while 48.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Disease Management - Management of diseases by recommended fungicides” the beneficiaries of NICRA project 76.00% were having high adoption, 20.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 56.00% were having medium adoption, while 32.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Pest Management - Pest management done by recommended pesticides and remedies.” the beneficiaries of NICRA project 64.00% were having high adoption, 24.00% were having medium adoption, while 12.00% were having low adoption. In case of non beneficiaries 08.00% were having high adoption, 40.00% were having medium adoption, while 52.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Harvested when 10% beans are turned brown” the beneficiaries of NICRA project 64.00% were having high adoption, 20.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

Table 4.18: Mean, S.D. and t-value for adoption between NICRA beneficiaries and non beneficiaries:

Respondents	Mean	S.D.	t value
Beneficiaries	21.66	14	
Non- beneficiaries	21.13	5.71	1.74**

**=significant at 0.01 probability level

The calculated t value for adoption in NICRA beneficiaries and non beneficiaries was 1.74 which was found to be significant at 0.01 probability level. Thus the earlier stated null hypothesis that there is low difference between the adoption of the NICRA beneficiaries and non beneficiaries is rejected. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

Table: 4.19 Distribution of NICRA beneficiaries and non beneficiaries according to their adoption of recommended production technology of pigeon pea.

S. No.	Practices	Beneficiaries level of adoption						Non-beneficiaries level of adoption					
		High		Medium		Low		High		Medium		Low	
		F	%	F	%	F	%	F	%	F	%	F	%
1.	Once ploughed with soil turning plow and 2-3 ploughing from Bakkhar or desi plough	19	76	5	20	1	04	3	12	14	56	8	32
2.	Made irrigation drains.	16	64	6	24	3	12	2	08	10	40	13	52
3.	Sowing from last week of June to first week of July.	16	64	5	20	4	16	3	12	11	44	11	44
4.	Seed rate 15 kg / hac adopted.	14	56.00	7	28	4	16	3	12.00	10	40.00	12	48.00
5.	Seed treatment - (seeds per kg) 2gm Thiram + 1gm Carbendazim and 5gm Rhizobium + 5gm P.S.B. Culture	17	68	4	16	4	16	3	12	11	44	11	44
6.	Adopted NPKS ratio 20: 50: 20: 20 kg per hac.	14	56	9	36	2	08	3	12	10	40	12	48
7.	Weed Management - Use of pendimethalin 1kg / hac for weeding.	16	64	6	24	3	12	2	08	10	40	13	52
8.	Pest Control - 2ml / lit of Quinalphos 25EC (ii) 2ml / lit of Propenophos 50EC	16	64	5	20	4	16	3	12	11	44	11	44
9.	Disease control by recommended measures.	18	72	6	24	1	04	3	12	7	28	15	60
10.	Harvesting was done at proper humidity.	18	72	5	20	2	08	4	16	6	24	15	60
11.	Storage = Drying up to 10% moisture.	17	68	4	16	4	16	3	12	11	44	11	44

In “Once ploughed with soil turning plow and 2-3 ploughing from Bakkhar or desi plough” the beneficiaries of NICRA project 76.00% were having high adoption, 20.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 56.00% were having medium adoption, while 32.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Made irrigation drains.” the beneficiaries of NICRA project 64.00% were having high adoption, 24.00% were having medium adoption, while 12.00% were having low adoption. In case of non beneficiaries 08.00% were having high adoption, 40.00% were having medium adoption, while 52.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Sowing from last week of June to first week of July.” the beneficiaries of NICRA project 64.00% were having high adoption, 20.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Seed rate 15 kg / hac adopted.” the beneficiaries of NICRA project 56.00% were having high adoption, 28.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 40.00% were having medium adoption, while 48.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Seed treatment - (seeds per kg) 2gm Thiram + 1gm Carbendazim and 5gm Rhizobium + 5gm P.S.B. Culture” the beneficiaries of NICRA project 68.00% were having high adoption, 16.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Adopted NPK.S ratio 20: 50: 20: 20 kg per hac.” the beneficiaries of NICRA project 56.00% were having high adoption, 36.00% were having medium adoption, while 08.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 40.00% were having medium adoption, while 48.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Weed Management - Use of pendimethalin 1kg / hac for weeding” the beneficiaries of NICRA project 64.00% were having high adoption, 24.00% were having medium adoption, while 12.00% were having low adoption. In case of non beneficiaries 08.00% were having high adoption, 40.00% were having medium adoption, while 52.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Pest Control - 2ml / it water of Quinalphos 25EC (ii) 2ml / it water of Popenophos50EC.” the beneficiaries of NICRA project 64.00% were having high adoption, 20.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Disease control by recommended measures.” the beneficiaries of NICRA project 72.00% were having high adoption, 24.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 28.00% were having medium adoption, while 60.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Harvesting was done at proper humidity.” the beneficiaries of NICRA project 72.00% were having high adoption, 20.00% were having medium adoption, while 08.00% were having low adoption. In case of non beneficiaries 16.00% were having high adoption, 24.00% were having medium adoption, while 60.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Storage = Drying up to 10% moisture.” the beneficiaries of NICRA project 68.00% were having high adoption, 16.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

Table 4.20: Mean, S.D. and t-value for adoption between NICRA beneficiaries and non beneficiaries:

Respondents	Mean	S.D.	t value
Beneficiaries	19.66	16.04	
Non- beneficiaries	13.66	4.64	1.79**

**=significant at 0.01 probability level

The calculated t value for adoption in NICRA beneficiaries and non beneficiaries was 1.79 which was found to be significant at 0.01 probability level. Thus the earlier stated null hypothesis that there is low difference between the adoption of the NICRA beneficiaries and non beneficiaries is rejected. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

Table: 4.21 Distribution of NICRA beneficiaries and non beneficiaries according to their adoption of recommended production technology of chickpea.

S. No.	Practices	Beneficiaries level of adoption						Non-beneficiaries level of adoption					
		High		Medium		Low		High		Medium		Low	
		F	%	F	%	F	%	F	%	F	%	F	%
1.	Ploughing by cultivator or bukhar before sowing.	19	76	5	20	1	04	3	12	14	56	8	32
2.	Prepared the field by Pata.	18	72	6	24	1	04	3	12	7	28	15	60
3.	Deep plowing once in three years.	17	68	4	16	4	16	3	12	11	44	11	44
4.	Soil testing	14	56	9	36	2	08	3	12	10	40	12	48
5.	Sowing time- third week of June to first week of July.	16	64	6	24	3	12	2	08	10	40	13	52
6.	Method of sowing in queues at a distance of 30-45 cm by the ridge and furrow method.	16	64	5	20	4	16	3	12	11	44	11	44
7.	Adopt seed rate-70-100kg.	18	72	6	24	1	04	3	12	7	28	15	60
8.	Seed treatment - (per kg seed) 2gm Thiram + 1 gm Carbendazim and 5 gm Rhizobium + 5 gm PSB Culture	18	72	5	20	2	08	4	16	6	24	15	60
9.	Adopted recommended improved varieties	19	76	5	20	1	04	3	12	14	56	8	32
10.	Adopted intercrop of pigeon pea and soybean.	18	72	6	24	1	04	3	12	7	28	15	60
11.	Nutrition Management 5 ton / hac organic fertilizer and N: P: K: S = 20: 60: 20: 20 kg / hac	17	68	4	16	4	16	3	12	11	44	11	44
12.	Weed Management -By recommended chemicals weedicide	14	56	9	36	2	08	3	12	10	40	12	48
13.	Disease Management- By recommended drugs and chemicals.	16	64	6	24	3	12	2	08	10	40	13	52
14.	Pest Management- By recommended pesticides and remedies.	16	64	5	20	4	16	3	12	11	44	11	44

In “Ploughing by cultivator or bukhar before sowing.” the beneficiaries of NICRA project 76.00% were having high adoption, 20.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 56.00% were having medium adoption, while 32.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Prepared the field by Pata” the beneficiaries of NICRA project 72.00% were having high adoption, 24.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 28.00% were having medium adoption, while 60.00% were having low adoption

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Deep plowing once in three years” the beneficiaries of NICRA project 68.00% were having high adoption, 16.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Soil testing” the beneficiaries of NICRA project 56.00% were having high adoption, 36.00% were having medium adoption, while 08.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 40.00% were having medium adoption, while 48.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Sowing time- third week of June to first week of July” the beneficiaries of NICRA project 64.00% were having high adoption, 24.00% were having medium adoption, while 12.00% were having low adoption. In case of non beneficiaries 08.00% were having high adoption, 40.00% were having medium adoption, while 52.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “The method of sowing in queues at a distance of 30-45 cm by the ridge and furrow method” the beneficiaries of NICRA project 64.00% were having high adoption, 20.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “adopt seed rate-70-100kg.” the beneficiaries of NICRA project 72.00% were having high adoption, 24.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 28.00% were having medium adoption, while 60.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Seed treatment - (per kg seed) 2gm Thiram + 1 gm Carbendazim and 5 gm Rhizobium + 5 gm PSB Culture” the beneficiaries of NICRA project 72.00% were having high adoption, 20.00% were having medium adoption, while 08.00% were having low adoption. In case of non beneficiaries 16.00% were having high adoption, 24.00% were having medium adoption, while 60.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Adopted recommended improved varieties” the beneficiaries of NICRA project 76.00% were having high adoption, 20.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 56.00% were having medium adoption, while 32.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Adopted endangered crop of pigeon pea and soybean.” the beneficiaries of NICRA project 72.00% were having high adoption, 24.00% were having medium adoption, while 04.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 28.00% were having medium adoption, while 60.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Nutrition Management- 5 ton / hac organic fertilizer and N: P: K: S = 20: 60: 20: 20 kg / hac” the beneficiaries of NICRA project 68.00% were having high adoption, 16.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Weed Management - By recommended chemicals weedicide” the beneficiaries of NICRA project 56.00% were having high adoption, 36.00% were having medium adoption, while 08.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 40.00% were having medium adoption, while 48.00% were having low adoption.

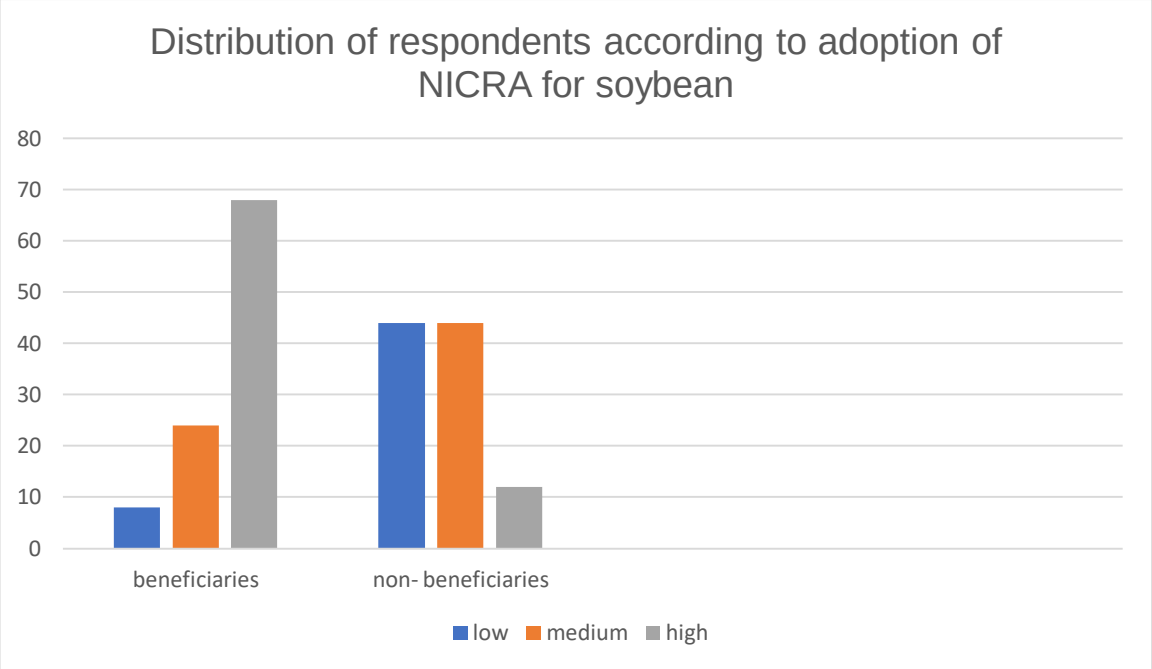
Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

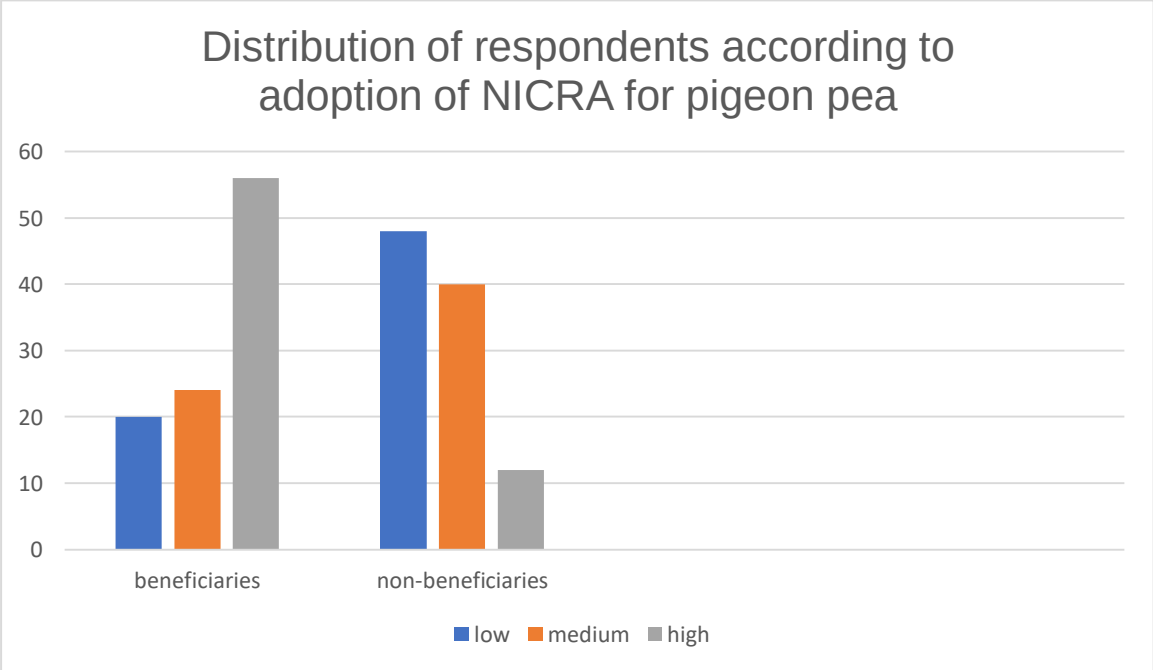
In “Disease Management - By recommended drugs and chemicals” the beneficiaries of NICRA project 64.00% were having high adoption, 24.00% were having medium adoption, while 12.00% were having low adoption. In case of non beneficiaries 08.00% were having high adoption, 40.00% were having medium adoption, while 52.00% were having low adoption.

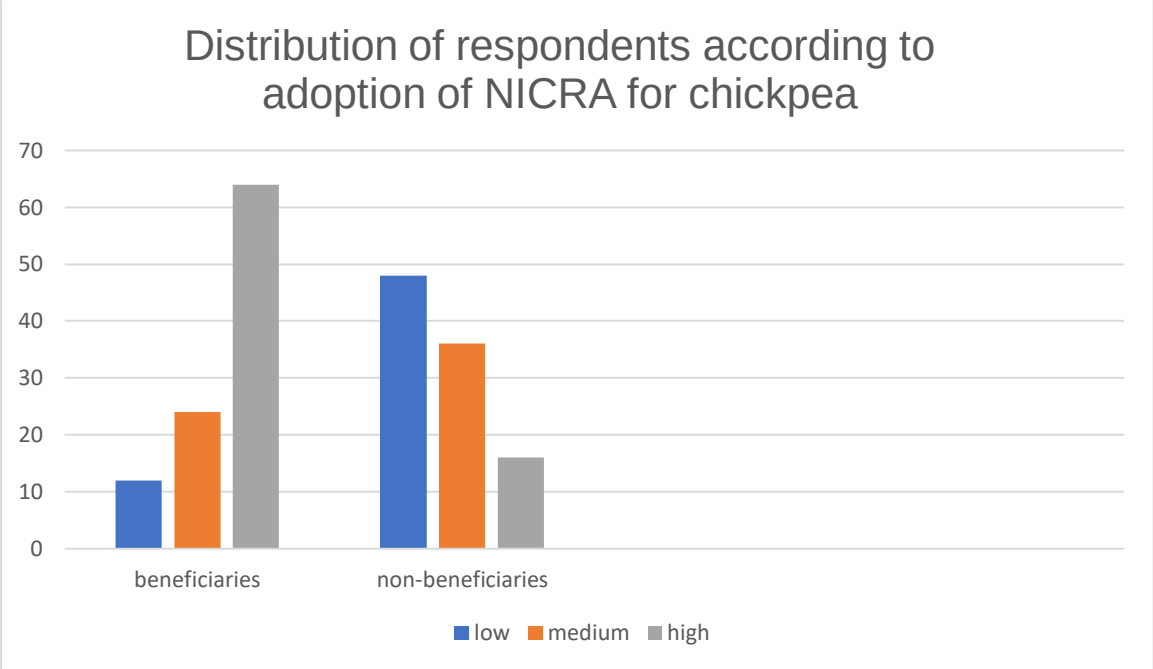
Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

In “Pest Management - By recommended pesticides and remedies.” the beneficiaries of NICRA project 64.00% were having high adoption, 20.00% were having medium adoption, while 16.00% were having low adoption. In case of non beneficiaries 12.00% were having high adoption, 44.00% were having medium adoption, while 44.00% were having low adoption.

Thus, it may be inferred majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.


Distribution of respondents according to adoption of NICRA for soybean
80
70
60
50
40
30
20
10
0
beneficiaries
non- beneficiaries
low
medium
high


Distribution of respondents according to adoption of NICRA for pigeon pea
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
low
medium
high


Distribution of respondents according to adoption of NICRA for chickpea
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60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
low
medium
high

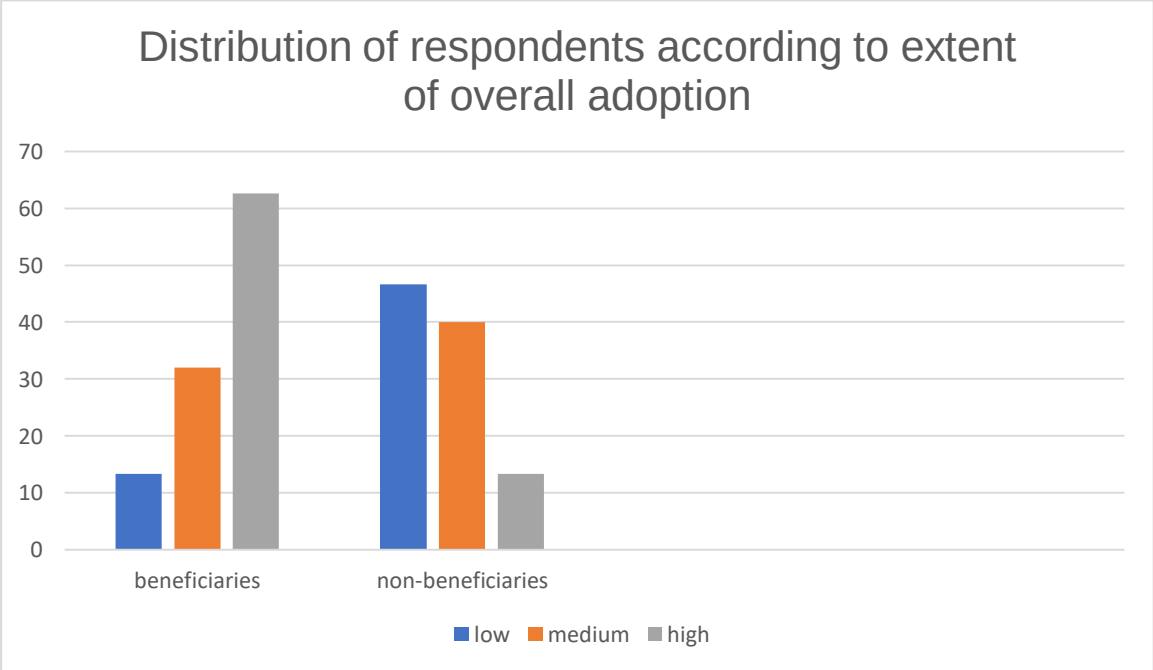
Distribution of respondents according to extent of overall adoption
70
60
50
40
30
20
10
0
beneficiaries
non-beneficiaries
low
medium
high

Table 4.22: Mean, S.D. and t-value for adoption between NICRA beneficiaries and non beneficiaries:

Respondents	Mean	S.D.	t value
Beneficiaries	19	20.54	1.20**
Non- beneficiaries	14	2.82	

**=significant at 0.01 probability level

The calculated t value for adoption in NICRA beneficiaries and non beneficiaries was 1.20 which was found to be significant at 0.01 probability level. Thus the earlier stated null hypothesis that there is low difference between the adoption of the NICRA beneficiaries and non beneficiaries is rejected. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

4.2.4 Overall extent of adoption

Table 4.23: Distribution of beneficiaries and non-beneficiaries of NICRA according to their overall extent of adoption:

Respondents	Beneficiaries						Non beneficiaries					
Crop	Low	%	medium	%	high	%	Low	%	Medium	%	High	%
Soybean	02	08	06	24	17	68	11	44	11	44	03	12
Pigeon pea	05	20	06	24	14	56	12	36	10	40	03	12
Chickpea	03	12	06	24	16	64	12	36	09	36	04	16
Total	10	13.33	18	32	47	62.66	35	46.66	30	40	10	13.33

According to overall extent of adoption Regarding the beneficiaries of NICRA project 13.33% were having low adoption, 22.66% were having medium adoption, while 64.00% were having high adoption. In case of non beneficiaries 52.00% were having low adoption, 46.66% were having medium adoption, while 12.00% were having high adoption.

Therefore majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

Table 4.24: Mean, S.D. and t-value for adoption between NICRA beneficiaries and non beneficiaries:

Respondents	Mean	S.D.	t value
Beneficiaries	62.33	69.35	2.514**
Non- beneficiaries	41.66	16.07	

**=significant at 0.01 probability level

The calculated t value for change in adoption of package of practices by NICRA beneficiaries and non beneficiaries was 2.514 which were found to be significant at 0.01 probability level. Thus the earlier stated null hypothesis that there is low difference between the adoption of NICRA beneficiaries and non beneficiaries is rejected. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

4.3: Relation between different variables and extent of adoption about recommended crop production technology.

Table 4.25: Correlation between Independent variables with extent of adoption of NICRA beneficiaries.

S. No.	Variables	Xs	Adoption Y1
1.	Age	X1	-0.31** NS
2.	Education	X2	0.38
3.	Farming experience	X3	0.46
4.	Family size	X4	0.25
5.	Land holding	X5	0.99
6.	Annual income	X6	0.14
7.	Material possession	X7	-0.14** NS
8.	Economic motivation	X8	0.79

significant at 0.01 probability level,

** NS = Non-significant.

The correlation coefficient ('r') between age (X1) and adoption (Y1) was obtained -0.31, which is non significant at 0.01 level of probability. Therefore, it can be concluded that age (X1) has low relation with adoption (Y1) of NICRA beneficiaries.

The correlation coefficient ('r') between education (X2) and adoption (Y1) was obtained 0.38, which is significant at 0.01 level of probability. Therefore, education (X2) has significant relation with adoption (Y1) of NICRA beneficiaries.

The correlation coefficient ('r') between farming experience (X3) and adoption (Y1) revealed the value 0.46, which is significant at 0.01 level of probability. Therefore, this variable has significant relation with adoption (Y1) of NICRA beneficiaries.

The correlation coefficient ('r') between family size (X4) and adoption (Y1) revealed the value 0.25, which is non significant at 0.01 level of probability. Therefore, it can be concluded that family size (X1) has low relation with adoption (Y1) of NICRA beneficiaries.

The correlation coefficient ('r') between size of land holding (X5) and adoption (Y1) revealed the value 0.99, which is significant at 0.01 level of probability. Therefore, this variable has positive and significant relation with adoption (Y1) of NICRA beneficiaries.

The correlation coefficient ('r') between annual income (X6) and adoption (Y1) revealed the value 0.14, which is significant at 0.01 level of probability. Therefore, this variable has positive and significant relation with adoption (Y1) of NICRA beneficiaries.

The correlation coefficient ('r') between material possession (X7) and adoption (Y1) revealed the value -0.141, which is non significant at 0.01 level of probability. Therefore, this variable has low relation with adoption (Y1) of NICRA beneficiaries.

The correlation coefficient ('r') between economic motivation (X8) and area increment (Y1) revealed the value 0.792, which is significant at 0.01 level of probability. Therefore, this variable has positive and significant relation with adoption (Y1) of NICRA beneficiaries.

4.4 Problems faced by the beneficiaries and to suggest ways and means for improvement.

4.5: Table 4.26: Problems faced by NICRA beneficiaries

S. No.	Problems	No. of respondents	Percentage	Rank
1.	NICRA farmers have lack of capital	126	84.00	I
2.	High infestation of insects	99	66.00	II
3.	Inputs are not available on time	45	30.00	IV
4.	Lack of power supply	54	36.00	III
5.	Lack of irrigation facilities	6	4.00	VI
6.	Lack of technical knowledge	42	28.00	V

Table 4.26 shows the problem faced by the beneficiaries in adoption of new technology. It is evident from the data that the major problems reported were lack of capital (84.00 %), high infestation of insects (66.00 %), lack of power supply

(36.00 %), non availability of inputs in time (30.00 %), lack of technical knowledge (28.00 %) and lack of irrigation facilities (4.00 %).

Table 4.27:Suggestions made by NICRA beneficiaries

S. No	Suggestions	No. of respondents	Percentage	Rank
1.	Loan facilities should be provided in time.	123	82.00	I
2.	Timely availability of plant protection chemicals.	93	62.00	III
3.	Seed, fertilizer and other inputs should be given in proper time.	105	70.00	II
4.	More electricity should be provided by the electricity department.	54	36.00	IV
5.	Irrigation facilities should be created.	6	4.00	VI
6.	Technical knowledge should be given more regularly by the NICRA project personnel.	45	30.00	V

Table shows the suggestions made by NICRA beneficiaries. The table clearly indicates that 82.00% of the beneficiaries suggested that loan facilities should be provided in time, followed by seed, fertilizers and other inputs should be given in proper time (70.00 %), timely availability of plant protection chemicals (62.00 %), more electricity should be provided by the electricity department (36.00 %), technical knowledge should be given more regularly by the extension personnel (30.00 %) and irrigation facilities should be created (4.00 %).

Chapter - V

Discussions

This chapter deals with the discussion of result in light of the objectives of study. The necessity for describing and prescribing the facts found in the chapter of result is to better understanding in the relationship of cause and effect of the facts. The discussion was presented as per the objectives of the study as follows:

A. socio personal, economic and psychological attributes of farmers:

Age:

The results of the present study showed that the higher percentage of beneficiaries farmers (46.66%) belonged to 26-55 years age group, while in case of non- beneficiaries majority of respondents (46.66%) belonged to 26-55 years aged group. Age found non-significant relationship, it shows increasing of beneficiaries farmers age is not affect their level of adoption. Means each and every farmer which has different age group is motivated to adopt new technology.

Education:

The results of the present study showed that the higher percentage of beneficiaries farmers (42.66%) belonged to middle and high education group, while in case of non- beneficiaries majority of respondents (64.00%) belonged to illiterate and primary education group.

Farming Experience:

The results of the present study showed that the higher percentage of beneficiaries farmers (40.00%) and non-beneficiaries farmers (37.33) belonged to moderate farming experience group.

Family size:

The results of the present study showed that the higher percentage of beneficiaries (53.33%) and non beneficiaries farmers (54.66%) possess large Family size.

Size of land holding:

The results of the present study showed that the higher percentage of beneficiaries farmers (60.00%) belonged to large size of land holding group, while in case of non- beneficiaries majority of respondents (37.33%) belonged to small size of land holding group.

Annual income:

The findings regarding Annual income, maximum beneficiaries farmer (64.00%) and non-beneficiaries farmers (56.00%) belonged to category of medium annual income group.

Material possession:

The findings regarding material possession, maximum (55.00%) of beneficiaries and (45%) of non beneficiaries farmers belonged to category of medium material possession group. Material possession found non-significant relationship with adoption level of beneficiaries farmers. The reason of that result is, material possession shows physical assets, it not comprises their mantel status. If they have many equipments but not necessary to operate or benefited with the equipments, where as adoption level is a skillful activity, so it is found significantly different.

Economic motivation:

The findings regarding economic motivation, maximum (40.00%) of beneficiaries farmers and non-beneficiaries farmers (46.66%) were of medium economic motivation group.

B. Knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea:

Knowledge of recommended production technology of soybean:

Study showed that According to knowledge of recommended production technology of soybean regarding the beneficiaries of NICRA project 12.00% were having low knowledge, 24.00% were having medium knowledge, while 64.00% were having high knowledge. In case of non-beneficiaries 52.00% were having low knowledge, 36.00% were having medium knowledge, while 12.00% were having high knowledge.

Therefore majority of NICRA beneficiaries had high knowledge, while majority of non-beneficiaries had low knowledge.

Knowledge of recommended production technology of Pigeon pea:

Study showed that According to knowledge of recommended production technology of Pigeon pea regarding the beneficiaries of NICRA project 16.00% were having low knowledge, 24.00% were having medium knowledge, while 60.00% were having high knowledge. In case of non-beneficiaries 56.00% were having low knowledge,

32.00% were having medium knowledge, while 12.00% were having high knowledge.

Therefore majority of NICRA beneficiaries had high knowledge, while majority of non-beneficiaries had low knowledge.

Knowledge of recommended production technology of chickpea:

Study showed that According to knowledge of recommended production technology of chickpea regarding the beneficiaries of NICRA project 12.00% were having low knowledge, 20.00% were having medium knowledge, while 68.00% were having high knowledge. In case of non-beneficiaries 48.00% were having low knowledge, 40.00% were having medium knowledge, while 12.00% were having high knowledge.

Therefore majority of NICRA beneficiaries had high knowledge, while majority of non-beneficiaries had low knowledge.

Overall extent of Knowledge of recommended production technology:

Study showed that According to overall extent of knowledge regarding the beneficiaries of NICRA project 13.33% were having knowledge, 22.66% were having medium knowledge, while 64.00% were having high knowledge. In case of non beneficiaries 52.00% were having low knowledge, 46.66% were having medium knowledge, while 12.00% were having high knowledge.

Therefore majority of NICRA beneficiaries had high knowledge as they get proper guidance and training from NICRA , while majority of non beneficiaries had low knowledge because of lake of guidance and training.

C. Adoption of recommended production technology of chickpea, soybean and pigeon pea:

Adoption of recommended production technology of soybean:

Study revealed that according to adoption of recommended production technology of soybean regarding the beneficiaries of NICRA project 08.00% were having low adoption, 24.00% were having medium adoption, while 68.00% were having high adoption. In case of non beneficiaries 44.00% were having low adoption, 44.00% were having medium adoption, while 12.00% were having high adoption. Therefore majority of NICRA beneficiaries had high adoption, while majority of non-beneficiaries had low adoption.

Adoption of recommended production technology of Pigeon pea:

Study revealed that according to adoption of recommended production technology of Pigeon pea regarding the beneficiaries of NICRA project 20.00% were having low adoption, 24.00% were having medium adoption, while 56.00% were having high adoption. In case of non-beneficiaries 48.00% were having low adoption, 40.00% were having medium adoption, while 12.00% were having high adoption. Therefore majority of NICRA beneficiaries had high adoption, while majority of non-beneficiaries had medium adoption.

Adoption of recommended production technology of Chickpea:

Study revealed that according to adoption of recommended production technology of Chickpea regarding the beneficiaries of NICRA project 12.00% were having low adoption, 24.00% were having medium adoption, while 64.00% were having high adoption. In case of non-beneficiaries 48.00% were having low adoption, 36.00% were having medium adoption, while 16.00% were having high adoption. Therefore majority of NICRA beneficiaries had high adoption, while majority of non-beneficiaries had low adoption.

Overall extent of adoption of recommended production technology:

Study revealed that according to overall extent of adoption regarding the beneficiaries of NICRA project 13.33% were having low adoption, 22.66% were having medium adoption, while 64.00% were having high adoption. In case of non-beneficiaries 52.00% were having low adoption, 46.66% were having medium adoption, while 12.00% were having high adoption. Therefore majority of NICRA beneficiaries had high adoption as they understand the pattern of climate because they are the NICRA beneficiaries, while majority of non-beneficiaries had low adoption because the farmers does not know the importance of climate in that particular area.

D. t-value for knowledge between NICRA beneficiaries and non beneficiaries:

Study showed that the calculated t value for knowledge ofrecommended production technology of soybean of NICRA beneficiaries and non beneficiaries was 1.93. Therefore it can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.

Study showed that the calculated t value for knowledge ofrecommended production technology of pigeon pea of NICRA beneficiaries and non beneficiaries

was 2.036. Therefore it can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.

Study showed that the calculated t value for knowledge ofrecommended production technology of chickpea of NICRA beneficiaries and non beneficiaries was 1.456. Therefore it can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.

Study showed that the calculated t value for knowledge ofrecommended production technology of soybean, pigeon pea and chickpea of NICRA beneficiaries and non beneficiaries was 3.306. Therefore it can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.

E. t-value for Adoption between NICRA beneficiaries and non beneficiaries:

Study reveals that the calculated t value for change in adoption of recommended production technology of soybean of NICRA beneficiaries and non beneficiaries was 1.74. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

Study reveals that the calculated t value for change in adoption of recommended production technology of pigeon pea of NICRA beneficiaries and non beneficiaries was 1.79. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

Study reveals that the calculated t value for change in adoption of recommended production technology of chickpea of NICRA beneficiaries and non beneficiaries was 1.20. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

Study reveals that the calculated t value for change in adoption of recommended production technology of soybean, pigeon pea and chickpea of NICRA beneficiaries and non beneficiaries was 2.514. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

F. Relation between different variables and extent of adoption about recommended crop production technology:

- it can be concluded that age (X1) has no relation with adoption (Y1) of NICRA beneficiaries.

- It can be concluded that education (X2) has significant relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that farming experience (X3) has significant relation with adoption (Y1) of NICRA beneficiaries.
- it can be concluded that family size (X4) has no relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that size of land holding (X5) has positive and significant relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that annual income(X6) has positive and significant relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that material possession (X7) has no relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that economic motivation (X8) has positive and significant relation with adoption (Y1) of NICRA beneficiaries.

G. Problems faced by NICRA beneficiaries:

It is evident from the data that the major problems reported were lack of capital (84.00 %), high infestation of insects (66.00 %), lack of power supply (36.00 %), non availability of inputs in time (30.00 %), lack of technical knowledge (28.00 %) and lack of irrigation facilities (4.00 %).

Chapter – VI

Summary, Conclusion & Suggestion

Summary:

National Innovations on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched in February, 2011. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. The research on adaptation and mitigation covers crops, livestock, fisheries and natural resource management. The project consists of four components viz. Strategic Research, Technology Demonstration, Capacity Building and Sponsored/Competitive Grants. Aim of NICRA is to make Indian agriculture resilient to climate change through development and application of adaptation and mitigation technologies.

Chickpea is commonly known as gram which is one of the important pulse crops of India. About 71% of global area with 71.95% of Global chickpea is contributed by India (Source-Annual Report of DPD 2016-17). It is important point to note that chickpea continues to be the largest consumed pulse in home as well as industrial purpose comprising of about 50% of total pulse production in India.

The wonder crop 'soybean' (*Glycine max* L. Merrill) is a leguminous crop and belongs to family *leguminoaceae* with sub family *papillionaceae.* It is also known as "Golden Bean" of the 20^{st} century because of its nutritive value and regarded a substitute or compliment of protein (Imliwati*et al*., 2016). In India it is cultivated in 10.16 Mha, producing 8.35 Mt with average productivity of 822 kg/ha. Madhya Pradesh is the leading state in India where soybean is grown on an area of 5.01 Mha and production of 5.40 Mt with productivity of 858 kg/ha (Anonymous, 2018). It plays an important role in solving problem of malnutrition as it contains about 20% oil and 40% high quality protein.

Pigeon pea (*Cajanus cajan*) is the second most important pulse crop in India after chickpea. It has multiple uses and occupies an important place in the prevailing farming systems in the country. It also plays an important role in sustainable agriculture by enhancing the soil through biological nitrogen fixation along with deep root system of this crop which makes it is more suitable for its cultivation under rain fed conditions.

The following specific objectives of study were under taken:-

Objectives:-

6. To study the socio personal, economic and psychological attributes of farmers.
7. To determine knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea.
8. To study the impact of knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea of beneficiaries and non-beneficiaries farmers.
9. To find out the relationship between different variables and extent of adoption about recommended crop production technology.
10. To determine the constraints and suggestions in relation to adoption of agricultural crop production technology.

The proposed study was confined to Indore district of Madhya Pradesh. From this district the Indore block was selected purposively for the present study because this block was taken by DARP, COA, Indore. From this block only 1 village i.e. Nignoti was selected since NICRA project was implemented only in 1 village during year 2017-18. All the 75 beneficiary farmers of NICRA Project were taken from DARP, for this study 75 non beneficiary farmers were taken from the nearby villages on random basis for comparison.

Variables and their Measurements:

The relevant independent and dependent variables were taken under the study:

S.NO.	**Independent Variables:**	**Measurement**
D)	**Socio personal variables**	
3.	Age	Structured schedule
4.	Education.	Structured schedule
3.	Farming Experience	Structured schedule
4.	Family size	Structured schedule
E)	**Economic variables**	
5.	Size of land holding	Structured schedule
6.	Annual income from different sources	Structured schedule
7.	Material possession	Structured Schedule
F)	**Psychological variables**	
8.	Economic motivation	Structured Schedule
Dependent Variable:		**Measurement**
Adoption of recommended production technology of Chickpea, Soybean and Pigeon pea		An Index on recommended production technology was developed according to recommendation of NICRA

Operationalization of Dependent Variable:

The major parameters to evaluate the impact of NICRA was taken in following crop as follows-

4. Yield /production
5. Knowledge
6. Adoption

Sum of Score = Obtainable Score ÷ Obtained Score × 100

Instrument of data collection:

The data was collected with the help of structured interview schedule, which was prepared as per the objectives of the study.

Statistical tools:

The data was transformed into table form and the results of study as per the objectives were presented in the form of table and charts. Keeping in view the objectives of the study and to draw logical conclusion, statistical test i.e. percentage, mean, t test, standard deviation and correlation coefficient were used for analyzing and interpreting the data.

Conclusions:

The analysis of the data led to the following conclusions:

1. **Socio- economic and psychological characteristics of farmers:**
   - Study showed that In case of beneficiaries of NICRA project, 26.66% belonged to up to 25 year age group, 46.66% belonged to 26-55 years age group and 26.66% belonged to above 55 years age group. Similarly, in case of non-beneficiaries of NICRA, 33.33% belonged to up to 25 year age group 46.66% belonged to 26-55 years age group and 20.00% belonged to above 55 years age group.
   - It can be concluded that In case of beneficiaries of NICRA project, 29.33% of the respondents had no education and up to primary school, 42.66% had education up to middle & high school passed, 28.00 percentage higher secondary school education and above graduation passed. Similarly, in case of non-beneficiaries of NICRA, 64.00% of the respondents had no education and up to primary school, 20.00% had education up to middle & high school passed, 16.00 percentage higher secondary school educations and above graduation passed. Majority of NICRA beneficiaries had education up to middle school, while in case of non beneficiaries, majority had education up to

primary school.

- Data showed that In case of beneficiaries of NICRA project 18.00% were having less farming experience, while 30.00% were having moderate and about 27.00% were high farming experience. Similarly, in case of non beneficiaries of NICRA project 36.00% were having less farming experience, while 37.33% were having moderate and about 26.66% were high farming experience. Thus in both beneficiaries and non beneficiaries of NICRA, majority had moderate farming experience.
- On the basis of data it can be say that In case of beneficiary farmers of NICRA project, 12.00% had small size of family, while 40.00% had medium and 36.00% had large size of family. Similarly, in case of non-beneficiaries, 5.33.00% had small size family, while 54.66% had medium and 40.54% had large size of family.
- Study depicted that In case of beneficiaries of NICRA project, 17.33% had small size of land holding, 22.66% had medium and 37.33% had large size of land holding. Similarly, in case of non-beneficiaries, 18.66% had small size of land holding, 37.33% had medium and 44.00% had large size of land holding.
- It was found that regarding beneficiaries of NICRA project, 16.00% had low annual income, 52.00% had medium annual income and, 32.00% had high annual income, Similarly, as regarding the non-beneficiaries of NICRA, 33.33% low annual income, 54.66% had medium annual income and, 12.00% had high annual income.
- Data depicted that In case of NICRA beneficiaries 13.33% were having low material possession, 64.00% were having medium material possession, while 22.66% have high material possession. Regarding non beneficiaries of NICRA program 24.00% were having low material possession, 56.00% were having medium material possession, while 20.00% have high material possession.
- The fact and finding of study showed that regarding the beneficiaries of NICRA project 13.33% were having low economic motivation, 40.00% were having medium economic motivation, while 46.66% were having high economic motivation. In case of non beneficiaries 33.33% were having low economic motivation, 46.66% were having medium economic motivation, while 26.66% were having high economic motivation.

A. Knowledge and adoption of recommended production technology of chickpea, soybean and pigeon pea:

Study showed that according to overall extent of knowledge regarding the beneficiaries of NICRA project 13.33% were having knowledge, 22.66% were having medium knowledge, while 64.00% were having high knowledge. In case of non beneficiaries 52.00% were having low knowledge, 46.66% were having medium knowledge, while 12.00% were having high knowledge.

Therefore majority of NICRA beneficiaries had high knowledge, while majority of non beneficiaries had low knowledge.

B. t-value for knowledge between NICRA beneficiaries and non beneficiaries:

Study showed that the calculated t value for knowledge in NICRA beneficiaries and non beneficiaries was 3.306. Therefore it can be concluded that there is significant difference between knowledge of beneficiaries and non-beneficiaries of NICRA.

C. Adoption of recommended production technology of chickpea, soybean and pigeon pea:

Study revealed that according to overall extent of adoption regarding the beneficiaries of NICRA project 13.33% were having adoption, 22.66% were having medium adoption, while 64.00% were having high adoption. In case of non beneficiaries 52.00% were having low adoption, 46.66% were having medium adoption, while 12.00% were having high adoption. Therefore majority of NICRA beneficiaries had high adoption, while majority of non beneficiaries had low adoption.

D. t-value for Adoption between NICRA beneficiaries and non beneficiaries:

Study reveals that the calculated t value for change in adoption of package NICRA beneficiaries and non beneficiaries was 2.514. Hence it can be concluded that there is significant difference between adoption of beneficiaries and non-beneficiaries of NICRA.

E. Relation between different variables and extent of adoption about recommended crop production technology:

- it can be concluded that age (X1) has no relation with adoption (Y1) of NICRA beneficiaries.

- It can be concluded that education (X2) has significant relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that farming experience (X3) has significant relation with adoption (Y1) of NICRA beneficiaries.
- it can be concluded that family size (X4) has no relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that size of land holding (X5) has positive and significant relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that annual income(X6) has positive and significant relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that material possession (X7) has no relation with adoption (Y1) of NICRA beneficiaries.
- It can be concluded that economic motivation (X8) has positive and significant relation with adoption (Y1) of NICRA beneficiaries.

Problems faced by NICRA beneficiaries:

It is evident from the data that the major problems reported were lack of capital (84.00 %), high infestation of insects (66.00 %), lack of power supply (36.00 %), non availability of inputs in time (30.00 %), lack of technical knowledge (28.00 %) and lack of irrigation facilities (4.00 %).

Suggestions:

The study clearly indicates that 82.00% of the beneficiaries suggested that loan facilities should be provided in time, followed by seed, fertilizers and other inputs should be given in proper time (70.00 %), timely availability of plant protection chemicals (62.00 %), more electricity should be provided by the electricity department (36.00 %), technical knowledge should be given more regularly by the extension personnel (30.00 %) and irrigation facilities should be created (4.00 %).

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राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय ग्वालियर (म.प्र.)
कृषि विस्तार शिक्षा एवं संचार विभाग, कृषि महाविद्यालय
इंदौर (म.प्र.)

साक्षात्कार अनुसूची

शोध मार्गदर्शक :-
डॉ. संध्या चौधरी
कृषि विस्तार शिक्षा एवं
संचार विभाग

शोधकर्ता
अनिल सिंह
एम.एस.सी. (कृषि)
कृषि विस्तार शिक्षा
एवं संचार विभाग

शोधवधि – 2020-21

शोध का विषय

"A study on impact of NICRA (National Innovation of Climate Resilient Agriculture) project on adoption of recommended production technology of Soybean, Chickpea and Pigeon pea in Indore block of Indore District."

सामान्य जानकारी

1) हितग्राही का नाम - .....
ग्राम, तहसील - .....
मो. नं. - .....
उम्र - .....

2) शैक्षणिक स्तर
- i. अशिक्षित/शिक्षित
- ii. प्राथमिक या माध्यमिक
- iii. उच्चतर माध्यमिक
- iv. स्नातक या अधिक

3) खेती का अनुभव ..... वर्ष

4) परिवार का आकार -
- i. पुरुष सदस्य -
- ii. महिला सदस्य -
- iii. बच्चे (18 वर्ष से कम) -
  - महिला -
  - पुरुष -
- iv. कुल सदस्य -

5) कुल कृषि योग्य भूमि का क्षेत्रफल –

6) वार्षिक आय –

स्त्रोत	आय (रु. में)
1. फसल उत्पादन	

2. सब्जी उत्पादन 3. डेयरी उत्पादन 4. मुर्गी पालन 5. मज़दूरी 6. व्यवसाय 7. नौकरी 8. अन्य स्त्रोत	
कुल आय	

8) आप सोयाबीन / चना / अरहर की खेती कितने क्षेत्रफल पर करते हो –

i. सोयाबीन - ..... hac
ii. चना - ..... hac
iii. अरहर - ..... hac

9) कृषि यंत्र व घरेलु यंत्र –

i. कृषि यंत्र –
   - देशी हल
   - मिट्टी पलटने वाला हल
   - बक्खर
   - ट्रेक्टर
   - कल्टीवेटर
   - सिडड्रिल
   - विद्युत् पम्प / डीजल पम्प
   - स्प्रिंकलर
   - निंदाई यंत्र
   - स्प्रेयर व डस्टर
   - रिपर
   - थ्रेसर

ii. घरेलु यंत्र –
   - सोफा
   - बिस्तर / पलंग
   - डायनिंग टेबल
   - गैस स्टोव
   - वाशिंग मशीन
   - टेलीफोन
   - स्कूटर

- कार
- साईकल
- फ्रिज
- टेलीविज़न
- अन्य

10) वार्षिक आय (फसलोत्पादन से) –

i) सोयाबीन - ..... रु.
ii) चना - ..... रु.
iii) अरहर - ..... रु.

II) आर्थिक अभिप्रेरणा –

वाक्य	पूर्णतः सहमत	सहमत	अंशतः सहमत
(1) आपको अधिक लाभ व आर्थिक सम्पन्नता के लिए काम करना चाहिए। (2)प्रशासनिक स्तर पर ग्रामीणों के आर्थिक विकास के लिए आयोजित आयोजित कार्यक्रम में आप सक्रिय रूप से भाग लेते हैं। (3) सफल किसान वाही है जो अधिक लाभ कमाने के लिए अन्य आर्थिक योजनाएँ बनाता है। (4) अधिक लाभ कमाने के लिए किसान को खाद्य फसलों के साथ नकदी फसलें लेनी चाहिए। (5) आर्थिक स्थिति में सुधार हेतु आप पूरे परिवार का मार्गदर्शन करते हैं।			

खण्ड (ब)

सोयाबीन, चना, अरहर फसलों की संस्तुत कृषि कार्यमाला के ज्ञान का मापन

सोयाबीन

वाक्य	पूर्ण ज्ञान	सामान्य ज्ञान	निम्न ज्ञान
(1) बुआई से पूर्व कल्टिवेटर या बक्खर से जुताई की जानी चाहिए।			
(2) पाटा चलाकर खेत को तैयार करना अच्छी फसल के लिए आवश्यक है।			
(3) तीन वर्ष में एक बार गहरी जुताई से खेत की उपजाऊ क्षमता बढती है।			
(4) कुढ़ मेढ़ बुआई पद्धति द्वारा बुआई फसल वृद्धि के लिए लाभदायक है।			
(5) बुआई का समय जून के तीसरे सप्ताह से जुलाई के प्रथम सप्ताह सम्पूर्ण फसल चक्र के लिए लाभदायक है।			
(6) सही पौध संख्या व अंकुरण के लिए बीजदर 70-100kg होनी चाहिए।			
(7) बीजोपचार रोगों से बचाव व पोषण प्रदान करने के लिए आवश्यक है।			
(8) संस्तुत उन्नत किस्में अधिक उत्पादन प्रदान करती हैं।			
(9) अरहर के साथ अन्तर्वर्ती फसल कम लागत पर अधिक उत्पादन हेतु अच्छी पद्धति है।			
(10) N:P:K:S अनुपात 20:60:20:20 फसल वृद्धि के लिए लाभदायक है।			

(11) उचित फसल वृद्धि हेतु खरपतवार प्रबंधन आवश्यक है। (12) पीले मोजेक रोग प्रबंधन हेतु रोगवाहक कीटो का नियंत्रण इथोफेन प्रोक्स 10EC 1 lit/hac छिडकाव तथा रोगरोधी किस्में PK-416, PSP-84 लगाना प्रभावी उपाय है. (13) चक्रभृंग (गर्डल बीटल) कीट नियंत्रण हेतु कड़ी फसल में क्विनालफ़ॉस 25EC 1.5lit का छिडकाव करना चाहिए			

अरहर

वाक्य	पूर्ण ज्ञान	सामान्य ज्ञान	निम्न ज्ञान
(1) मिट्टी पलटने वाला हल व बक्खर से जुताई उचित बीज अंकुरण के लिए आवश्यक है। (2) जून के अंतिम सप्ताह से जुलाई के प्रथम सप्ताह में बुआई फसलचक्र हेतु आवश्यक है। (3) उचित अंकुरण व फसल वृद्धि हेतु 15 kg/hac बीजदर उचित है। (4) अरहर में पोषण प्रबंधन हेतु 5 gm राइजोबियम + 5 gm पी.एस.बी. कल्चर द्वारा बीजोपचार करना चाहिए। (5) अरहर में उकटा रोग प्रबंधन हेतु 2gm थायरम +1gm कार्बंडाजिम द्वारा बीजोपचार करना चाहिए। (6) अरहर में फल मक्खी नियंत्रण हेतु क्विनालफ़ॉस 25 ई.सी. (1.5 lit) + प्रोपेनोफ़ॉस 50 EC (1 lit) का प्रयोग 15-15 दिन के अंतराल से प्रयोग करना चाहिए।			

चना

वाक्य	पूर्ण ज्ञान	सामान्य ज्ञान	निम्न ज्ञान
1. बक्खर व पाटा द्वारा खेत की तैयारी मृदा वातन व बीजन्कुरण हेतु लाभदायक है। 2. चना में उत्तम उपज हेतु 70-100 kg बीज दर उचित है। 3. चना में पोषण प्रबंधन हेतु उर्वरक अनुपात N:P:K:S - 15-20:40-50:20:60 अपनाना चाहिए। 4. 15 अक्टूबर से 15 नवम्बर के मध्य बुआई उचित फसल चक्र हेतु आवश्यक है। 5. असिंचित खेती के लिए इमं उपाय है – I. पाटा चलाकर नमी संरक्षण II. बीजों को भिगोकर बुआई III. फूल अवस्था व 10 दिन बाद 2% यूरिया घोल का छिडकाव IV. वर्षा के बाद हेण्ड-हो चलाना 6. पेंडिमिथालिन (1 lit / hac) खरपतवार नियंत्रण हेतु उचित है। 7. चने की इल्ली के नियंत्रण हेतु इन्डोसल्फान 35EC (1 lit) का प्रयोग करना चाहिए।			

सोयाबीन, अरहर, चना फसलों की संस्तुत कृषि कार्यमाला के अगीकरण का मापन

सोयाबीन

वाक्य	पूर्णतः सहमत	सहमत	अंशतः सहमत
(1) बुआई के पूर्व कल्टीवेटर या बक्खर से जुताई की। (2) पाटा चलाकर खेत तैयार किया। (3) तीन वर्ष में से एक बार गहरी जुताई की। (4) मृदा परिक्षण करवाया। (5) बुआई जून के तीसरे सप्ताह से जुलाई के प्रथम सप्ताह में की। (6) कुढ़ मेढ़ विधि द्वारा 30-45 cm की दूरी पर कतारों में बुआई की पद्धति को अपनाया। (7) बीजदर – 70-100 kg को अपनाया। (8) बीजोपचार – (प्रति kg बीज) 2 gm थायरम + 1 gm कार्बंडाजिम 5 gm राइजोबीयम + 5 gm PSB कल्चर (9) संस्तुत उन्नत किस्मों को अपनाया (10) अरहर व सोयाबीन की अन्तर्वर्ती फसल की संस्तुति को अपनाया। (11) पोषण प्रबंधन – 5 टन / hac कार्बनिक खाद N:P:K:S =20:60:20:20 kg/hac (12) खरपतवार प्रबंधन – 15-20 दिन व 30-40 दिन पर दो निंदाई II. संस्तुत नींदानाशक रसायनों द्वारा खरपतवार प्रबंधन किया। (13) रोग प्रबंधन – संस्तुत दवाओं व रसायनों द्वारा रोगों का प्रबंधन किया। (14) कीट प्रबंधन – संस्तुत कीटनाशकों व उपायों द्वारा कीट प्रबंधन किया। (15) 10% फलियाँ भूरी पड़ जाने पर कटाई की।			

अरहर

वाक्य	पूर्णतः सहमत	सहमत	अंशतः सहमत
(1) एक बार मिट्टी पलटने वाला हल से तथा बक्खर या देशी हल से 2-3 जुताई की l (2) सिंचाई नालियाँ बनाई l (3) बुआई जून के अंतिम सप्ताह से जुलाई के प्रथम सप्ताह में की l (4) बीजदर 15 kg / hac अपनाई l (5) बीजोपचार - (प्रति kg बीज) I. 2gm थायरम + 1gm कार्बंडाजिम II. 5gm राइजोबियम + 5gm पी.एस.बी.कल्चर (6) N:P:K:S अनुपात 20:50:20:20 kg प्रति hac अपनाया l (7) खरपतवार प्रबंधन – संकरी प्रति के खरपतवार के लिए पेंडिमिथलीन 1 kg / hac का उपयोग l (8) कीट नियंत्रण – (i) क्विनालफ़ॉस 25EC का 2ml / lit जल (ii) प्रोपेनोफ़ॉस 50EC का 2ml / lit जल (9) रोग नियंत्रण संस्तुत उपायों व दवाओं के प्रयोग द्वारा किया l (10) कटाई उचित आद्रता पर की गई l (11) भण्डारण = 10% नमी तकसुखाकर भण्डारण किया l			

चना

वाक्य	पूर्णतः सहमत	सहमत	अंशतः सहमत
(1) बक्खर के बाद पाटा चलाकर खेत की तैयारी की l (2) बीजदर 70-100kg/hac को अपनायाl (3) फसल दूरी – 30x10cm को अपनाया (4) बीजोपचार – (i) 2gm थायरम +1gm कार्बंडाजिम (ii) 5gm राइजोबियम + 5gm पी.एस.बी.कल्चर + 1 gm अमोनियम मोलिन्डेड (5) बुआई 15 oct से 15 nov. के मध्य की l (6) उर्वरक अनुपात N:P:K:S – 15-20:40-50:20:60 को अपनाया l (7) असिंचित खेती के लिए संस्तुत लाभदायक उपायों को अपनाया l (8) जल संरक्षण एवं जल संवर्धन –			

(i) गहरी जुताई द्वारा मृदा जल संरक्षण किया। (ii) सब-स्वाईलर के प्रयोग द्वारा। (iii) वर्षा जल एकत्रण किया। (iv) पलवार का प्रयोग किया। (9) फूल आने के पूर्व व दाना भरने की अवस्था पर सिचाई की। (10) खरपतवार नियंत्रण पेंडिमिथलीन 1lit / hac के प्रयोग द्वारा किया। (11) रोग प्रबंधन संस्तुत उपायों व दवाओं के प्रयोग द्वारा किया। (12) कीट प्रबंधन संस्तुत कीटनाशकों व उपायों के प्रयोग द्वारा किया।			

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College of Agriculture, Indore (M.P.)
(INTERVIEW SCHEDULE)

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Anil Singh
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Name of Supervisor
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Dept. Agri. Extension and communication

Period of study
2020-21

Topic: "A study on impact of NICRA (National Innovation of Climate Resilient Agriculture) project on adoption of recommended production technology of Soybean, Chickpea and Pigeon pea in Indore block of Indore District."

(General information)

1.) Name of the beneficiary - …….
Village, Tehsil - …….
Mo. No. - ……..
2) Age - ……..
3) Academic level
i. Uneducated
ii. Primary or secondary
iii. Higher Secondary
iv. Graduate or more
4) Farming experience …… year
5) Family Size -
i. Male Member -
ii. Female Members -
iii. Children (under 18 years) -
Female -
Male -
iv. Total members
6) Area of total arable land -
7) Annual Income -

Source Income (in Rs.)
1. Crop Production
2. Vegetable Production
3. Dairy Production
4. Poultry
5. wages
6. Business
7. Job
8. Other sources
Total income

8) On what area do you cultivate soybean / gram / pigeonpea-
i. Soybeans - …… hac
ii. Gram - .....hac
iii. Arhar - …… hac

9) Agricultural machinery and domestic equipment -
i. Agricultural Equipment -
• native solution
• Soil Turning Solution
• Bakkar
• tractor
• Cultivator
• sidewheel
• electric pump / diesel pump
• sprinkler
• sleeping equipment
• Sprayer and Duster
• Ripper
• Thresher
ii. Home appliances
•Sofa
• Bed / Bed
• dining table
• gas stove
• washing machine
•Phone
•Scooter
•car
• cycle
• fridge
• television
•other
10) Annual Income (from crop production) -
i) Soyabean - …… Rs.
ii) Gram - …… Rs.
iii) Arhar - …… Rs.

S. No.	Practices	Strongly Agree	Agree	Partially Agree
1.	You get more profit and financial Should work for prosperity.			
2.	of the villagers at the administrative level Organized for economic development In the event you are active Participate as.			
3.	The successful farmer is the one who is more Other financial to make profit Makes plans			
4.	Farmers to earn more profit cash with food crop Crops should be taken.			
5.	To improve the financial situation, Guide the whole family.			

Section (B)

Measurement of knowledge of recommended agricultural package of practice of soybean, pigeon pea and Chickpea crops

Soybean

S. No.	Practices	Complete	Sufficient	Partial
1.	Plowing of cultivators or bukhars before sowing.			
2.	Prepared the field by running Pata.			
3.	Deep plowing once out of three years			
4.	Undergone soil testing			
5.	Sowing from third week of June to first week of July.			
6.	The method of sowing in queues at a distance of 30-45 cm by the ridge and furrow method.			
7.	Seed rate - 70-100 kg			
8.	Seed treatment - (Seeds per kg) 1. 2 gm Thiram+ 1gm Carbendazim and 5gm Rhizobium + 5gm PSB Culture.			
9.	Adopted the recommended improved varieties			
10.	Adopted the recommended intercropping of pigeon pea and soybean.			
11.	Nutrition management - 5 ton / hac organic manure N: P: K: S = 20: 60: 20: 20 kg / hac			
12.	Weed management - Weeding on 15-20 days and 30-40 days and Weed management by recommended weedicides			
13.	Disease management: Management of diseases by recommended fungicides.			
14.	Pest Management Pest management done through recommended pesticides and remedies.			
15.	10% legumes harvested when they turn brown.			

Pigeon pea

S. No.	Practices	Level of adoption		
		Complete	Sufficient	Partial
1.	Once plowed with soil turning plow and 2-3 plowing from Bakkhar or native plow.			
2.	Made irrigation drains.			
3.	Sowing from last week of June to first week of July.			
4.	Seed 15 kg / hac adopted.			
5.	Seed treatment - (seeds per kg) 2gm Thiram + 1gm Carbendazim and 5gm Rhizobium + 5gm P.S.B. Culture			
6.	Adopted NPK.S ratio 20: 50: 20: 20 kg per hac.			
7.	Weed Management - Use of Dimethylene 1kg / ha for weeding of narrow copy.			
8.	Pest Control - 2ml / lit of Quinalphos 25EC (ii) 2ml / lit of Propenophos 50EC			
9.	Disease control by recommended measures.			
10.	Harvesting was done at proper humidity.			
11.	Storage = Drying up to 10% moisture.			

Chickpea

S. No.	Practices	Complete	Sufficient	Partial
1.	After Bakkhar, prepare the field by running the Pata.			
2.	Seed 70-100kg / hac adopted.			
3.	Spacing- 30x10crn adopted			
4.	Seed treatment. (i) 2gm Thiram + 1gm Carbendazim (ii) 5gm Rhizobium + 5gm PSB Cultures + 1gm ammonium molind			
5.	Sowing between 15 oct to 15 nov			
6.	Fertilizer ratio N: P: K: S - 15-20: 40-50: 20: 60 adopted.			
7.	Adopted recommended measures for non-irrigated farming.			
8.	Water conservation and water promotion - (i) Soil water conservation through deep plowing. (ii) By use of sub-soiler. (iii) collected rainwater. (iv) Used mulch.			
9.	Irrigated before flowering and filling stage.			
10.	Weed control by using pandimethylene 1lit / hac.			
11.	Disease management by recommended measures and use of medicines.			
12.	Pest management by use of recommended pesticides and remedies.			

Recommended agricultural package of practice for Soybean, Pigeon pea, Chickpea crop Measurement of adoption -

Soybean

Srno.	Practices	Complete	Sufficient	Partial
1.	Plowing of cultivators or bukhars before sowing.			
2.	Prepared the field by running Pata.			
3.	Deep plowing once out of three years.			
4.	Soil testing done.			
5.	Sowing from third week of June to first week of July.			
6.	The method of sowing in queues at a distance of 30-45 cm by the Kudh Medh method.			
7.	adopted seed-70-100kg.			
8.	Seed treatment - (per kg seed) 1. 2gm Thiram + 1 gmCarbendazim and 5 gm Rhizobium + 5 gm PSB Culture			
9.	Adopted recommended improved varieties			
10.	Adopted intercrop of pigeon pea and soybean.			
11.	Nutrition Management :- 5 ton / hac organic fertilizer and N: P: K: S = 20: 60: 20: 20 kg / hac			
12.	Weed Management - 15-20 days and 30-40 days after sowing and Recommended weedicide.			
13.	Disease Management - Management of diseases by recommended fungicides.			
14.	Pest Management - Pest management done by recommended pesticides and remedies.			
15.	Harvested when 10% beans are turned brown.			

Pigeon-pea

S. No.	Practices	Level of adoption		
		Complete	Sufficient	Partial
1.	Once plowed with soil turning plow and 2-3 plowing from Bakkhar or native plow.			
2.	Made irrigation drains.			
3.	Sowing from last week of June to first week of July.			
4.	Seed 15 kg / hac adopted.			
5.	Seed treatment - (seeds per kg) 2gm Thiram + 1gm Carbendazim and 5gm Rhizobium + 5gm P.S.B. Culture			
6.	Adopted NPK.S ratio 20: 50: 20: 20 kg per hac.			
7.	Weed Management - Use of Dimethylene 1kg / ha for weeding of narrow copy.			
8.	Pest Control - 2ml / lit of Quinalphos 25EC (ii) 2ml / lit of Propenophos 50EC			
9.	Disease control by recommended measures.			
10.	Harvesting was done at proper humidity.			
11.	Storage = Drying up to 10% moisture.			

Chickpea

S. No.	Practices	Complete	Sufficient	Partial
1.	Plowing of cultivators or bukhars before sowing.			
2.	Prepared the field by Pata.			
3.	Deep plowing once out of three years.			
4.	Soil testing done.			
5.	Sowing from third week of June to first week of July.			
6.	The method of sowing in queues at a distance of 30-45 cm by the ridge and furrow method.			
7.	Adopted seed-70-100kg.			
8.	Seed treatment - (husband kg seed) 1. 2gm Thiram + 1 gmCarbendazim and 5 gm Rhizobium + 5 gm PSB Culture			
9.	Adopted recommended improved varieties			
10.	Adopted intercrop of pigeon pea and soybean.			
11.	Nutrition Management 1. 5 ton / hac organic fertilizer II. N: P: K: S = 20: 60: 20: 20 kg / hac			
12.	Weed Management - 15-20 days and 30-40 days two sowing. II. Recommended weed management chemicals weed.			
13.	Disease Management - Management of diseases by recommended drugs and chemicals.			
14.	Pest Management - Pest management done by recommended pesticides and remedies.			

Constraints:

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Suggestions:

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Vita

The author of this thesis Anil Singh S/o Shankar Singh was born on 4th May 1997 in Jodhpur district of Rajasthan. He completed his High School from Govt. Secondary School, Bawarli Jodhpur in the year of 2011 with 69.83percent and Higher Secondary School Examination from Swami Pritam Das Gobindram Academy, in the year 2013 with 74.80 percent.

He was selected through entrance examination (P.A.T.) and joined the College of Agriculture, Indore (M.P.) and obtained B.Sc. (Ag.) degree in 2018 with 7.46 OGPA out of 10.00 point scale.

The author continued his post graduation from **College of Agriculture, Indore** (M.P.) to specialize in **Department of Agricultural Extension and Communication** and for partial fulfillment of the requirements for the award of the same. He was allotted with interesting problem as **"A Study on Impact of NICRA (National Innovation of Climate Resilient Agriculture) Project on Adoption of Recommended Production Technology of chickpea, soybean and pigeon pea in Indore block, Indore district"** for thesis work which has been duly completed by him and presented in this thesis.

He actively participated in all the cultural activities of the college. Now, he is submitting the thesis after completing the course with 7.54 SGPA out of 10.00 scale.