

### जलवायु समुत्थानशील कृषि में राष्ट्रीय नवाचार

### National Innovations in Climate Resilient Agriculture



**ICAR-Agricultural Technology Application Research Institute, Zone-II**

**भाकृअनुप-कृषि प्रौद्योगिकी अनुप्रयोगअनुसंधान संस्थान, क्षेत्र-II**

CAZRI Campus, Jodhpur -342 005. Rajasthan

काजरी परिसर, जोधपुर - 342 005. राजस्थान





**निकरा वार्षिक प्रतिवेदन: 2023**

**NICRA ANNUAL REPORT: 2023**

**जलवायु समुत्थानशील कृषि में राष्ट्रीय नवाचार**

**National Innovations in Climate Resilient Agriculture**



**ICAR-Agricultural Technology Application Research Institute, Zone-II**

**भाकृअनुप-कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, क्षेत्र-II**

CAZRI Campus, Jodhpur -342 005, Rajasthan

काजरी, जोधपुर - 342 005, राजस्थान



**NICRA**  
National Initiative on Climate Resilient Agriculture



NICRA- Annual Report: 2023

**ICAR-Agricultural Technology Application Research Institute, Zone-II**

CAZRI Campus, Jodhpur- 342005, Rajasthan, INDIA.

Tel: +91-291-2740516, Fax: 0291-2744367

Email: atarijodhpur@gmail.com, zpd6jodhpur@gmail.com, nicraatarijodhpur@gmail.com

Website: www.atarijodhpur.res.in

***Published by***

**Dr. J.P. Mishra**

Director

ICAR-Agricultural Technology Application Research Institute, Zone-II

CAZRI Campus, Jodhpur- 342005.Rajasthan.INDIA.

***Compiled & Edited by***

**Dr. P.P. Rohilla**, Principal Scientist (LPM) and Nodal Officer

**Dr. B.L. Jangid**, Principal Scientist (Agricultural Extension)

**Sh. Dilip Matwa**, Senior Research Fellow, NICRA Project

***Citation***

NICRA- Annual Report: 2023.

ICAR-Agricultural Technology Application Research Institute,

CAZRI Campus, Jodhpur- 342005. Rajasthan. INDIA.

December, 2024

***Printed at***

Evergreen Printers, 14-C, H.I.A., Jodhpur-342003. Mob. 94141 28647

## PREFACE

Climate change is becoming apparent and felt by all sections and sectors of society and economy. Climate change and variability are impacting the productivity of agricultural communities and thereby which are effecting food security and livelihood. “National Innovations in climate Resilient Agriculture” (NICRA) is a network project of Indian Council of Agricultural Research, New Delhi launched for identifying climate resilient practices in partnership with farming community to cope up with the climate variability and increase their adaptive capacity. This is the unique project which brings all sectors of agriculture viz., NRM, crops, horticulture, livestock, fisheries and extension scientists on one platform. The scheme involved four major components, viz., Strategic Research, through network as well as Sponsored and Competitive Grants components mode, Technology Demonstration and capacity building. During the first phase of NICRA, best infrastructure was established across the country at different institutes to facilitate the climate change research. Further, there is a need to apply modern science combined with indigenous technical knowledge of farmers to enhance the resilience of Indian agriculture to climate change.

The Technology Demonstration Component (TDC) of NICRA as on-farm participatory demonstration of available technologies is being implemented in 151 most vulnerable districts of the country. Climate vulnerabilities such as drought, cold wave, heat wave, hailstorm, flood, cyclone etc are being addressed. Demonstration of appropriate practices and technologies with a climate focus evolved by the NARS is taken up in farmer participatory mode in NCIRA villages. These villages have become centres of learning on climate resilient agriculture.

During 3<sup>rd</sup> Phase of NICRA 18 KVKs including 13 in Rajasthan and 5 in Haryana have implemented Technology Demonstration Components. During 2021 in the selected NICRA villages the technological interventions have been found feasible for the particular situations and majority of the farmers have accepted and adopted under NICRA and adjoining villages of the selected districts. Custom hiring centres have proved as a model for easy availability of different implements as well as timely completion of different operations during the crop periods.

I sincerely acknowledge the guidance and support received from Dr. Himanshu Pathak, Secretary (DARE) & Hon'ble Director General of ICAR, Dr U.S. Gautam, Deputy Director General (Agril. Extn.), ICAR, New Delhi for successful implementation of NICRA project. Thanks are also due to coordination and support received from Dr. VK Singh, Director, ICAR-CRIDA and Dr. JVNS Prasad, Coordinator (Technology Demonstration Component), ICAR-CRIDA, Hyderabad. The Co-PIs at ICAR-ATARI Jodhpur and Sr. Scientists & Heads of participating KVKs deserve special thanks for their painstaking efforts in implementing the programme and preparation of the annual report 2023.

Date : 10.12.2024  
Jodhpur

  
**(J.P. Mishra)**  
Director





# CONTENTS

| S.No.  | Particulars                         | Pages     |
|--------|-------------------------------------|-----------|
|        | Executive Summary (Hindi & English) | 1 - 6     |
|        | Introduction                        | 7 - 10    |
|        | KVK-wise Achievements 2023          | 11 - 121  |
| 2.1    | Rajasthan (13)                      | 11 - 87   |
| 2.1.1  | Alwar-I                             | 11 - 17   |
| 2.1.2  | Barmer-I                            | 17 - 24   |
| 2.1.3  | Bharatpur                           | 24 - 32   |
| 2.1.4  | Bhilwara-I                          | 32 - 37   |
| 2.1.5  | Bikaner-I                           | 37 - 43   |
| 2.1.6  | Churu-I                             | 43 - 50   |
| 2.1.7  | Hanumangarh-I                       | 50 - 55   |
| 2.1.8  | Jaisalmer-I                         | 55 - 60   |
| 2.1.9  | Jhunjhunu                           | 60 - 67   |
| 2.1.10 | Jodhpur-I                           | 67 - 74   |
| 2.1.11 | Nagaur-I                            | 74 - 80   |
| 2.1.12 | Pali-I                              | 80 - 83   |
| 2.1.13 | Sirohi                              | 83 - 87   |
| 2.2    | Haryana (5)                         | 88 - 121  |
| 2.2.1  | Bhiwani                             | 88 - 92   |
| 2.2.2  | Fatehabad                           | 92 - 98   |
| 2.2.3  | Hisar                               | 98 - 104  |
| 2.2.4  | Mahendergarh                        | 104 - 111 |
| 2.2.5  | Sirsa                               | 111 - 121 |
| 3.     | Publications/Awards                 | 122 - 122 |
| 4.     | Success Stories                     | 123 - 140 |
| 5.     | NICRA Annual-Review Meeting         | 141 - 144 |
| 6.     | Budget allotted in 2023-24          | 145 - 145 |
| 7.     | Annexure-I (Summary Tables-1 to 7)  | 146 - 152 |



## कार्यकारी-सारांश

भाकृअनुप-कृषि तकनीकी अनुप्रयोग अनुसंधान संस्थान, जोधपुर के समन्वय व अनुश्रवण के माध्यम से चयनित अठ्ठारह कृषि विज्ञान केन्द्रों (जिसमें तेरह राजस्थान एवं पाँच हरियाणा से) ने 'जलवायु समुत्थानशील कृषि में राष्ट्रीय नवाचार (निकरा)' परियोजना के अर्न्तगत वर्ष 2023-24 में तकनीक प्रदर्शन घटक के विभिन्न अनुखण्डों (मॉड्यूल) पर उल्लेखनीय कार्य किया। इस परियोजना के तहत की गई गतिविधियों में कुल 23318 किसान जिसमें प्राकृतिक संसाधन प्रबंधन में 771 फसल उत्पादन में 2638, पशुधन एवं चारा उत्पादन में 1194 संस्थानिक हस्तक्षेप/कस्टम हायरिंग में 3554, समता विकास में 3239, एवं प्रसार गतिविधियों में 11922 किसानों को सेवाएं प्रदान की गई।

- **प्राकृतिक संसाधन प्रबंधन अनुखण्ड:** इसके अर्न्तगत कृषि विज्ञान केन्द्रों द्वारा 762 प्रदर्शनों का आयोजन 963.1 हेक्टेयर क्षेत्र में 771 किसानों की सक्रिय भागीदारी द्वारा किया गया। 'संसाधन संरक्षण तकनीकी द्वारा स्वस्थाने नमी संरक्षण', के 115 प्रदर्शन 83 हेक्टेयर क्षेत्र में किसानों के यहाँ सफलतापूर्वक लगाये गये। इसी प्रकार 'वर्षा जल के संरक्षण व संपूरक सिंचाई के पुनःचक्रण हेतु', पुराने बाँधों का जीर्णोद्धार, नए जलाशयों का निर्माण करके उल्लेखनीय सफलता हासिल की जिससे 120 हेक्टेयर क्षेत्र में 33 किसान लाभान्वित हुए। 'मृदा संशोधन व परीक्षण आधारित पौषक तत्वों के अनुप्रयोग' में उल्लेखनीय सफलता मिली जिसमें 90 किसानों के यहाँ 200 हेक्टेयर क्षेत्र में कार्य किया गया।

ग्रीष्मकालीन गहरी जुताई पर 230.5 हेक्टेयर में 126 किसान को शामिल करते हुए प्रदर्शन आयोजित किये गये। वर्ष 2023-24 के दौरान 52 हेक्टेयर क्षेत्र में 80 किसानों के माध्यम से लेजर लैंड लेवलर तकनीक का उपयोग करके प्रदर्शन आयोजित किए गए।

- **फसल उत्पादन अनुखण्ड:** इसके अर्न्तगत राजस्थान एवं हरियाणा के कृषि विज्ञान केन्द्रों द्वारा 1023 हेक्टेयर क्षेत्र में 2702 प्रदर्शन आयोजित किए गये। 'लघु अवधि फसल किस्मों' जैसे आरजीसी-1066, एचजी-2-20 (ग्वार), व डीएमआरआईजे-31 (सरसों), एमपीएमएच-17 (बाजरा), आरसी-19 (चंवला), पीयू-1 (उडदबीन), जीएनजी-2141 (चना), पीबी-1509 (धान) आदि के 255 प्रदर्शन किसानों के खेतों पर 92.4 हेक्टेयर क्षेत्र में लगाए गए। इन किस्मों ने किसानों द्वारा प्रयोग की गई स्थानीय देशी किस्मों की तुलना में 16 से 28.58 प्रतिशत उच्च उपज दी। इसी प्रकार 'सूखा-रोधी किस्मों' जैसे-आरडी-2849 एवं आरडी-2786 (जौ), आरजीसी-1066, एचजी-2-20 (ग्वार), जीएम-07 एवं जीएम-5 (मूँग), एमपीएमएच-17, एचएचबी-667, एचएचबी-29 (बाजरा) तथा आरएमओ-225-1 (मोठ) आरएच-725 (राया), जीएनजी-1581 (चना), जीसी-4 (जीरा) एवं आरसीएच-776, अंकुर-555, यूएस-51, अजित-155 (कपास) आदि किस्मों के 225 प्रदर्शन 90 हेक्टेयर क्षेत्र में लगाए गये। इन सभी किस्मों की उपज किसानों द्वारा उगाई गई देशी किस्मों के मुकाबले 17.25 से 38.56 प्रतिशत अधिक प्राप्त हुई।?



रबी फसलों जैसे सरसों (गिरिराज) और जीरा (जीसी-4) गेहूँ (राज-4120) की अगेती बुवाई करके 14.4 हेक्टेयर क्षेत्र में 51 किसानों के खेतों पर रबी फसलों में गर्मी से तनाव की प्रगति का प्रदर्शन किया गया। किसानों की तुलना में इन फसलों की उपज में प्रतिशत वृद्धि 19.72 और 37.30 दर्ज की गई। वर्ष के दौरान 76.80 हेक्टेयर क्षेत्र में कपास की फसल में 192 भागीदार किसानों के प्रक्षेत्र पर एकीकृत कीट और रोग प्रबंधन के प्रदर्शनों का आयोजन किया गया। इस हस्तक्षेप से किसानों के अभ्यास की तुलना में 15.65 से 36.28 प्रतिशत अधिक उपज प्राप्त हुई।

‘फसल विविधीकरण’ के अर्न्तगत सौफ (एएफजी-3), तिल (एचटी-2, आरटी-351), चना (जीएनजी-2171) के कुल 119 प्रदर्शन 47.6 हेक्टेयर क्षेत्र पर लगाये गये जिनकी उपज किसानों द्वारा अपनाई गई विधियों के मुकाबले 18.55 व 23.07 प्रतिशत अधिक प्राप्त हुई। इसके अतिरिक्त पौषण तत्व प्रबन्धन, लवण प्रतिरोधी किस्म के तहत 109 किसानों के 43.8 हेक्टेयर क्षेत्र में प्रदर्शनों का आयोजन किया गया। इन प्रदर्शनों की उपज किसानों द्वारा उगाई गई देशी किस्मों/विधियों के मुकाबले 13.8 से 19.34 प्रतिशत अधिक प्राप्त हुई।

- **पशुधन एवं चारा उत्पादन अनुखण्ड:** इसके अर्न्तगत पशुपालन सम्बन्धी विभिन्न तकनीकियों पर 1076 प्रदर्शन लगाए गये जिसमें 5436 पशुओं का उपचार किया गया। ‘नस्ल सुधार कार्यक्रम’ के अर्न्तगत मुर्रा भैंस, थारपारकर गाय, जमनापारी व सिरोही बकरी पर निकरा गाँवों में 465 प्रदर्शनों का आयोजन किया गया। खनिज-लवण मिश्रण व पशुआहार बट्टिका, कृमीनाशक व टीकाकरण आदि हस्तक्षेपों से दूधारू पशुओं के दुग्ध उत्पादन में सार्थक सुधार (11.6 से 18.9 प्रतिशत) पाया गया है।

मुर्गीपालन पर 96 प्रदर्शनों के माध्यम से 1470 मुर्गीयों किसानों को प्रदान की गई। पशु-स्वास्थ्य शिविरों के आयोजन द्वारा 376 पशुपालकों के 2747 पशुओं का टीकाकरण किया गया। पशुआहार में ‘आहार प्रबंधन’ तथा ‘लवण अल्पता’ में सुधार के लिए 258 पशुओं को खनिज-लवण, पशुआहार बट्टिका, व हरे चारे द्वारा संतुलित पशु आहार उपलब्ध कराया गया जिससे दुग्ध उत्पादन में 18.6 प्रतिशत बढ़ोतरी हुई तथा पशु स्वास्थ्य में भी उचित सुधार हुआ।

- **संस्थानिक तकनीक हस्तक्षेप अनुखण्ड** के अर्न्तगत कृषकों द्वारा निर्धारित किराये पर कृषि यंत्र सुलभीकरण (कस्टम हायरिंग), सामुदायिक चारा उत्पादन, कम्पोस्ट खाद उत्पादन, साईलेज तैयार करना, सामुदायिक बीज व चारा बैंक, सामुदायिक पौषक नर्सरी तैयार करना एवं बायो गैस ईकाई स्थापित करना (निकरा परियोजना जानकारी जैसे कि- अनुवीक्षण एवं तकनीकी मार्गदर्शन आदि) संस्थानिक हस्तक्षेप 4200.5 हेक्टेयर क्षेत्र में 3554 किसानों की सक्रिय भागीदारी से राजस्थान व हरियाणा राज्य में किये गये। चारा और बीज गृहों की स्थापना से क्रमशः 381 और 88 भागीदार किसानों को कमी की अवधि के दौरान चारा और बीज प्राप्त करने में मदद मिली। केवीके ने कस्टम हायरिंग सेंटरों के माध्यम से कुल 3085 किसानों ने 3440.5 हेक्टेयर क्षेत्र में खेत जुताई एवं अन्य विभिन्न कृषि कार्यों को समय पर पूरा किया जिससे केवीके ने कुल 1.83 लाख रुपये का राजस्व अर्जित किया।



- **दक्षता विकास गतिविधियाँ:** विभिन्न विषयों पर कुल 107 प्रशिक्षण पाठ्यक्रम आयोजित किये गए जिनमें कुल 3239 प्रतिभागियों (2261 कृषकों व 978 कृषक महिलाएँ) ने सक्रिय रूप से भाग लिया। प्रशिक्षण पाठ्यक्रम में मुख्यरूप से फसल विविधीकरण व प्रबंधन, खेती सम्बन्धित मशीनें व औजार, प्राकृतिक संसाधन प्रबन्धन, पशु-आहार, चारा उत्पादन एवं प्रबन्धन, फसल-कीट व रोग प्रबन्धन, संसाधन संरक्षण तकनीक, चूहे एवं खरपतवार प्रबन्धन, नर्सरी उगाना एवं प्रबंधन, वर्मीकम्पोस्ट उत्पादन, मूल्य संवर्धन, वैकल्पिक ऊर्जा स्रोत, मानव पौषण व शिशु देखभाल, कृषक महिलाओं के लिए उपयुक्त कृषि औजारों द्वारा महिलाओं की कृषि कार्यों में नीरसता व श्रम कम करना आदि विषय सम्मिलित थे।
- **प्रसार गतिविधियाँ:** वर्ष 2023-24 के दौरान केवीके द्वारा विभिन्न गाँवों में कुल 345 प्रसार गतिविधियों का आयोजन 11922 कृषकों (6676 कृषक व 5246 कृषक महिलायें) की सक्रिय भागीदारी से किया गया। प्रसार गतिविधियों में जागरूकता कार्यक्रम, विधि-प्रदर्शन, संस्थागत-भ्रमण, प्रक्षेत्र भ्रमण, प्रक्षेत्र-दिवस, किसान-दिवस, सामुदायिक सभा, समूह चर्चा तथा कृषि सम्बन्धित सलाह आदि सम्मिलित थे।

निकरा परियोजना के तहत राजस्थान एवं हरियाणा राज्य के जिलों में **सफल तकनीकी हस्तक्षेपों** का प्रदर्शन किया गया है जैसे कि :-

- **प्राकृतिक संसाधन प्रबन्धन:** इसके अन्तर्गत अल्प लागत नलकूप पुनर्भरण ढांचों की तकनीक, बाँधों में वर्षा जल संग्रहण, सूक्ष्म सिंचाई तकनीक, संसाधन संरक्षण तकनीकी-रोटावेटर एवं बिजली चालित चारा मशीन, गर्मियों में गहरी जुताई, सीधी खेत में धान बुवाई, मिट्टी व भूमि सुधार, लेजर द्वारा जमीन समतल करना, खेतों में मेढबन्धी करना, हैप्पी सीडर द्वारा फसलावशेष प्रबंधन, हरित खाद एवं बायो गैस ईकाई आदि पर प्रदर्शनों का आयोजन किया गया।
- **फसल उत्पादन:** इसके अन्तर्गत कम अवधि वाली किस्में, वृद्धि नियन्त्रक एवं सूक्ष्म तत्वों का छिड़काव, फसल विविधीकरण, सोयाबीन-सरसों मिश्रित खेती, मकई+उड़दबीन, चने की उकटा रोधी किस्म (जीजेजी-3), लवण रोधी किस्में (केआरएल-210 एवं 213) एवं कपास में समन्वित कीट प्रबन्धन आदि पर प्रदर्शनों का आयोजन किया गया।
- **पशुधन एवं हरा चारा उत्पादन:** इसके अन्तर्गत पशु नस्ल सुधार, उन्नत पशु आवास, मक्का का साईलेज, संतुलित पशुआहार (यूरिया, खनिज लवण, पशुआहार बट्टिका), कृमीनाशक व टीकाकरण का क्रियान्वयन किया गया।



## EXECUTIVE SUMMARY

During the year 2023-24 under NICRA project seven KVKs (13 in Rajasthan and 5 in Haryana) actively involved in carrying out different activities under Technology Demonstration Components comprised of various modules. Under this project 23318 partner farmers (NRM-771, crop production-2638, livestock and fodder production-1194, institutional interventions including custom hiring-3554, capacity building-3239, extension activities-11922) were involved.

- **Natural Resource Management Module:** Total 762 demonstrations were conducted, covering 963.1ha area which involved 771 practicing farmers of 18 districts. *In-situ* moisture using resource conservation technology 115 demonstrations were conducted which have been successfully implemented in the NICRA villages and covered 83.0ha area during the year. Similarly, interventions on low cost rain water harvesting structure and recycling for supplemental irrigation achieved in renovating the old check dams, constructions of new farm ponds and village water ponds involved 33 farmers and covered 120ha area. Significant success achieved in soil health card issued for 200.0ha area in which 90 partner farmers participated.

Interventions on summer deep ploughing in which total 126 partner farmers involved covering 230.5ha area in both states. Several demonstrations were conducted about use laser land leveler technology using through 80 trials, which were adopted by 80 farmers covering an area of 52.0ha during the year 2023-24.

- **Crop Production Modules** were implemented through 2702 demonstrations by KVKs of Rajasthan and Haryana which covered 1023.0ha area. On short duration varieties total 255 demonstrations were conducted which covered an area of 92.4ha; involving cluster bean (RGC-1066), mustard (DRMRIJ-31, RIJ-31), pearl millet (RHB-173), Til (RT-351), Cow Pea (RC-19), Paddy (PB-1121). These crop varieties recorded significantly higher yield varying from 16.0 to 28.58% as compared to varieties locally grown by the farmers. On drought tolerant varieties total 225 demonstrations were conducted which covered an area of 90.0ha; including barley (RD-2849, RD-2786), chickpea (GC-5), sesame (RT-351), cluster bean (RGC-1066), green gram (GAM-4, GAM-5), pearl millet (MPMH-17), moth bean (RMO-257) Cumin (GC-4), Cotton (Ajit-155). These crop varieties yielded significantly higher yield varying from 17.25 to 38.56% as compared to varieties locally grown by the practicing farmers.

Advancement of planting dates of *rabi* crops with terminal heat stress was demonstrated on 51 farmers' field covering an area of 14.4ha using mustard (Giriraj) and cumin (GC-4) Wheat (Raj-4120). The percent increase yield in these crops recorded 19.72 and 37.30 as compared to farmers' practice. Integrated pest and disease management was practiced by 192 partner farmer in cotton crop on 76.80ha area during the year under report. It was found that yield under this intervention was 15.65 to 36.28 % higher than the farmers who did not follow the IPM & IDM.

Under crop diversification 119 demonstrations were conducted in 47. ha area including Spring Maize, Fenugreek (AFG-3), Sesame (HT-2, RT-351) and Chickpea (GNG-2171) by NICRA KVKs of



Haryana and Rajasthan. The demonstration yield was found 18.55 and 23.07 percent higher than farmers practice. Demonstrations were conducted on nutrient management, Salt Tolerant Variety, crops on 109 partner farmers' fields covering 43.8ha area. It was found that yield under these interventions was 13.8% to 19.34% higher than the local crop varieties grown by the farmers.

- **Livestock and Fodder Production:** Various livestock related interventions were carried out through 1076 demonstrations which covered 5436 different categories of livestock during the year 2023-24. Breed improvement programme implemented through 50 interventions using Murrah buffalo bull, Tharparkar bull, Jamnapari and Sirohi bucks was initiated in NICRA villages, which involved 465 different categories of animals. Due to interventions of feeding of mineral mixture and UMMB, deworming and vaccination of the lactating animals a significant improvement in the milk production of animals (11.6 to 18.9%) was recorded.

Total 96 demonstrations were conducted on 1470 backyard poultry in NICRA villages. Total 2747 livestock were vaccinated; owing to 376 livestock farmers. To mitigate the mineral deficiency total 258 animals were provided balanced nutrition through mineral mixture and green fodder owing to 373 livestock farmers. A significant improvement in milk production (18.6%) and health improvement was recorded due to mineral mixture supplementation to different livestock species.

- **Institutional Interventions:** Custom hiring for timely operations, community fodder production, compost-pit and silage making, community seed and fodder bank, kitchen gardens and establishment of bio-gas units etc. (monitoring and technical guidance) covered 4200.5ha area of 3554 partner farmers in Rajasthan and Haryana states. Further, establishment of fodder banks and seed banks helped 381 and 88 partner farmers, respectively to get fodder and seed during the scarcity period. NICRA KVKs under ATARI Jodhpur earned total revenue of Rs1.83 lakhs through Custom Hiring Centres by which 3085 farmers completed different agricultural operations timely covering an area of 3440.5ha during the year under report.
- **Capacity Building Activities:** A total of 107 courses were conducted on various thematic areas during the year, in which 3239 partner farmers and farm women (2335 male and 978 female) actively participated. Thematic areas were; crop diversification and management, agricultural farm implements and machineries, NRM, feed, fodder and livestock management, pest and disease management, resource conservation technology, rodent and weed control, nursery raising, vermi-compost, value addition, alternate energy source, human nutrition and child care and drudgery reduction through farm implements for women etc.
- **Extension Activities:** Total 345 different activities were organized on various thematic areas which involved 11922 practicing farmers (6676 male and 5246 farm women) during the year 2023-24. The major extension activities conducted were on awareness programmes, method demonstrations, exposure, diagnostic field visits, celebration of field and farmers' day, community meeting, group discussion and agro-advisory services etc.





- **Several successful interventions** were demonstrated in selected districts of Rajasthan and Haryana states.
- **NRM:** Recharge of tube well technology, rainwater harvesting by check dams, micro-irrigation system, resource conservation technology - rotavator and mobile chopper, summer deep ploughing, direct seeded rice, soil reclamation, laser land leveller, field bunding, residue management through Happy Seeder, Zero till wheat, green manuring and gobar gas unit etc.
- **Crop production:** Short duration variety (PB-1509) hybrid (Arize 6129/ Sava127) of paddy, drought tolerant cultivars, spray of growth regulator and micro-nutrient, crop diversification, FIRB sowing method, soybean-mustard mixed cropping, inter-cropping of soybean maize and soybean-blackgram (5:2 row), wilt resistant varieties of chickpea GJG-3 variety, salt tolerant wheat varieties KRL 210 and 213 and IPM in cotton etc.
- **Livestock production:** Animal breed up-gradation, animal housing and manger, fodder maize silage, balanced animal nutrition (UMMB, mineral mixture supplementation), vaccination and deworming etc.



## 1. INTRODUCTION

In today's Agriculture large number of recommendations and technological packages are available for different crops, micro-farming situations and also for climate resilience. However, the adoption of these technologies by the farmers is quite low. Most of the technologies generated and recommended by the research institutions have either not been adopted or partially adopted because the technologies are often not consistent with real farming systems. Farmers vary in socio-economic parameters such as farm size, resources, labour skills, literacy, managerial ability and risk bearing capacity. Therefore, there is a need to assess and demonstrate the technologies on real situations of the village with active participation of farmers in technology integration process.

Keeping the above facts in view, **National Innovations in Climate Resilient Agriculture (NICRA)**, a network project of Indian Council of Agricultural Research (ICAR) has a technology demonstration component. The rationale for **Technology Demonstration Component (TDC)** is based on the premise that an array of technologies is available to cope up with different types of climate related vulnerabilities in National Agricultural Research System (NARS). These technologies can be adopted to overcome the current challenges of climate variability. In addition, farming community also has long standing experience and inherent adaptive capabilities to various kinds of weather aberrations. The TDC focus on participatory evaluation of location specific interventions in vulnerable districts of the country to enable farmers to cope with current climate variability. The TDC of NICRA is being implemented by 151 KVKs in 11 Zones. In addition, co-operating centres of AICRP in Dryland Agriculture (25) and Technology Transfer Divisions of core institutes (7) have also implemented the activities. The project has been implemented in one of the representative *Gram Panchayat* in each of the selected 151 districts on major climatic vulnerability viz. drought, floods, heat wave, cold wave, frost and cyclones etc. The project is implemented by Krishi Vigyan Kendras (KVKs) at district level, regionally coordinated by the ICAR-Agricultural Technology Application Research Institutes (ATARIs) with overall planning, monitoring and coordination by ICAR-Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad. As part of NICRA, under Technology Demonstration Component, ICAR-ATARI-II, Jodhpur actively involved in coordination and monitoring of 18 selected Krishi Vigyan Kendras involving 13 districts from Rajasthan and five districts from Haryana (details are shown in Table 1.1).

The project sites have been selected by a multi-disciplinary team constituted by each KVK based on degree of intensity of climate vulnerability faced by the farmers in the village. The Agro-ecosystem Analysis by using Participatory Rural Appraisal (PRA) tools of the selected villages was undertaken to understand the farming situations, resource availability, constraints and climatic

vulnerabilities and to identify opportunities of climate change adaptation and mitigation of aberrant weather conditions. Based on location specificity analysis, action plan for each selected village was prepared by the multi-disciplinary team of scientists in a participatory mode.

**Table- 1.1. Details of major climatic vulnerability in selected NICRA villages**

| Selected district  | Name of selected NICRA village | Major climatic variability                    | Annual Rainfall (mm) |
|--------------------|--------------------------------|-----------------------------------------------|----------------------|
| <b>• Rajasthan</b> |                                |                                               |                      |
| 1. Alwar-I         | Gurapur Khurd                  | Frost/ Heat wave/Drought                      | 500-650              |
| 2. Barmer-I        | Junapatrasar                   | Drought/ Heat wave                            | 240-320              |
| 3. Bharapur        | Gagrasoli                      | Floods/ Heat wave                             | 500-700              |
| 4. Bhilwara-I      | Dholikhera                     | Heat wave/ Dry Spell                          | 640- 800             |
| 5. Bikaner-I       | Kanasar                        | Drought/ Heat wave/ Frost                     | 250-265              |
| 6. Churu-I         | Miitaras                       | Heat wave/ Cold wave/ Erratic rainfall        | 200-300              |
| 7. Hanumangarh-I   | Hiranwali                      | Heat wave/ Cold wave/ dry                     | 250-300              |
| 8. Jaisalmer-I     | Jogidas ka Goan                | Heat wave/ Frost/ Unseasonal rainfall         | 420-480              |
| 9. Jhunjhunu       | Bharu                          | Frost/ Drought                                | 300-420              |
| 10. Jodhpur-I      | Purkhawas                      | Heat wave /cold wave                          | 300-350              |
| 11. Nagaur-I       | Deshwal                        | Heat/cold wave & Drought                      | 350-380              |
| 12. Pali-I         | Gajangarh                      | Drought/ Heat wave                            | 300-350              |
| 13. Sirohi         | Dhanta                         | Heat wave /cold wave                          | 300-350              |
| <b>• Haryana</b>   |                                |                                               |                      |
| 1. Bhiwani         | Lohani, Dhareru                | Erratic rainfall                              | 250-300              |
| 2. Fatehabad       | Banmandori, Bodiwali           | Heat wave/ Cold wave                          | 360-400              |
| 3. Hisar           | Bhodia Bishoniyar              | Heat wave/ Cold wave/ Erratic rainfall/ Frost | 400-500              |
| 4. Mahendergarh    | Gadania, Bairawas              | Heat wave/ dry spell/ Frost                   | 300 -500             |
| 5. Sirsa           | Rupana Khurd                   | Erratic Rainfall                              | 170-250              |

Following criteria were followed to demonstrate the climate resilient technologies under TDC at project locations:

1. Analysis of climatic vulnerabilities of village based on long term data
2. Identification of the natural resources status of village
3. Identification of major cropping pattern and
4. Assessment of existing institutional structures and gaps.



Focus group interactions, informal talks, group meeting, interface etc. were organized with the farming community for finalizing the interventions. The interventions were implemented under four technological modules viz., Natural Resources, Crop Production, Livestock and Fisheries, and Institutional Interventions.

## **1.1 Intervention modules**

In order to address the climatic vulnerabilities of the selected villages, different interventions were planned under four modules. However, the specific intervention under each module for a particular village was decided on the basis of climatic vulnerability, resources availability and existing situation of particular village. All the four intervention modules plan are explained below:

### **1.1.1 Module I: Natural Resource Management**

This module consists of following interventions- *in-situ* moisture conservation, biomass mulching, residue incorporation instead of burning, brown and green manuring, water harvesting and recycling for supplemental irrigation, improved drainage in flood prone areas, conservation tillage (where appropriate), artificial ground water recharge and water saving irrigation methods.

### **1.1.2 Module II: Crop Production**

This module consists of following interventions- drought or high temperature tolerant varieties, advancement of planting dates of *rabi* crops in areas with terminal heat stress, water saving paddy cultivation methods (SRI, aerobic, direct seeding), frost management in horticulture through fumigation, community nurseries (for optimal sowing in delayed monsoon), farm machinery 'custom hiring centres' for timely completion of farm operations, location specific intercropping systems with high sustainable yield index.

### **1.1.3 Module III: Livestock, Fodder and Fisheries Production**

This module consists of following interventions- use of community lands for fodder production during droughts or floods, augmentation of fodder production through improved planting materials, improved fodder and feed storage methods, fodder enrichment, prophylaxis, improved shelters for reducing heat stress in livestock, management of fish ponds per tanks during water scarcity and excess water and promotion of livestock taken up as climate change adaptation strategy.

### **1.1.4 Module IV: Institutional Interventions**

This module consists of institutional interventions either by strengthening the existing ones or initiating new ones, relating to community seed bank, fodder bank, commodity groups, custom hiring centre, collective marketing group, introduction of weather index based insurance and climate literacy through a village weather station etc.



The KVK team at each centre carried out a detailed exercise to assess the needs of villagers, the climate vulnerability (drought and floods/heat and cold wave/frost and hailstorm/cyclone) and the available technology options from the concerned Zonal Agricultural Stations of the SAU. After scientific study of the gaps, specific interventions from each of the module were selected and integrated package modules were formulated. Demonstrations on climate resilient technologies were conducted in participatory mode with the farmer as partners. Hence, there was a need to understand the process and to conduct participatory demonstrations for wider adoption of climate resilient agriculture practices by the farmers in NICRA village.

### 1.2 Objectives of NICRA Project

- To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic vulnerability and climate change through development and application of improved production and risk management technologies
- To demonstrate site specific technology packages on farmers' fields for adapting to current climate risks and
- To enhance the capacity building of scientists and other stakeholders in climate resilient agriculture demonstration and its application.

## 2. KVK-wise Achievements 2023

### Rajasthan State

#### Alwar-I

Performances of component demonstrations laid out by KVK Alwar-I under different modules are as follows:

**Natural Resource Management:** In 2023, Krishi Vigyan Kendra Alwar-I conducted 47 demonstrations on sustainable agricultural practices to address soil health, moisture conservation, and heat stress management. Key techniques demonstrated included summer deep ploughing, *in-situ* moisture conservation through polythene mulching, Dhaincha cultivation for green manuring, and heat stress management using 1% Potassium Chloride (KCL) solution. These initiatives, involving 47 farmers in 18.6ha, aimed to improve soil structure, reduced moisture loss, and enhanced crop resilience under heat stress. As a result, farmers reported healthier soil, increased organic matter, and improved crop tolerance to high temperatures, ultimately supporting more sustainable yields and resilient farming systems.

**Crop production:** In Rabi 2023, a total of 34 field demonstrations covering 14.0ha area were conducted on wheat, barley, and mustard to assess performance and economic viability of improved crop varieties. The barley variety DWRB-137 was tested on 4.0ha involving 10 farmers, yielding a net return of ₹55824/ha with a B:C ratio of 3.97, significantly outperforming the local cultivar, which provided ₹49258/ha and B:C ratio of 2.97. Similarly, the mustard variety DRMR-2017-15, demonstrated on 5.0ha area across 14 farmers, achieved higher yields with net returns of ₹86020/ha and a B:C ratio of 2.77, compared to ₹73320/ha and a B:C ratio of 2.61 for local varieties.

**Livestock and Green fodder production:** Total 58 demonstrations were conducted on Oat (Kent), Calcium, and mineral mixture during *Rabi* 2023, Improved variety of Oat for green fodder was



FLD on Dhaincha (DH-1) at Farmer's field



FLD on Mustard (DRMR 2017-15) at Farmer's field





demonstrated at 18 farmers' field over 3.0ha area, which resulted in more green fodder yield than local variety. Farmers those who have sown the modern variety earned a net return of Rs 37600/ha with B:C ratio 2.2.68 as compared to farmers' variety (Rs 31550/ha with B:C ratio 2.47). Looking to the results of crop farmers are ready for growing the variety during the next year also.

**Institutional interventions: Custom Hiring Activities:** Rotavator emerged as the most utilized implement, benefiting 60 farmers and covering 25.0jha area, with a mobilization of ₹14200. The Seed cum Fertilizer Drill achieved the largest area coverage of 48.0ha; while assisting 57 farmers. Tractor-Mounted Sprayers supported 28 farmers, contributing to pest and disease management across 14.0ha area. Bund Maker and Knapsack Sprayer had relatively limited mobilization but were significant in localized or niche applications.

**Seed bank established during the year:** During 2023-24, the Seed Bank initiative focused on enhancing seed systems for wheat, barley, and mustard, benefiting farmers through seed production, retention, and mobilization: Wheat (DBW-187): Produced 11.9 tons, covering 13 farmers across 3.0ha area. Retention for the next season was 1.5tons, mobilizing ₹35000. Barley (DWRB-137): Produced 5.2tons, assisting 8 farmers covered 2.0ha area. Retention was 1.10tons, mobilizing ₹7050. Mustard (Radhika): Produced 6.0tons, supporting 30 farmers over 6.0ha area. Retention for the next season was 0.5 tons, worth ₹4600 mobilized.

**Fodder Bank established during the year:** Fodder Bank initiative emphasized sustainable fodder production to enhance livestock nutrition and resilience in farming systems. The primary intervention involved cultivating Oat (Kent), a high-yielding and nutrient-rich fodder species. A total of 35 tons of oat fodder was produced, benefiting 18 farmers covering 3.0ha of land. While no fodder was retained for the next year, this intervention ensured immediate fodder availability to support livestock feeding during critical/scarcity periods.

**Capacity Building Activities:** A total of 217 farmers, comprising 106 men and 111 women, actively participated in eight specialized training sessions across various thematic areas in NICRA villages. The training covered essential topics, including crop production, plant protection, horticultural crop management, rainwater harvesting, custom hiring centres, and kitchen gardening. The capacity-building sessions focused primarily on crop production techniques, pest and disease management, and horticultural practices. Conducted before the planting season and field demonstrations, these trainings enabled farmers to gain awareness of the latest technologies and best practices in crop production, horticulture, and integrated pest management, empowering them to enhance productivity and resilience in their farming systems.

**Extension Activities:** Total 6 programmes were organized involving total 384 farmers (184 male and 46 farm women) through method demonstration, awareness programmes, VCRMC Meeting, Field day on





**Off-campus training of NICRA Farmers**



**Exposure visit of NICRA Farmers**

Barley, World Soil Day, exposure visit of farmers in 7th Farm Tech Asia, Jobner, Seed treatment & Weed management in *Rabi* crops, warehouse for safe grain storage, Interface meeting and Scientists' visit at farmers' field.

### Rainfall scenario for the year 2023:

| Month                                                                             |                                                                                                                                        | June | July | Aug | Sept | Oct | Nov | Dec | Jan | Annual |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------|------|-----|------|-----|-----|-----|-----|--------|
| Rainfall received in (mm)                                                         |                                                                                                                                        | 65   | 198  | 118 | 54   | 7   | 8   | 2   | 10  | 506    |
| No. of dry spells during <i>kharif</i> season 2023                                | >10days                                                                                                                                | -    | -    | 1   | 1    | -   | -   | -   | -   |        |
|                                                                                   | >15days                                                                                                                                |      | -    | -   | -    | -   | -   | -   | -   |        |
|                                                                                   | >20days                                                                                                                                | -    | -    | -   | -    | 1   | -   | -   | -   |        |
| No. of intensive rain spells (2023)                                               | >60 mm per day                                                                                                                         | -    | 1    | 1   | -    | -   | -   | -   | -   |        |
|                                                                                   | Waterlogging/Flooding observed (number of days)                                                                                        | -    | -    | -   | -    | -   | -   | -   | -   |        |
| Any other extreme events (Heat wave, Cold wave, frost) observed during the season | Heat wave 6.06.2023 to 14.06.2023<br>Cold wave 17.1.2023 to 20.01.2023                                                                 | 1    | -    | -   | -    | -   | -   | -   | 1   |        |
| Contingency measures adopted during the season                                    | 1. Apply light irrigation<br>2. Irrigate during the evening or early morning<br>3. Mulch with crop residue, straw/polythene in orchard |      |      |     |      |     |     |     |     |        |

During the reporting year annual rainfall recorded 506.00 mm.

### Adoption of successful interventions in the NICRA village & the adjoining villages:

| Successful interventions    | Crop            | Variety                | Extent of adoption in the village in ha (2023) |
|-----------------------------|-----------------|------------------------|------------------------------------------------|
| <b>NRM</b>                  |                 |                        |                                                |
| Summer deep ploughing       | -               | -                      | 17                                             |
| Green manuring              | Dhaincha        | DH-1                   | 10                                             |
| Polythene mulching          | Tomato          | Hybrid                 | 4                                              |
| Mini sprinkler              | Wheat           | DBW-187                | 14                                             |
| <b>CROP</b>                 |                 |                        |                                                |
| Improved variety of Barley  | Barley          | DWRB-137               | 27                                             |
| Improved variety of Mustard | Mustard         | Radhika (DRMR-2017-15) | 52                                             |
| <b>Livestock</b>            |                 |                        |                                                |
| Improved variety            | Oat             | Kent                   | 13                                             |
| Mineral mixture             | Mineral mixture | -                      | 65                                             |
| Liquid calcium              | Liquid calcium  | -                      | 75                                             |

### Popularization of Climate Resilient Varieties:

| Crop*        | Climate Resilient Varieties incorporated in the Kharif 2023 plan of the State Department | Approx. area brought under the variety by the state department during the Kharif 2023 (ha) | Climate Resilient Varieties incorporated in the Rabi 2023 plan of the State Department | Approx. area brought under the variety by the state department during the Rabi 2023 (ha) |
|--------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Pearl millet | HHB 299                                                                                  | 12                                                                                         | -                                                                                      | -                                                                                        |
| Mustard      | -                                                                                        | -                                                                                          | DRMR IJ 31 (Girraj)                                                                    | 6.0                                                                                      |
|              | -                                                                                        | -                                                                                          | DRMR 2017-15                                                                           | 8.0                                                                                      |
| Wheat        | -                                                                                        | -                                                                                          | Raj 4238                                                                               | 14.0                                                                                     |
|              | -                                                                                        | -                                                                                          | DBW 187                                                                                | 2.0                                                                                      |
| Barley       | -                                                                                        | -                                                                                          | RD 2907                                                                                | 1.20                                                                                     |
|              | -                                                                                        | -                                                                                          | DWRB 137                                                                               | 6.0                                                                                      |

### Awards Received during the year for the work related to NICRA: Nil

### Amount (Rs) mobilized through convergence from various departments:

| S. No. | Activity/ Intervention                     | No. of farmers benefited | Coverage [Area (ha)] | Convergence established with (Name of the programme or department) | Approx. amount (Rs) mobilized |
|--------|--------------------------------------------|--------------------------|----------------------|--------------------------------------------------------------------|-------------------------------|
| 1      | Ber Orchard, Guava Orchard, Mosami Orchard | 3                        | 1.0                  | Sehagal Foundation, NGO                                            | 150000                        |
| 2      | Mini Sprinkler                             | 3                        | 3.0                  | Sehagal Foundation, NGO                                            | 3000000                       |
| 3      | Crop Demonstration                         | 20                       | 8.0                  | Sehagal Foundation, NGO                                            | 140000                        |

**Publications and other products/Video films etc., developed during the year: Nil**

**Significant observation about the project per the performance of interventions per adoption of intervention per livelihood improvement etc:**

| SN | Name of intervention      | Description of technology , adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | <b>Polythene Mulching</b> | <p><b>Adoption of technology:</b> Polythene sheet mulching involves covering the soil around tomato plants with a thin layer of polythene. This technique helps conserve soil moisture, control weed growth, and maintain optimal soil temperature, creating a conducive environment for plant growth.</p> <p><b>Impact:</b></p> <p><b>Enhanced Crop Productivity:</b> Tomato yield and quality significantly improved due to better soil conditions and reduced plant stress.</p> <p><b>Water Conservation</b><br/>Reduced irrigation requirements by minimizing evaporation.</p> <p><b>Weed Control:</b> Suppressed weed growth, reducing competition for nutrients and water.</p> <p><b>Economics:</b> As a result of these factors, the net return for farmers adopting the technology increased to Rs107100/ha as compared to Rs 79300 for non-NICRA farmers. The benefit-cost ratio (BCR) for the technology-adopting farmers was 1.95, while it was 1.72 for control group.</p> <p><b>Upscaling:</b> NICRA village has up-scaled polythene mulching through demonstrations, training, and incentives. This practice improves soil moisture, controls weeds, and boosts crop yields, especially in drought-prone areas. 5 farmers are ready to adopt this sustainable technology, promising a brighter future for farmers</p>                                                                                                                                                                                                                                                                                                                                                                        |
| 2. | <b>Mini sprinkler</b>     | <p><b>Adoption of technology:</b> Mini sprinkler irrigation is an advanced water distribution system designed for efficient irrigation in wheat cultivation. It ensures uniform water application, maintaining optimal soil moisture levels across the field. The system minimizes water loss due to evaporation and deep percolation while reducing manual labour and energy consumption.</p> <p><b>Impact:</b></p> <p><b>Improved Crop Growth:</b> Enhanced water distribution promotes uniform germination, better root development, and overall plant health.</p> <p><b>Water Conservation:</b> Reduces water usage significantly compared to conventional irrigation methods, addressing the challenge of limited water resources.</p> <p><b>Sustainable Farming:</b> Minimizes soil erosion and nutrient leaching, contributing to long-term soil health.</p> <p><b>Economics:</b> NICRA farmers using mini sprinklers for wheat cultivation demonstrated higher economic efficiency compared to non-demo farmers. They achieved a gross income of Rs 106250 with a cost of Rs 35600, resulting in a net profit of Rs 70650 and a benefit-cost ratio of 2.98. In contrast, non-demo farmers earned Rs 97750 with a cost of Rs 35400, leading to a net profit of Rs 62350 and a benefit-cost ratio of 2.76. This indicates that NICRA farmers' investment in mini sprinklers yielded a greater return on investment and improved resource utilization.</p> <p><b>Upscaling Potential:</b> The upscaling potential of mini-sprinkler technology in NICRA project villages is promising, with 15 farmers eager to adopt it. Previously villagers were not aware about this water saving technology.</p> |



| SN | Name of intervention                       | Description of technology , adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. | New fodder Crop Oat (Kent)                 | <p><b>Adoption of technology:</b> The introduction of Oat (Kent) as a fodder crop represents a significant step toward establishing sustainable fodder banks. Known for its high nutritional value, palatability, and adaptability to various agro-climatic conditions, this crop ensures a consistent supply of quality fodder for livestock. Its cultivation involves simple agronomic practices, making it accessible for small and marginal farmers.</p> <p><b>Impact:</b></p> <p><b>Improved Livestock Nutrition:</b> High protein and energy content in oat fodder boosts livestock health, milk production, and overall animal productivity.</p> <p><b>Reduced Fodder Dependency:</b> Establishing on-farm fodder banks decreases reliance on expensive external fodder sources, especially during lean seasons.</p> <p><b>Sustainable Resource Use:</b> Oat cultivation prevents overgrazing and contributes to soil health by acting as a cover crop, reducing erosion.</p> <p><b>Economics:</b> The NICRA project demonstrated the economic viability of oat cultivation for green fodder. Farmers incurred a production cost of Rs 22400/ha, yielding a gross return of Rs 60000, resulting in a net return of Rs 37600 and a benefit-cost ratio of 2.67. This intervention led to 13.21% increase in production compared to non-NICRA farmers.</p> <p><b>Lower Feed Costs:</b> Reduced reliance on purchased fodder.</p> <p><b>Higher Livestock Productivity:</b> Improved milk yield and growth rates due to superior feed quality.</p> <p><b>Minimal Investment:</b> Low-cost inputs for oat cultivation with high economic returns.</p> |
|    |                                            | <p><b>Upscaling Potential:</b> Upscaling oat (Kent) cultivation in NICRA villages involves demonstrations, training, and awareness about green fodder. This high-yielding fodder crop improved livestock feeding efficiency, milk production, and farmer income. By addressing challenges like seed availability and technical know-how, NICRA can promote widespread adoption of oat cultivation for sustainable livestock production.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4. | Mitigation of Mineral & vitamin deficiency | <p><b>Adoption of technology:</b> The use of mineral mixtures in animal feed is a nutritional intervention that enhances livestock health by supplementing essential minerals often deficient in basal feed. This technology ensures that animals receive a balanced diet, improving digestion, metabolism, and overall productivity. Mineral mixtures are particularly crucial for dairy cattle, as they directly influence milk production, disease resistance, and reproductive health.</p> <p><b>Impact:</b></p> <p><b>Improved Milk Yield:</b> Farmers who adopted mineral mixtures recorded 13-15% increase in milk yield, leading to higher farm profitability.</p> <p><b>Enhanced Animal Health:</b> The supplementation reduced disease incidence, improving the overall health and longevity of the animals.</p> <p><b>Reduced Service Period:</b> The use of mineral mixtures also shortened the service period by 25-45 days, meaning animals were inseminated back more efficiently, leading to higher reproductive success and reduced costs related to extended calving intervals.</p> <p><b>Increased Farm Productivity:</b> The overall productivity of dairy farms increased due to healthier animals, more consistent milk production, and better reproductive outcomes.</p>                                                                                                                                                                                                                                                                                                                                                        |



| SN | Name of intervention | Description of technology , adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                      | <p><b>Economics:</b> NICRA farmers, supplementing green fodder oat with mineral mixture and calcium, significantly increased buffalo milk production by 22% (1620 kg vs. 1230 kg), leading to higher net returns (Rs 32400 vs. Rs 20400) and a better benefit-cost ratio (1.67 vs. 1.45).</p> <p><b>Upscaling Potential:</b> NICRA upscale mineral and vitamin deficiency mitigation in adopted villages by providing mineral mixtures and calcium supplements to livestock. This can be achieved through awareness campaigns, training programs of these supplements. Regular monitoring and evaluation will ensure the effectiveness of this intervention and its impact on animal health and productivity.</p> |

## Barmer-I

Krishi Vigyan Kendra, Barmer-I has been actively involved in implementation of various climate resilient agriculture technology demonstration components. Category wise progress of different modules is presented here under:

**Natural Resource Management:** Total 67 demonstrations were conducted in *Kharif* and *Rabi* season diuring 2023. Major interventions carried out were: *In-situ* moisture conservation in NICRA villages. 14 field bunding/summer ploughing were practiced for moisture conservation over 112.0ha area covered cultivation of green gram var. MH-442 along with (inter-cropping) pearl millet with minimal expenditure as well as good return against the climate vagaries. 13 Vermicompost Unit (scaling up) 150.0 ha area had covered.

Major interventions carried out *ex-situ* moisture conservation in NICRA villages. Renovation of seven open well (Renovated in Convergence with the NGOs i.e. Gravis). Total 10 demonstrations on sprinkler irrigation installed for moisture conservation for cultivation of Cumin var. GC-4 and Isabgol var. IR-1 were conducted in 2.0 and 2.0ha area each; which resulted an increase of yield by 23.65, 29.11 per cent over local check with higher B:C ratio of 4.82 and 6.63 as compared to local check (3.06, 3.49) and average net return was Rs 79430 and Rs 104810/ha respectively, during *Rabi* season 2023-24, respectively.



Renovation of open well at NICRA village



FLD on Isabgol var.RI-1 at Farmer's field



**Crop Production Module:** Total 325 demonstrations were conducted over 122.5ha area at 325 partner/beneficiary farmers during *Kharif-2023* and *Rabi -2023-24*. Total 25 demonstrations on different technologies of cumin disease tolerant var. GC-4 were conducted in 10.0ha area; which resulted an increase of yield by 21.64 per cent over local check with higher B:C ratio of 2.81 as compared to local check (2.37) and average net return was Rs 86000/ha during *Rabi-2022-23*.

Total 225 demonstrations on different technologies of Isabgol disease tolerant var. RI-1 were conducted over 10.0ha area; which resulted an increase of yield by 22.35 per cent over local check with higher B:C ratio of 3.49 as compared to local check (2.99) and average net return was Rs 76130/ ha during *Rabi-2023-24*.

Total 75 demonstrations on different technologies of pearl millet drought tolerant/improved var. MPMH-17 were conducted covering 30.0ha. area; which resulted an increase of yield by 28.57 per cent over local check with higher B:C ratio of 1.28 as compared to local check (1.03) and average net return was Rs 4356/ha under FST-4 (Irrigated with Animals) during *Kharif-2023*.

Total 75 demonstrations on different technologies of Moth bean drought tolerant/improved var. RMO-225-1 were conducted over 30.0ha area; which resulted an increase of yield by 27.61 per cent over local check with higher B:C ratio of 1.60 as compared to local check (1.32) and average net return was Rs10760/ha under FST-2 (Rainfed with Animals) during *Kharif-2023*.

Total 75 demonstrations on different technologies of Green gram YVM resistant, short duration & climate resilient var. MH-421 were conducted in 30.0ha area; which resulted an increase of yield by 26.46 per cent over local check with higher B:C ratio of 2.34 as compared to local check (1.98) and an average net return was Rs 25075/ha under FST-4 (Irrigated with Animals) during *Kharif-2023*.

Total 25 demonstrations of income generation activities Vegetables (Nutri Garden/Kitchen gardening) were conducted under diversification at farmer's fields over 2.50ha area under FST-4 (Irrigated with Animal) in *Kharif-2023*. Per capita availability increased 145.0gm/day/capita (177.96 kg/unit area) from 120.0gm/day per capita (149.86 kg/unit area) with 18.75 per cent increase in consumption gm/day increase availability.

**Livestock and Fodder Production:** Total 33 demonstrations on different technology were conducted. 25 demonstrations were conducted on resilient practice of breed up-gradation (Breeding buck of Sirohi Breed). Introduction of new fodder crops of 8 demonstrations of green fodder: Napier Grass improved var. Co-5 were conducted covering 3.20ha area; which resulted with B:C ratio of 2.91 and an average net return was Rs 77899/ha under FST-4 (Irrigated with animals) during *Zaid/summer* season 2023-24.

To upgrade the goat breed, 15 breeding buck and 5 Sirohi goat units (9 female+1 male) had been provided to partner/beneficiary farmers for animal breed improvement in the NICRA villages. Introduction of improved breed of Sirohi goat to livestock farmers under FST-2 (Rainfed with Animals) and FST-4 (Irrigated with Animals) situation in NICRA-TDC project; as this breed performs well because

Sirohi goat conceives at an average 300-350 days, kidding 875 through breeding buck of Sirohi breed and >65 per cent of twins from Sirohi goat. Up-scaled of 13 vermicompost beds with total amount Rs 30720 out of 23.40q vermicompost and earned Rs 18720, worms amounting to Rs12000 was mobilised by products and recycled in farming system typologies during the year 2023-24 (in all the villages)

**Institutional Interventions:** Total 166 farmers benefited covering 15.0ha area for various institutional activities *i.e.* Seed production Technology (Cluster been), Custom Hiring Centre (CHC), Climate literacy through a village level weather station, 4 SHGs etc. *during the year 2023-24.*

**Custom Hiring Centre (CHC):** Selection of site & planning done for the establishment of Custom Hiring Centre (CHC) at newly adopted NICRA villages *i.e.* Juna Patrasar, Sujan Nagar & Punro Ki Basti according to ICAR-CRIDA-Hyderabad (Telangana) guideline. Rainfall is limited hence the time for field preparation and sowing operation is limited hence farm machinery/implements is purchased for timely agriculture operations. In order to address this problem a CHC was established in NICRA village and is being managed by VCRMC. Different agricultural implements (Rotavator, harrow, knapsack sprayer, power chaff cutter, manual chaff cutter etc.). An amount of Rs 2400 mobilised by total 69 farmers benefited by covering 212.0ha area for various institutional activities *i.e.* Seed production Technology (Cluster been), Custom Hiring Centre (CHC), Climate literacy through a village level weather station, 4 SHGs etc.

**Capacity Building activities:** Total 371 partner farmers (239 Male farmers & 132 farm women) were trained through 11 training courses in several thematic areas related to crop diversification ICM in Moth bean, Green gram & Pearl millet during *kharif-2023*, Rajasthan Krishi Shramik Sambal Mission (DoA, Barmer) at NICRA village Punro Ki Basti, ICM in cumin & isabgol during *Rabi-2023-24*, Training on ICM isabgol at Juna Ptrasar; and Nutri Garden-Importance and management (Gardening in winter season) and animal production etc. in NICRA villages.

**Extension Activities:** Total 27 programmes were conducted by involving 1554 partner farmers (1283 males and 361 farm women) through various thematic activities conducted in NICRA villages. KVK Barmer-I organised Strengthening VCRMC monthly meeting at NICRA villages, rain water harvesting, diagnostic field visits, field day on moth bean & moong bean, diagnostic field visit, field day on cumin & Isabgol, Vikshit Bharat Sankalp Yatra, exposure visit, awareness programme, International Women's Day & natural farming under exhibition etc.



**FLD on Sirohi goat unit at Farmer's house**



**Field day on Cumin var. GC-4 Farmer's field**



### Rainfall scenario of the year 2023-24:

| <b>Kharif 2023</b>                                  |                 | <b>Jun</b>          | <b>Jul</b> | <b>Aug</b> | <b>Sept</b> | <b>Oct</b> | <b>Nov</b> | <b>Dec</b> | <b>Annual</b> |
|-----------------------------------------------------|-----------------|---------------------|------------|------------|-------------|------------|------------|------------|---------------|
| Rainfall received (mm)                              |                 | 217.5               | 94.9       | 10         | 0           | 0          | 0          | 0          | 322.4         |
| No. of dry spells during <i>kharif</i> season 2023  | > 10 days       | 01                  | 02         | Nil        | Nil         | Nil        | Nil        | Nil        | Nil           |
|                                                     | > 15 days       | Nil                 | Nil        | Nil        | Nil         | Nil        | Nil        | Nil        | Nil           |
|                                                     | > 20 days       | Nil                 | Nil        | 01         | 01          | Nil        | Nil        | Nil        | Nil           |
| No. of intensive rain spells (2023)                 | > 60 mm per day | 2<br>(16 & 17 June) | -          | -          | -           | -          | -          | -          | -             |
| Water logging observed (days)                       |                 | Nil                 | Nil        | Nil        | Nil         | Nil        | Nil        | Nil        | Nil           |
| Any other extreme events observed during the season |                 | -                   | -          | -          | -           | -          | -          | -          | -             |

During the reporting year annual average rainfall recorded 322.4 mm comparing to an average rain fall of Barmer district 277 mm, while rainfall received 217.50 mm, 94.9 mm, 10 mm, & 0.00 mm, respectively in the month of June, July, August & September during the year 2023 (rainy session). Three dry spells of more than 10 days and one dry spell > 20 observed during June, July & August month of rainy season. Total two intensive rain spells observed, one rainfall on 16<sup>th</sup> June (97 mm) & 17<sup>th</sup> June (51 mm) occurred; respectively.

### Impact of contingency measures (Relate the dry spells with crop and growth stages):

| S<br>N | Dry spell<br>(no. of<br>days) | Duration<br>(from ---<br>to---)                                                                                                                         | Crop name                                     | Crop stage<br>Affected                                                                                                          | Intervention taken<br>up*                                                                                                                                                                                                                                                                                                 | Number<br>of<br>farmers<br>involved | Impact on crop yields (q per |      |                                               |
|--------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------|------|-----------------------------------------------|
|        |                               |                                                                                                                                                         |                                               |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                           |                                     | Farmers'<br>practice         | Demo | %<br>Increase<br>over<br>farmers'<br>practice |
| 1.     | >10 Days                      | 17 <sup>th</sup> -26<br>June,<br>2023<br>28 <sup>th</sup> -27<br>June, 23<br>29 <sup>th</sup> June<br>to 7 July<br>23<br>9 <sup>th</sup> -18<br>July 23 | Pearl millet<br>Moth bean,<br>Green gram<br>- | Flowering<br>stage of mung<br>bean in<br>rainfed &<br>growing stage<br>in pearl millet<br>crop affected<br>due to dry<br>spell. | <ul style="list-style-type: none"> <li>Adopted drought tolerant variety.</li> <li>Provide life saving irrigation at FST-4.</li> <li>Foliar spray of 1-3 % Nano Urea (urea) along with @ 0.5 % ZnSo<sub>4</sub> at flowering &amp; seed filling stage to enhance ability of crop to withstand terminal drought.</li> </ul> | 175                                 | -                            | -    | -                                             |
| 2.     | >15 Days                      | 1 <sup>st</sup> -18<br>Aug 23                                                                                                                           |                                               |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                           |                                     | -                            | -    | -                                             |
| 3.     | >20 days                      | -                                                                                                                                                       | -                                             | -                                                                                                                               | -                                                                                                                                                                                                                                                                                                                         | -                                   | -                            | -    | -                                             |

During consecutive dry spell of >10 days observed the 17<sup>th</sup> - 27 June, 2023, 28<sup>th</sup> -27 June 2023 and 29<sup>th</sup> June to 7 July 9<sup>th</sup> -18 July 2023 three dry spells along with one dry spells of >15days in month of 1<sup>st</sup> -18 Aug 23 of rainy season; drought tolerant varieties of Pearl millet (MPMH-17), Moth bean (RMO-225-1) and Green gram (MH-1142, GM-4 & MH-421) were sown by farmers covering 175.0ha area. Which has no effects in Irrigated FLDs because drought resistant variety and life-saving irrigation were adopted during *kharif*-2023. In Isabgol crop (var. RI-1), 25 and cumin crop (var. GC-4), 25 demonstrations were conducted involving 25 partner/beneficiary farmers in 10.0 and 10.0ha area; respectively.

**Adoption of successful intervention in the NICRA village and the adjoining villages:** Several successful interventions under NICRA project have been adopted in Barmer district.

| Successful Interventions including crops per varieties and others                           | Extent Adoption in the village (ha) | Farmers (No) | Mode of spread (Process)                               |
|---------------------------------------------------------------------------------------------|-------------------------------------|--------------|--------------------------------------------------------|
| CROP Production:                                                                            |                                     |              |                                                        |
| Improved var. Pearl millet (MPMH-17)                                                        | 500                                 | 1250         | KVK, State Agriculture Dept.& NGOs                     |
| Improved var. Green gram (MH-1142/424 & GM-4)                                               | 500                                 | 1250         |                                                        |
| Improved var. Moth bean (RMO-435/RMO-257/ RMO-225-1)                                        | 680                                 | 1700         |                                                        |
| Income generation activities (Nutri Garden/Kitchen gardening- kharif & rabi (Vegetable Kit) | 30                                  | 450          |                                                        |
| Improved var. Cumin (GC-4)                                                                  | 98                                  | 245          |                                                        |
| Improved var. Isabgol ( RI-1)                                                               | 74                                  | 185          |                                                        |
| Horticultural crops: Ber, Var. Gola                                                         | 5                                   | 10           | KVK, State Horticulture Dept.& NGOs                    |
| Micro (sprinkler) Irrigation: Cumin, var;- GC-4                                             | 90                                  | 55           | KVK & State Agriculture Dept. Water Conservation Dept. |
| Livestock: Breeding buck & Goat unit (Breed: Sirohi)                                        | 25                                  | 25           | KVK                                                    |
| Total                                                                                       | 2005                                | 7450         |                                                        |

Several successful interventions under NICRA project have been adopted in Barmer district. In the year 2023-24, drought tolerant and short duration varieties of pearl millet (var. MPMH-17), green gram (var. MH-1142, MH-424& GM-4and moth bean (var. RMO-435/RMO-257/RMO-225-1) have been sown in 500.0ha, 500.0 and 680.0ha area by 1250, 1250 & 1700 farmers, respectively during *Kharif*-2023. Wilt tolerant var.- of cumin (var. GC-4), Isabgol (var. RI-1) have been demonstrated in 98.0ha, 74.0ha area by 245, 185 partner farmers, respectively during *Rabi*-2023-24. In horticultural crop, ber orchards have been established in 5.0ha area by 10 farmers of NICRA villages. Breed Up gradation

(Breeding buck) for the animal breed improvement 25 breeding buck (Sirohi Breed) to 25 partner/beneficiary farmers have been provided in NICRA villages during 2021-22. Apart from those 25-30 farmers started Sirohi goat rearing from adjoining villages of NICRA village. Total 25 Sirohi breeding bucks have been provided to the livestock owners of Juna Patrasar, Sujan Nagar & Punro Ki Basti villages.

### Popularization of Climate Resilient Varieties:

| Crop*        | Climate Resilient Varieties incorporated in the <i>Kharif 2023</i> plan of the State Department | Area brought under the var.- by the state department during the <i>Kharif 2023</i> (ha) |
|--------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Pearl millet | MPMH-17                                                                                         | 4550                                                                                    |
| Green gram   | GM-4/IPM-02-3/MH-421/IPM-02-14                                                                  | 850                                                                                     |
| Moth bean    | RMO-435/RMO-257/RMO-225-1                                                                       | 2500                                                                                    |
| Ber          | Gola/Apple                                                                                      | 250                                                                                     |
| Crop*        | Climate Resilient Varieties incorporated in the <i>Rab- 2023</i> plan of the State Department   | Area brought under the var.- by the state department during the <i>Rabi 2023</i> (ha)   |
| Cumin        | GC-4                                                                                            | -                                                                                       |
| Isabgol      | RI-1/GI-2                                                                                       | -                                                                                       |

\*Source: Department of Agriculture (State Govt.), Barmer (Rajasthan)

Plan of the State Department have been covered climate resilient variety demonstration (mini kits) variety of pearl millet (var. MPMH-17), green gram (var. GM-4, GAM-5) and moth bean (var. RMO-435, 257 & 225-1) in 4550, 850 & 2500ha, area respectively.

### Awards Received during the year for the work related to NICRA: One

| Name of the award                 | Given by whom                                                                        | When the award was given       |
|-----------------------------------|--------------------------------------------------------------------------------------|--------------------------------|
| Padamshree Magraj Jain Award-2023 | Best innovator award for Kitchen gardening to Smt. Sushiya Bheel under NICRA village | 4 <sup>th</sup> November, 2023 |

### Distinguished visitors to the NICRA village during the year 2023-24:

| Name of the person                                                                                              | When the visit occurred     | Significant comments/ suggestions                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Dr. Vinod Kumar Singh<br>Directors, ICAR-Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad. | 23 <sup>rd</sup> Feb., 2023 | Appreciated on-going activities (all <i>Rabi</i> -2023-24 crop FST-2 & 4) under NICRA-TDC <i>i.e.</i> FLDs, Goat & breeding buck units etc. |
| Sh. Kishori Lal Verma,<br>Joint Director (DoA-ATMA), Barmer: and<br>Sh. Sukhdev, A.O., DoA, Barmer.             | 14 <sup>th</sup> July, 2023 | Appreciate on-going activities <i>Kharif</i> -2023 FLDs FST-2 & FST-4 under NICRA-TDC <i>i.e.</i> Pearl millet, Moth bean & Green gram etc. |

### Amount (Rs) mobilized through convergence from various departments:

| S. No. | Activity/ Intervention                        | No. of farmers benefited                  | Coverage [Area (ha.)]                                                | Convergence established with (Name of the programme or department) | Approx. amount (Rs) mobilized |
|--------|-----------------------------------------------|-------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------|
| 1.     | Improved variety                              | Pearl millet var. MPMH-17                 | Collaboration with Dept. of Agriculture (Govt. Of Rajasthan), Barmer | 1250/500                                                           | 225000                        |
| 2.     | Improved variety                              | Green gram var. GM-4                      |                                                                      | 1250/500                                                           | 75000                         |
| 3.     | Improved variety                              | Moth bean var. RMO-225-1/RMO-435/ RMO-257 |                                                                      | 1700/680                                                           | 100800                        |
| 4.     | Kitchen gardening- kharif-2023 & rabi-2023-24 | Vegetable Kit (Kitchen gardening)         |                                                                      | 450/30                                                             | 32500                         |
|        | Total                                         |                                           |                                                                      | 4550/1710                                                          | 230300                        |

Total amount of Rs 230300 was mobilized in different activities/interventions such as improved variety of pearl millet (MPMH-17), green gram (GM-4), moth bean (RMO-225-1/RMO-435/ RMO-257) and others through convergence mode from various departments *i.e.* Rs 225000, Rs 75000, Rs 100800 and Rs 32500, respectively through Department of Agriculture, NGOs *i.e.* SURE, Gravis & Lucid colloid Pt. Ltd. etc.

### Publications and other products developed during the year: Nil

### Significant observations about the project/the performance of interventions/adoption of interventions/livelihood improvement etc:

| SN | Name of Intervention                            | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Cumin var.-GC-4 (wilt tolerant & high yielding) | <p><b>Adoption of technology:</b> Spices crop cumin is the major <i>Rabi</i> crop in Barmer. About 58 per cent farmers are growing cumin crop, but they use the local seed and up to some extent none recommended varieties which perform poorly in aberrant weather conditions families under FST4 (Irrigated with Animal) situation.</p> <p><b>Impact:</b> Cumin var.-GC-4 gives higher return and free from wilt disease caused by <i>Fusarium Spp.</i> A drastic increase in area under cumin var.- of GC-4 was observed in Barmer district.</p> <p><b>Performance of interventions:</b> Total 25 farmers adopted GC-4 FLDs under NICRA-TDC at NICRA village resulting others farmers of villages willing to procure the variety seed from KVK/Govt. agencies for growing. <i>i.e.</i> GC-4 improved variety families under FST-4 (irrigated with animal) situation in <i>Rabi</i>-2023-24.</p> <p><b>Livelihood improvement:</b> Cumin is the major <i>Rabi</i> crop in Barmer district. About 58 per cent farmers are growing cumin crop, but they use the local seed and up to some extent non recommended varieties which perform poorly in aberrant weather conditions in Barmer.</p> |



| SN | Name of Intervention                         | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2  | Moth bean var. RMO-435<br>(Drought tolerant) | <p><b>Adoption of technology:</b> Moth bean is major pulse crop of desert area in Barmer district crop grown about 20 percent area out of 17.55 lakh area. Moth bean is the rainfed crop; so farming of this crop depends on rainfall. Farmers used local cultivar but due to less productivity and insect and disease attack it is necessary to adopt higher yielding cultivar.</p> <p><b>Impact:</b> Moth bean var.-RMO-435 gives higher return and drought tolerant cultivar. A drastic increase in area under moth bean var. RMO-435 was observed in Barmer district.</p> <p><b>Up-scaling:</b> RMO-435 is a high yielding and drought tolerant var.- of Moth bean. This cultivar has become very popular among farming community families under FST-2 (Rainfed with Animal) situation of Barmer district.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3  | Sirohi goat<br>(Breeding buck & Goat Units)  | <p><b>Adoption of technology:</b> For earning the livelihood security of small, marginal and landless families under FST-1 (Rainfed with without animals) and FST-2 Rainfed with Animal) and FST-4 (Irrigated with Animal) situation 25 breeding Buck; earlier same breed was established through 05 units of Sirohi Goat breed (9 female + 1 male) in NICRA villages.</p> <p><b>Impact:</b> Establishment of Sirohi goat unit not only resulted in nutritional improvement but also provided partial employment to farm women, small, marginal, landless farmers and rural youth of Barmer district of Rajasthan.</p> <p><b>Performance of interventions:</b> After establishment of Sirohi goat one farmer earned a net income of Rs 2500-3200 additional through buck selling over local non-descriptive breed at the age of 6 months. The goat again conceived at 375-500 and kidding 365 days through Sirohi breeding buck.</p> <p><b>Livelihood improvement:</b> Due to success of Sirohi goat, farmers adopted to rear Sirohi Goat unit, majority of the farmers have been diverted to purchase Sirohi breed goat and breeding buck under NICRA &amp; adjoining villages under FST-2 (rainfed with animal) and FST-4 (irrigated with animal) agro-climatic situation in the Barmer district.</p> |

## Bharatpur

Performance of component demonstrations laid out by KVK Bharatpur under different modules is as follows:

**Natural Resource Management:** Krishi Vigyan Kendra, Kumher Bharatpur conducted 105 demonstrations which covered 50.00ha area. Under *in-situ* and *ex-situ* moisture conservation different activities like; summer deep ploughing, bunding and levelling minimized run-off water and conserved the moisture for *Rabi* sowing crops; which involved 105 farmers and area increased up to 50.00ha.

Major challenges for farmers of Bharatpur district are over exploited ground water and saline water below 25 feet, uneven exotic, unpredictable rain resulted water scarcity, frequent drought and salinity and dry spell are more/heavy rains and flooding some time. Keeping the point of farmer's challenges, KVK Bharatpur demonstrated the low cost water recharged tubewell technique at 20 farmer's field for better use of run-off rain water for recharge tube well, reduction in fertile soil erosion

and reduced time of composting. Adoption of low cost water recharge tube well technology increased among farmers of nearby area. Change in cropping pattern, farmers started high remunerative crops cultivation and changing in farmer's income and social status. Bringing about radical change in management packages/contributing record production from land, water or animals. Production of wheat, barley, vegetable increased. Soil salinity decrease due to good quality irrigation water, increased income resources. Farmer is focusing on high remunerative vegetable crops. During *Kharif* season, cultivation of Dhaincha green manuring has increased for higher organic carbon in soil and reduction in cost of irrigation.

The stored water is used for irrigation purpose during dry spell as protective irrigation. Due to recharge of tube well and availability of water farmers cultivating wheat, barley, green fodder and vegetables other than mustard. Run off water continuously deliver in tube well, helps farmers to pre-irrigate the field for sowing the rabi crops when September rains are not received. Area of wheat, barley has increased due to availability of water and it helps to reduce the risk of cultivation.

#### **Status of Water quality (before & after recharge) of tube well in NICRA village: Gagaroli**

| Name of farmers | Sampling month: May, 2023 |       | Sampling month: January, 2024 |      |
|-----------------|---------------------------|-------|-------------------------------|------|
|                 | pH                        | EC    | pH                            | EC   |
| Hardam Singh    | 7.3                       | 10.13 | 7.2                           | 7.43 |
| Harveer Singh   | 7.2                       | 8.07  | 7.1                           | 6.25 |
| Rakesh meena    | 7.1                       | 5.65  | 7.0                           | 5.12 |
| Karua           | 7.4                       | 9.45  | 7.2                           | 6.08 |

Normal level: pH <8.5 and EC: <1.50

#### **Recharge tubewell system addressed: Drought & poor quality groundwater**

| Item              | Technology Extension in villages |        |            |             |             |
|-------------------|----------------------------------|--------|------------|-------------|-------------|
| Village name      | Sitara                           | Senhti | Mukandpura | Gangar Soli | Chak Sitara |
| Name of mandal    | Kumher                           | Kumher | Kumher     | Kumher      | Kumher      |
| Total area (ha)   | 365                              | 200    | 92         | 317         | 145         |
| No. of households | 275                              | 150    | 125        | 262         | 90          |

By adding organic matter into the soil, green manures significantly helped in improving the soil structure. KVK Bharatpur demonstrated dhaincha grown as green manuring over 24.0ha area; sowing to 60 farmers' field; which improved the soil health, reduced about 20-25% Nitrogen requirement and also improved the soil physical properties.





FLD on Green manuring using Dhaincha



FLD on Mustard var. DRMR1165-40 at field

**Crop Production:** Total 211 demonstrations were conducted of bajra, mustard, wheat, and barley covering 84.40ha area during *Rabi* season in 2023-24.

RHB-233 variety of pearl millet is medium maturity, yellow anther colour, complete exertion, greyish seed, resistant to major disease & insect pest and variety ICAR-AICRP on Pearl millet, RARI, Jaipur released in 2019. During *Kharif* season in 2023-24 pearl millet variety RHB-233 was demonstrated at 66 farmers' fields covering 26.50ha area, which gave 15.09% higher yield as compared to local variety. Farmers earned a net return of Rs 27030/ha with B:C ratio of 1.68 over the local cultivar (Rs 20410/ha with 1.32 B:C ratio).

Bharatpur district is the largest mustard growing division in Rajasthan with a contribution of more than 48% in the total state's output. DRMR 1165-40 variety of mustard is timely sown rainfed condition, plant height- 177-196cm, average seed yield- 2200-2600kg/ha, oil content- 40-42.5%, seed size- 3.2-6.6g and maturity- 133-151 days, heat tolerant at seedling stage and moisture stress tolerant. During *Rabi* season 2023-24 mustard variety DRMR 1165-40 was demonstrated at 75 farmer's field covering 30.00ha area, which resulted 19.21% more yield than local variety. Farmers earned a net return of Rs 59615/ha with 2.36 B:C ratio in comparison to farmers' variety (Rs 43477/ha with B:C ratio of 2.00).

High yield, late sown and high demand for good for chapatti making variety Raj 4238 of wheat. During *Rabi* season 2023-24 wheat variety Raj-4238 was demonstrated at 50 farmer's field over 20.00ha area, which resulted 15.25% more yield than local variety. Farmers earned a net return of Rs 77600/ha with 1.95 B:C ratio in comparison to farmers' variety (Rs 71818/ha with B:C ratio of 1.88).

In Bharatpur district of Rajasthan 20.0% area is infested with alkali water and 63.0 per cent area is having saline water and rest only 13.0per cent area is of good quality. Six row barley variety DWRB-137, which was released for the irrigated timely sowing condition of North Eastern Zone and Central zone, high yielding ability 42.49 qt/ha, bold grains and higher grain protein content. During *Rabi* season 2023-24 KVKs demonstrated DWRB-137 variety at 20 farmers' fields in 8.00ha area. It was observed



that barley variety DWRB-137 performed better than local varieties under saline soil and water condition, which yielded 19.54% more yield, resulting a net return of Rs 36210/ha with 1.75 B:C ratio as compared to local check (Rs 27840/ha with 1.58 B:C ratio).

Regarding the global climate change the past few decades, the impact of rising temperature on wheat production is gaining concern in the country. Wheat is much sensitive to heat stress. High temperature alters different physiological, biological and biochemical process in wheat. Heat stress in wheat cause decrease in grain filling duration, reduction in grain number, deactivation of rubisco enzyme, decrease in photosynthetic capacity, reduction in rate of assimilate translocation, premature leaf senescence, decrease chlorophyll content and ultimately decrease in yield. KVK Bharatpur demonstrated on foliar application of salicylic acid @100 ppm to enhance the heat stress tolerance in wheat for higher production at 10 farmers field in 4.0ha area, which resulted 15.82% more yield than local variety. Farmers earned a net return of Rs 79850/ha with 1.98 B:C ratio in comparison to farmers' variety (Rs 72742/ha with B:C ratio of 1.87).

**Livestock and Fodder Production:** Low productivity of animals with higher genetic potential can be primarily attributed to the imbalanced and inadequate feeding. Imbalanced feeding leads to excess feeding of some nutrients whilst others remain deficient. This not only reduces milk production and increases costs per kg milk, but also affects various physiological functions including long term animal health, fertility and productivity. A balanced ration should provide protein, energy, minerals and vitamins from dry fodders, green fodders, concentrates, mineral supplements etc., in appropriate quantities to enable the animal to perform optimally and remain healthy. Livestock are more likely to have lower reproductive and productive performance due to summer stress. Feeding high quality forages and balanced rations decrease summer stress and enhance performance of the milking animals. KVK Bharatpur demonstrated 30 demonstrations of mineral mixture (2.0kg/demo) involving 30 livestock owners.

Major interventions were feeding of mineral mixture to overcome mineral/vitamin deficiency, de-worming of animals (150) for internal worm control. Net returns of Rs 175/ animal/day was earned with B:C ratio of 1.89 as compared to control group (Rs 105/ animal/day with B:C ratio of 1.53). Due to use of health management practices, milk production increased (18.62%) in buffaloes as compared to animals which were not provided balanced feed. Total 20 demonstrations were conducted on Urea Molasses Mineral block bricks for 30 buffaloes which resulted 17.65% more milk production as compared to buffaloes which were not provided Urea Molasses Mineral block bricks. During *Kharif* season 2023-24 sorghum fodder variety MP Chari was demonstrated at 20 farmers' fields in 8.00ha area, which gave 30.85% higher yield as compared to local variety. During *Rabi* season 2023-24 berseem fodder variety CSV-141 was demonstrated at 20 farmers' fields in 8.00ha area, which gave 17.64% higher yield as compared to local fodder variety.

**Institutional Interventions:** Total 80 demonstrations were conducted on various implements including disc plough, sprayer, disc Harrow, MP plough, rotavator by involving 80 partner farmers and farm-women for timely completion of agricultural operations covering 124.00ha area during the year 2023. This intervention resulted in saving of time 1.5 to 2.5hr/day, 30 to 35% manpower, 8 to 10% of diesel and with an additional benefit of 10 to 15% in crops yield.



FLD on mineral mixture at NICRA village



Field day on Pearl millet at Gagersoli village

**Custom Hiring Centre:** Different agricultural equipments have performed well and CHC earned revenue of Rs 6850/- during the year 2023; which helped 80 farmers for timely completion of agricultural operations covering 124.00ha area. With the help of custom hiring centre 25 farmers' sprayed micro-nutrient and weedicides. 35 farmers ploughed their field using disc plough and MB plough in heavy clay nature of soils, 10 farmers used disc harrow and 5 farmers used rotavator in shorter time and thus saved labour up to 50 percent.

**Capacity Building Activities:** Total 426 farmers (301-male and farm women 125) actively participated in 9 different training courses in thematic areas related to crop production, livestock management, child nutrition and kitchen gardening etc in NICRA villages. Capacity building activities mainly covered natural resource management, crop management, resource conservation technology, livestock management, pest and diseases control, Natural Farming etc. These trainings were organized prior to season and conductance of demonstrations; as a result, the farmers were aware about latest technologies related to crop production, animal husbandry, diseases and pest management etc.

**Extension Activities:** Adaptation of appropriate mitigation technologies such as the cultivation of tolerant breeds to overcome the climate stress. Water and nutrient management for efficient productivity and resource utilisation. Agro-advisories for timely crop monitoring. Conservation agricultural practices to build soil organic carbon and to build congenial environment for plant growth, manure management. KVK Bharatpur organized various extension activities for adaptation of appropriate mitigation technologies to overcome the climate stress and given emphasis to adopt improved and stress tolerant varieties, *in-situ* and *ex-situ* moisture conservation technologies, water



and nutrient management for efficient productivity and resource utilisation, application of liquid fertilizers, conservation agricultural practices to build soil organic carbon and to build congenial environment for higher crop production and manure management, animal health management crop diversification etc.

Total 9 on-campus and off- campus trainings were organized; in which more than 426 farmers actively participated. Total 37 programmes were organized involving 973 farmers (709 male and 264 farm women) through method demonstrations, group discussions, awareness programmes, agro-advisory services, dignitaries' visits, diagnostic field visits and expert visits etc. Four field days were organized in *Kharif* and *Rabi* season on bajra crops, mustard crops, barley and wheat crop respectively. Two method demonstrations were organised on seed treatment and weed control in which 65 farmers and 10 farm women participated. Total 8 group discussion were held on different topics related to crop production, NRM and livestock management which were attended by 87 farmers and 36 farm women.

### Rainfall scenario for the year 2023:

| <b>Kharif 2020</b>                                    |                 | <b>June</b> | <b>July</b> | <b>Aug</b> | <b>Sept</b> | <b>Oct</b> | <b>Annual</b> |
|-------------------------------------------------------|-----------------|-------------|-------------|------------|-------------|------------|---------------|
| • Rainfall received (mm)                              |                 | 46.6        | 138.3       | 146.9      | 124.6       | 0.7        | 605.2         |
| • No. of dry spells during kharif season 2020         | > 10 days       | 0           | 0           | 1          | 0           | 0          | 0             |
|                                                       | > 15 days       | 0           | 0           | 0          | 0           | 0          | 0             |
|                                                       | > 20 days       | 0           | 0           | 0          | 0           | 0          | 0             |
| • No. of intensive rain spells (2020)                 | > 60 mm per day | 0           | 0           | 0          | 0           | 0          | 0             |
| • Water logging observed (days)                       |                 | Nil         | 1           | Nil        | Nil         | Nil        | Nil           |
| • Any other extreme events observed during the season |                 | Nil         | Nil         | Nil        | Nil         | Nil        | Nil           |

During the reporting year annual average rainfall recorded 605.2mm; while rainfall received 46.6, 138.3, 146.9, 124.6, 0.7mm, respectively, in the months of June, July, August, September and October.

### Impact of contingency measures (Relate the dry spells with crop growth stages:

| S. No | Dry spell (no. of days) | Duration (from --- to---) | Crop name | Crop stage affected | Intervention taken up*                                     | Number of farmers involved | Impact on crop yields (a per ha) |      |                                   |
|-------|-------------------------|---------------------------|-----------|---------------------|------------------------------------------------------------|----------------------------|----------------------------------|------|-----------------------------------|
|       |                         |                           |           |                     |                                                            |                            | Farmers' practice                | Demo | % Increase over farmers' practice |
| 1     | 1                       | 7- August 2023            | Bajra     | -                   | Short duration drought tolerant varieties of Bajra RHB-233 | 66                         | 16.7                             | 19.5 | 16.76%                            |

### Adoption of successful intervention in NICRA village and adjoining villages:

| Successful interventions including crops and varieties | Extent of adoption in the village (ha) |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------------------------------------|----------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
|                                                        | 2012                                   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| Tube-well recharge                                     | 38                                     | 45   | 55   | 75   | 95   | 105  | 125  | 140  | 145  | 165  | 195  | 195  |
| Green manuring                                         | 9                                      | 12   | 15   | 24   | 21   | 26   | 19   | 30   | 28   | 39   | 50   | 60   |
| Spray of growth & micro nutrients                      | 90                                     | 125  | 140  | 160  | 210  | 184  | 250  | 110  | 115  | 110  | 120  | 140  |
| Mineral mixture (no of farmers)                        | 45                                     | 70   | 110  | 125  | 140  | 83   | 150  | 90   | 120  | 150  | 80   | 155  |
| Custom Hiring                                          | 51                                     | 104  | 122  | 130  | 132  | 136  | 140  | 175  | 125  | 145  | 135  | 146  |

Five successful interventions have been adopted in adjoining villages. Recharge of tube well technology has been increased from 38.0ha in 2012 to 195.0ha in the year 2023. Green manuring to improve the soil health, dhaincha crop was taken for green manuring and ploughed down into the soil. This intervention has been adopted in 9.0 ha in 2012 to 60.0ha in 2023. Similarly, spray of growth and micro-nutrient i.e. application of micro-nutrient ( $ZnSO_4$  and  $FeSO_4$ ) technology in mustard, wheat and barley have been widely adopted by the farmers in 90.0ha area during 2012 to 140.0ha in the year 2023. Feeding of mineral mixture to animals has increased from 45 farmers in 2012 to 155 farmers in 2023. Total area under allotment of implements has been increased from 51.00ha in 2012 to 146.00ha in 2023.

### Popularization of Climate Resilient Varieties:

| Crop*   | Climate Resilient Varieties incorporated in the <i>Kharif 2023</i> plan of the State Department | Area brought under the variety by the state department during the <i>Kharif 2023</i> (ha) |
|---------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Bajra   | HHB-299,RHB-233                                                                                 | 124.00                                                                                    |
|         | Climate Resilient Varieties incorporated in the <i>Rabi 2023</i> plan of the State Department   | Area brought under the variety by the state department during the <i>Rabi 2023</i> (ha)   |
| Mustard | DRMRIJ-31,DRMR1165-40                                                                           | 26540.00                                                                                  |
| Barley  | RD-2794,DWRB-137                                                                                | 115.00                                                                                    |
| Wheat   | Raj-4238                                                                                        | 3206.00                                                                                   |

The climate resilient variety of bajra (HHB-299, RHB-233) was demonstrated in the *Kharif 2023* covering 124.00ha area. Similarly, under climate resilient varieties of mustard (DRMRIJ-31, DRMR1165-40), barley (RD-2794, DWRB-137) and wheat (Raj-4238) were included in the *Rabi-2023* plan of the State Department and has covered 26540.00, 115.00ha area and 3206.00ha area, respectively in Bharatpur district of Rajasthan.



**Awards Received during the year for the work related to NICRA: Nil**

**Distinguished visitors to the NICRA village during the year:**

| Name of the person                                                                                                          | When the visit occurred | Significant comments per suggestions                                                 |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------|
| Sh. Shivcharan Meena, NITI AAYOG,<br>Dr. Harshika Choudhary, consultant,<br>Agriculture and allied sectors, NITI AAYOG, GOI | 23.06.2023              | Interaction with NICRA farmers and visited tube well recharge technology at village. |
| Dr. Sudesh Kumar, DEE SKNAU Jobner                                                                                          | 26.02.2024              | Interaction with NICRA farmers                                                       |

**Amount (₹) mobilized through convergence from various departments: Nil**

**Publications and other products developed during the year: Two**

| Description (nature of publication)                                              | Citation                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| मासिक पत्रिका. खेती. मार्च 2024                                                  | नवाबसिंह, पी. पी. रोहिल्ला, दिलीप मातवा, और जे.पी. मिश्रा. .2024. कम लागत वाली ट्यूबवेल पुरर्भरण तकनीकी. खेती. मार्च 2024: 37–40                                                                                      |
| कृषि स्मारिका फार्म टेक एशिया 2024. श्री कर्ण नरन्द्र कृषि विश्वविद्यालय, जोबनेर | नवाबसिंह, कृष्ण अवतार मीणा, डॉ योगेन्द्र कुमार मीणा एवं गोविन्दा. 2024. जलवायु समुत्थानशील कृषि पर राष्ट्रीय नवाचार (निकरा). कृषि स्मारिका फार्म टेक एशिया 2024. श्री कर्ण नरन्द्र कृषि विश्वविद्यालय, जोबनेर.:21–23. |

**Significant observations about the project per the performance of interventions per adoption of interventions per livelihood improvement etc:**

| SN | Name of Intervention                           | Description of technology, adoption ,impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Recharge of Tube well by rain water harvesting | <p><b>Adoption of technology:</b> Underground water being saline and rainfall occurrence is less than average, hence irrigation water availability is major concern. Farmers did not cultivate oilseeds, pulses and vegetables in selected villages under NICRA scheme.</p> <p><b>Impact:</b> Water table has raised significantly (8 to 10 ft) collects nearly 3000 cubic meters of rain water and continuously delivers in tube wells. The stored water is used for irrigation purpose during dry spell as life saving irrigation. Due to recharge of tube well and availability of water, farmers are cultivating wheat, barley and vegetables in addition to mustard. Runoff water continuously delivers in tube well, helps farmers to pre-irrigate the fields for sowing the <i>Rabi</i> crops when September rains are not received. Area of wheat, barley has increased due to availability of water and it helped to reduce the risk of cultivation and also reduced cost of irrigation. Soil salinity decreased due to good quality water.</p> <p><b>Economics:</b> Total expenditure in one recharge Tube well is about Rs 10000/- only and crop yield increased up to 25% with quality seed and area also increased under <i>Rabi</i> crops.</p> <p><b>Up-scaling:</b> Recharge of tube well technology has been largely adopted by farmers of nearby four villages in Bharatpur district.</p> |
| 2. | Gypsum application                             | Groundwater of village is slightly saline in nature. Farmers used gypsum @ 250kg/ha and demonstrations were also conducted on gypsum application under NICRA project. Now around 25 farmers of NICRA villages are regularly using gypsum in crop, especially in oilseeds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



| SN | Name of Intervention                       | Description of technology, adoption ,impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                  |
|----|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. | Mitigation of Mineral & vitamin deficiency | Total 10 farmers were using mineral mixture in animal feeding at the time of Project launch. Demonstrations on mineral mixture incorporation in animal feed were carried out to motivate the farmers under NICRA Project. As a result, more than 70% farmers are using mineral mixture for animal feeding. Incorporation of mineral mixture increased 15-17% milk yield, decreased disease incidence and service period by 20-40 days. |

## Bhilwara-I

Performance of component demonstration laid out by KVK Bhilwara under different modules is as follows:

**Natural Resource Management:** During the year 2023, KVK Bhilwara organized 5 *In-situ* moisture conservation in maize like; deep ploughing + sowing against the slope and ridging after sowing (30 DAS) which resulted in improving the available moisture to maize and gave 22.40% higher grain yield as compared to farmers' practices. Farmers earned a net return of Rs 39130/ha with B:C ratio of 2.6 over the local cultivar (Rs 26380/ha with 1.9 B:C ratio) increased productivity through demonstrations involving 5 farmers. They used this practice to raise the crop and improve the water holding capacity of soil and 5 foliar sprays of 1% KNO<sub>3</sub> in maize during drought period. The results showed to mitigate the drought effect in maize and gave 21% higher grain yield as compared to farmer practices. Farmers earned a net return of Rs 36440/ ha with B:C ratio of 2.5 over the local cultivar (Rs 25210/ha with 1.9 B:C ratio) increased the productivity through demonstrations involving 10 partner farmers.

**Farm pond:** Suitalbe place was finalized for the farm pond establishment at newly selected NICRA village, selection of site and planning has been done for the establishment of farm pond with the capacity of 3.00 lakh litre of water (size:10×10×3 meter) for *ex-situ* moisture conservation at newly adopted NICRA village in March, 2023 Dholikhhera, Bhilwara according to ICAR-CRIDA Hyderabad guidelines.



***In-situ* moisture conservation in maize at 30DAS**



**FLD on Gram var GNG-2144 at farmer's field**



**Crop Production:** Total 30 demonstrations were conducted in maize, black gram, sorghum covering 6.0ha area. During *Kharif* season 2023, maize variety PHM-3 was demonstrated at 10 farmers' fields covering 2.0ha area, which resulted in 21.07% higher yield as compared to local variety. Farmers earned a net return of Rs 36970/ ha with B:C ratio of 2.59 over the local cultivar (Rs 18830/ha with 1.68 B:C ratio). Improved variety of black gram PU-1 was demonstrated at 10 farmers' fields in 2.0 ha area, which resulted in 24.84% higher yield as compared to local variety. Farmers those who have sown the modern variety earned a net return of 12630/ha with 1.62 B:C ratio in comparison to farmers' variety (Rs 6900/ ha with B:C ratio 1.30). Double purpose variety of sorghum CSV-15 was demonstrated at 10 farmers' fields in 2.0ha area, which resulted in 30.67% higher yield as compared to local variety. Farmers earned a net return of Rs 27680/ha with 2.29 B:C ratio in comparison to farmers' variety (Rs 11590/ ha with B:C ratio 1.49).

Suitable intercropping systems under real rainfall situations (maize + black gram 2:2) were also demonstrated at 5 farmers' fields in 1.00ha area; which resulted in 24% higher yield as compared to local variety. Farmers earned a net return of Rs 41854/ha with 2.88 B:C ratio in comparison to farmers' variety (Rs 26630/ha with B:C ratio 2.08) which minimized the loss of single crop failure.

During *Rabi* season 2023, total 20 demonstrations were conducted on mustard and gram covering 4.0ha. *Mustard* variety RH-725 was demonstrated at 10 farmers' fields in 2.0ha area, which resulted in 34% higher yield as compared to local variety. Farmers earned a net return of Rs 50490/ ha with B:C ratio of 3.31 over the local cultivar (Rs 32410/ha with 2.38 B:C ratio). Improved variety of gram GNG-2144 was demonstrated at 10 farmers' fields in 2.0ha area, which resulted in 39% higher yield as compared to local variety. Farmers those who have sown the modern variety earned a net return of Rs 48250/ha with 2.68 B:C ratio in comparison to farmers' variety (Rs 32460/ ha with B:C ratio 2.00).

**Livestock and Green fodder production:** Total 101 demonstrations were conducted, viz; introduction of new fodder crops napier grass at 20 farmers field, improved poultry breed 20 demonstrations (Partapdhan chicks) and goat (Sirohi breed) were demonstrated to livestock farmers under NICRA project as these breeds perform well and gave additional income. Total 40 demonstrations of area specific mineral mixture for animal feeding and digestibility of fodder and milk production increased and 20 demonstrations were conducted on vermicompost, jeevamrit, Ghanjeevamrit & beejamrit.

### **Institutional Interventions:**

**Custom Hiring Centre:** CHC established in March 2022 at newly adopted NICRA village Dholikhara, Bhilwara according to ICAR-CRIDA Hyderabad guidelines. Different agricultural implements (seed cum fertilizer drill, tractor operated spray machine, disc harrow, MB plough, cultivator, disc plough and knapsack sprayer) performed very well which earned a revenue of Rs 7110/- by helping 52 farmers for timely completion of agricultural operations covering 80.0 ha area during the year under report.

**Capacity Building Activities:** Total 599 farmers (256 male and 343 farm women) actively participated in 15 different training courses in thematic area related to crop production, plant protection, horticulture, livestock management, self-employment through poultry rearing, awareness on custom hiring center forest etc. in NICRA village. Capacity building activities mainly covered crop production, pest and diseases control, livestock management etc. These trainings were organized prior to season

and conductance of demonstration; as a result, the farmers are being aware about latest technologies related to crop production, livestock, diseases and pest management etc.



FLD on Sirohi Goat at Dolikhhera village



Exposure visit of Farm women to SKNAU Jobner

**Extension Activities:** Two exposure visit of farmers programmes were conducted involving total 70 partner farmers (25 male and 45 farm women) and 9 Awareness programmes were organized involving total 303 partner farmers (100 male and 203 farm women) through awareness training programme on zaid crops, awareness about *in-situ* moisture conservation, awareness programme on natural farming, awareness on rearing and feeding of Pratapdhan poultry, awareness programme on natural farming etc.

### Rainfall scenario for the year 2023:

| Month                                                                             |                                                    | June  | July | Aug  | Sept | Oct | Nov  | Dec  | Jan | Annual |
|-----------------------------------------------------------------------------------|----------------------------------------------------|-------|------|------|------|-----|------|------|-----|--------|
| Rainfall received in (mm)                                                         |                                                    | 245.3 | 249  | 28.5 | 109  | 0.0 | 10.3 | 31.2 | 0.0 | 673.3  |
| No. of dry spells during <i>kharif</i> season 2023                                | >10days                                            | -     | -    | -    | -    | -   | -    | -    | -   | -      |
|                                                                                   | >15days                                            | 1     | 1    | -    | -    | -   | -    | -    | -   | -      |
|                                                                                   | >20days                                            | -     | -    | 1    | 1    | 1   | 1    | 1    | 0   | -      |
| No. of intensive rain spells (2023)                                               | >60 mm per day                                     | 1     | 0    | 0    | 0    | 0   | 0    | 0    | 0   | -      |
|                                                                                   | Water logging/ Flooding observed (days)            | -     | 2    | -    | -    | -   | -    | -    | -   | -      |
| Any other extreme events (Heat wave, Cold wave, frost) observed during the season | Heat waves at the maturity of crops in rabi season | -     | -    | -    | -    | -   | -    | -    | -   | -      |
| Contingency measures adopted during the season                                    | 1)                                                 | Nil   | Nil  | Nil  | Nil  | Nil | Nil  | Nil  |     | Nil    |

During the reporting year annual rainfall recorded 673.3 mm.

### Impact of contingency measures taken up in the village (Relate the dry spells with crop and their growth stages):

| S. No | Dry spell/ heat wave/cold wave/frost (no. of days) | Duration (from --- to-----)                                                                                                    | Crop name | Crop stage affected | Intervention taken up*                                  | Number of farmers involved | Impact on crop yields (q/ha)  |                             |                                 |
|-------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------|---------------------------------------------------------|----------------------------|-------------------------------|-----------------------------|---------------------------------|
|       |                                                    |                                                                                                                                |           |                     |                                                         |                            | Farmers' practice             | Demo                        | Increase over farmers' practice |
| 1     | Dry spell (49 days)                                | 1 <sup>st</sup> June to 15 <sup>th</sup> June, 1 <sup>st</sup> August and 24 <sup>th</sup> August to 5 <sup>th</sup> September | Maize     | Grain filling       | Foliar Spray KNO <sub>3</sub> @1%                       | 5                          | 18.40                         | 23.30                       | 21%                             |
| 2     | Heat wave (>10 days)                               | 16th Feb to 25th Feb                                                                                                           | Mustard   | Grain filling       | Lifesaving irrigation given wherever water is available | 5                          | Without lifesaving irrigation | Light lifesaving irrigation | 15%                             |

### Adoption of successful interventions in NICRA village & adjoining villages:

| Successful interventions                                                            | Crop                       | Variety                          | Extent of adoption in the village in ha (2023) |
|-------------------------------------------------------------------------------------|----------------------------|----------------------------------|------------------------------------------------|
| NRM                                                                                 |                            |                                  |                                                |
| <i>In-situ</i> moisture conservation in maize                                       | Maize                      | PHM-3                            | 10                                             |
| Foliar spray of 1% KNO <sub>3</sub> in maize                                        | Maize                      | PHM-3                            | 10                                             |
| CROP                                                                                |                            |                                  |                                                |
| Short duration and drought resistant improved variety                               | Maize, Black gram, sorghum | PHM-3, PU-01, CSV-15             | 30                                             |
| Suitable intercropping systems under real rainfall situations (maize+blackgram 2:2) | Maize+Black gram           | PHM-3 + PU-01                    | 12                                             |
| Livestock                                                                           |                            |                                  |                                                |
| Feeding of Area Specific Mineral mixture                                            | Mineral mixture            | Area Specific                    | 15                                             |
| Animal health and vaccination camp                                                  | 1                          | 1                                | 70 farmers                                     |
| Sirohi buck                                                                         | Buck                       | Breed improvement                | 1                                              |
| Improved germplasm of poultry                                                       | Partapdhan                 | 20 chicks/ farmer                | 10                                             |
| Vermicompost, Jeevamrit, Ghanjeevamrit and Beejamrit                                |                            | 60 kg each                       | 10                                             |
| Napier grass                                                                        |                            | Round the year fodder production | 10 (10 kg each)                                |



Several successful interventions under NICRA project have been adopted in Dholikhara village in Bhilwara district. In 2023-24, Drought tolerant and short duration varieties of maize (PHM-3) have been sown in 32.0ha area, black gram (PU-01) has been sown over 16.0ha area, sorghum (CSV-15) has been sown over 8.0ha area. For the animals' milk production, health and breed improvement at NICRA village 100kg area specific mineral mixture, one animal health and vaccination camp and artificial insemination/improved bull, one breeding buck (Sirohi) have been established in NICRA village. Total 10 waste decomposer, 10 vermicompost and 20 napier grass have been established in village for animals.

### Popularization of Climate Resilient Varieties:

| Crop       | Climate Resilient Varieties incorporated in the <i>Kharif</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Kharif</i> 2023 (ha) |
|------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Maize      | PHM-3                                                                                           | 22612                                                                                             |
| Black gram | PU-01                                                                                           | 11520                                                                                             |
| Sorghum    | CSV-15                                                                                          | 22800                                                                                             |
|            | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023 plan of the State Department   | Approx. area brought under the variety by the state department during the <i>Rabi</i> 2023 (ha)   |
| Mustard    | RH-725                                                                                          | 14000                                                                                             |
| Chickpea   | GNG-2144                                                                                        | 15340                                                                                             |

**Awards Received during the year for the work related to NICRA:** Nil

**Distinguished visitors to the NICRA village during the year:** Nil

**Amount (Rs) mobilized through convergence from various departments:** Nil

**Publications & other products/Video films etc, developed during the year:** Nil

**Significant observation about the project per the performance of interventions per adoption of intervention per livelihood improvement etc:**

| SN | Name of intervention                                                                | Description of technology , adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                         |
|----|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Maize—PHM-3<br>(Drought tolerant/improved varieties)                                | <b>Adoption of technology:</b> Maize the major <i>kharif</i> crop in Bhilwara district. About 90% farmers are growing maize but they use the local seed and up to some extent non recommended varieties which perform poorly in aberrant weather conditions.<br><b>Impact:</b> In normal rainfall area it gives higher return. A drastic increase in area under maize variety-PHM-3 has been recorded.                          |
| 2. | Blackgram—PU-01-<br>(Short duration varieties /Drought tolerant/improved varieties) | <b>Adoption of technology:</b> Black gram is major pulse <i>kharif</i> crop in Bhilwara. About 78% farmers growing black gram crop, but they use local seed and up to same extent non recommended varieties which perform poorly in aberrant weather conditions.<br><b>Impact:</b> Black gram variety PU-01 higher yield and high return variety. A drastic increase in area under black gram variety -PU-01 has been observed. |

| SN | Name of intervention                                                             | Description of technology , adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                            |
|----|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. | Sorghum-CSV-15<br>(Double purpose<br>/Drought<br>tolerant/improved<br>varieties) | <b>Adoption of technology:</b> Sorghum is the major fodder and grain crop in <i>kharif</i> season of Bhilwara district. Old varieties have lower yield potential as well as poor tolerance.<br><b>Impact:</b> Sorghum variety CSV-15 is double purpose and high yielding with good tolerance against stresses.                                                                                                                                     |
| 4. | Partapdhan unit                                                                  | <b>Adoption of technology:</b> For earning the household low income and food security of small and marginal families total 10 units of Partapdhan poultry breed of 60 chicks were demonstrated in NICRA village.<br><b>Impact:</b> After this intervention farmers earned Rs 200 to 250 per day extra income through poultry rearing and along with this, using the products obtained from poultry in their food, they are taking a balanced diet. |
| 5  | Sirohi goat unit                                                                 | <b>Adoption of technology:</b> For earning extra income and breed improvement of goat 2 breeding buck of Sirohi breed were established in NICRA village.<br><b>Impact:</b> Establishment of Sirohi buck not only resulted in breed improvement but also provided partial employment to farm women, rural youth of Bhilwara.                                                                                                                        |
| 6  | Area specific mineral<br>mixture                                                 | <b>Adoption of technology:</b> After selection NICRA village we found that animals' health and digestibility is not good then KVK provided area specific mineral mixture (10 kg/ farmer).<br><b>Impact:</b> After this intervention animals feeding and digestibility of fodder has increased significantly and milk production is also increasing 200 to 300 ml per day per animal.                                                               |
| 7  | Napier grass                                                                     | <b>Adoption of technology:</b> After selection NICRA village we found that during drought time no availability of green fodder for animals then animals gave low milk yield.<br><b>Impact;</b> After this intervention round the year green fodder availability was ensured to animals at the time of drought.                                                                                                                                     |
| 8  | Improved shelters                                                                | <b>Adoption of technology:</b> Before this intervention, animals were kept under the open sky, due to which animals were more afraid of heat and cold wave, due to which animals exposed to many diseases and low milk yield.<br><b>Impact:</b> Due to improved animal shelters; protection of animals from heat & cold wave, rain and not affected through diseases and milk production has also increased.                                       |

## Bikaner-I

Performance of component demonstration laid out by KVK Bikaner-I under different modules is as follows:

**Natural Resource Management:** During the year 2023, the Krishi Vigyan Kendra Bikaner-I undertook a significant initiative in Natural Resource Management by analysing soil samples from 40 farmers' fields. This assessment provided valuable insights into the soil's nutrient status and health. Based on the findings, KVK experts offered tailored recommendations for nutrient application, aligning with the specific needs indicated by the soil health cards issued to each farmer. This proactive approach not only



aims to enhance crop productivity but also promotes sustainable farming practices, ensuring the long-term health of the agricultural ecosystem.

In an effort to enhance soil health, a collaborative initiative involved the sowing of cluster bean across a 10.0ha area for green manuring, engaging 25 local farmers. This sustainable practice not only reduced nitrogen requirements by 20-24% but also significantly improved the soil's physical properties, promoting better water retention and aeration. By integrating such natural resource management techniques, the project not only supports agricultural productivity but also fosters environmental stewardship within the farming community.

**Crop production:** During the *Kharif* season of 2023, a total of 50 demonstrations were conducted on green gram and moth bean, covering 20.0ha area. The improved green gram variety, Virat, was shown on 25 farmers' fields across 10.0ha area, resulting in significantly higher yields compared to local varieties. Farmers who adopted this modern variety reported a net return of Rs 56711/ha with B:C ratio of 4.15, in contrast to Rs 41649/ha with B:C ratio of 3.31 for the local variety.



FLD on Moth bean var RMO-2251 at field



FLD on green gram var. Virat at farmer's field

Additionally, the short-duration moth bean variety RMO-2251 was also demonstrated on 25 farmers' fields in another 10.0ha area, yielding better results than the local variety. Farmers growing RMO-2251 achieved a net return of Rs 33950/ha with a B:C ratio of 4.57, compared to Rs 22675/ha with a B:C ratio of 3.38 for the local variety. These demonstrations highlighted the economic benefits of adopting improved crop varieties in sustainable agricultural practices.

**Livestock and fodder production:** In the year 2023-24, one demonstration was conducted under the NICRA project, focusing on the Sirohi goat breed, which is renowned for its adaptability and high performance in various climatic conditions. This demonstration aimed to educate livestock farmers about the advantages of this breed, such as its efficient meat and milk production. To further enhance the genetic quality of the goat population in the NICRA village, one high-quality breeding buck was

introduced, promoting better breeding practices among local farmers. In addition to the goat demonstration, a livestock management initiative was implemented, where 20 Chebro poultry birds were provided to 20 farmers as part of a breed improvement program. This initiative not only aims to improve the poultry stock but also to encourage sustainable farming practices. By integrating these demonstrations, the project seeks to elevate the productivity and profitability of livestock farming community, ultimately contributing to improved livelihoods.

**Institutional Interventions:** Custom Hiring Centre suitable place was finalized for the CHC establishment at newly selected NICRA village, selection of site and planning has been done for the establishment of CHC at newly adopted NICRA village in April 2022 Kanasar, Bikaner according to ICAR-CRIDA Hyderabad guidelines. Different agricultural implements (rotavator and tractor operated spray machine, disc harrow) performed very well which earned revenue of Rs 10000/- by helping 125 partner farmers for timely completion of agricultural operations over 290.0ha area.

**Capacity Building Activities:** Total 232 farmers (197 male and 35 farm women) actively participated in 8 different training courses in thematic area related to crop production, plant protection, horticultural crops management and kitchen gardening etc in NICRA village. Capacity building activities mainly covered; crop production, pest and diseases control horticulture crops management etc. These trainings were organized prior to season and conductance of demonstration; as a result, the farmers were aware about latest technologies related to crop production, horticulture crops, diseases and pest management etc.



**On-campus training of NICRA farmers**



**FLD on Sirohi goat at Kanasar village**

**Extension Activities:** Total 11 programmes were organized involving total 323 partner farmers (270 male and 53 farm women) through method demonstration awareness programmes, VCRM meeting, pre *Kharif* workshop, ICAR foundation day, World soil day, Viksit Bharat sankalp yatra, field days on cluster bean, moth bean, green gram, mustard and chickpea.

### Rainfall Characteristics of 2023 and stress experienced:

| Rainfall                                           |                | Normal RF |       |
|----------------------------------------------------|----------------|-----------|-------|
| Annual rainfall (mm)                               |                | 265       | 360.2 |
| June                                               |                |           | 34.6  |
| July                                               |                |           | 256.2 |
| August                                             |                |           | 0     |
| September                                          |                |           | 61.8  |
| Total <i>Kharif</i> rainfall                       |                |           | 352.6 |
| Total <i>rabi</i> rainfall                         |                |           | 7.6   |
| No. of rainy days                                  |                |           | 49    |
| No. of dry spells during <i>kharif</i> season 2023 | >10days        |           | 14    |
|                                                    | >15days        |           | 09    |
|                                                    | >20days        |           | 05    |
| No. of intensive rain spells                       | >60 mm per day |           | 01    |

During the reporting year annual rainfall recorded 360.2.mm.

### Impact of contingency measures taken up in the village (Relate the dry spells/floods/heat wave/cold wave/etc., with crops and their growth stages)

| S. No | Dry spell (no. of days)                                                    | Duration (from --- to---)   | Crop name     | Crop stage affected | Intervention taken up*                                   | Number of farmers involved | Impact on crop yields (q/ha)   |                              |                                 |
|-------|----------------------------------------------------------------------------|-----------------------------|---------------|---------------------|----------------------------------------------------------|----------------------------|--------------------------------|------------------------------|---------------------------------|
|       |                                                                            |                             |               |                     |                                                          |                            | Farmers' practice              | Demo                         | Increase over farmers' practice |
| 1.    | Heat stress (Temperature went above 36 °C)<br>04 days in (Feb)05days March | 16-17,19-20 feb&11-15 march | Gram, Mustard | Grain filling       | Life saving irrigation given wherever water is available | 40                         | Without life saving irrigation | Light life saving irrigation | 13-15%                          |

### Adoption of successful interventions in the NICRA village & the adjoining villages:

Several successful interventions under NICRA project have been adopted in Kanasar village in Bikaner district. In 2023-24, drought tolerant and short duration varieties of green gram (Virat) have been sown over 110.0ha area, moth bean (RMO-2251) has been sown over 80.0ha area, green manuring, cluster bean (RGC-1033) have been sown in 08.0ha area. For the animal breed improvement one Sirohi breeding buck and Poultry unit 20 framers (2+1) have been established in NICRA.



| Successful interventions | Crop                   | Variety  | Extent of adoption in the village in ha (2023) |
|--------------------------|------------------------|----------|------------------------------------------------|
| NRM                      |                        |          |                                                |
| Green Manuring           | Cluster bean           | RGC-1033 | 08                                             |
| CROP                     | Moth bean              | RMO-2251 | 80                                             |
|                          | Green gram             | Virat    | 110                                            |
|                          | Mustard                | Radhika  | 30                                             |
|                          | Chickpea               | GNG-2171 | 90                                             |
| Livestock                | Breeding Buck -1(Goat) | Sirohi   | -                                              |
|                          | Poultry (2+1)          | Chebro   |                                                |

### Popularization of Climate Resilient Varieties:

| Crop*        | Climate Resilient Varieties incorporated in the <i>Kharif</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Kharif</i> 2023 (ha) | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Rabi</i> 2023 (ha) |
|--------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Cluster bean | RGC-1033                                                                                        | 21000                                                                                             | Mustard (Radhika)                                                                             | 50                                                                                              |
| Greengram    | Virat                                                                                           | 170                                                                                               | Chickpea GNG2171                                                                              | 30000                                                                                           |
| Moth bean    | RMO-2251                                                                                        | 11000                                                                                             |                                                                                               |                                                                                                 |

**Awards Received during the year for the work related to NICRA: Nil**

**Distinguished visitors to the NICRA village during the year: 2023-24**

| Name of visitors                                                                             | Date                      | Remarks                                                                                                          |
|----------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------|
| Dr. A.K Singh, Former ATARI Director and former Vice Chancellor Bihar Agriculture University | 26.08.2023                | He reviewed NICRA activities and gave valuable suggestion and appreciated the crop production, livestock and CHC |
| Dr. PP Rohilla, PS & Nodal Officer, NICRA Project, ATARI Jodhpur                             | 27.06.2023                | He reviewed NICRA activities and progress NICRA project                                                          |
| Dr. Arun Kumar Vice Chancellor, SKRAU Bikaner                                                | 26.08.2023 and 16.02.2024 | He reviewed NICRA activities and progress NICRA project                                                          |

**Amount (Rs.) mobilized through convergence from various departments : Nil**

**Publications and other products/Video films etc. developed during the year : Nil**





### Significant observation about the project per the performance of interventions per adoption of intervention per livelihood improvement etc:

| SN | Name of intervention                                    | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Green gram –Virat (Drought tolerant/improved varieties) | <p><b>Adoption of technology:</b> The adoption of the improved green gram variety, Virat, in Bikaner district has significantly transformed local agricultural practices, particularly among the 56% of farmers who cultivate this important kharif crop. Traditionally, many farmers relied on local and non-recommended varieties, which often underperformed in the face of erratic weather patterns, leading to lower yields and economic instability. However, the introduction of the drought-tolerant Virat variety has provided a robust alternative that is better suited to the region's climatic challenges. Farmers who adopted Virat variety have reported substantial increases in crop productivity, especially in areas with normal rainfall. This improved variety not only enhanced yield but also offered higher economic returns, making it a more viable option for local farmers. The transition to Virat has resulted in a significant expansion of the area under green gram cultivation, as farmers recognize the benefits of using a variety that is resilient to drought and adverse weather conditions at Bikaner district.</p> <p><b>Impact:</b> The impact of this technology adoption goes beyond individual farm profitability; it fosters greater food security in the region and encouraged sustainable farming practices. By shifting to the improved green gram variety, farmers are better equipped to adapt the climate variability, ensuring more stable incomes and contributing to the overall agricultural resilience.</p> |
| 2. | Moth bean –RMO-2251 (Short duration var.)               | <p><b>Adoption of technology:</b> The adoption of the short-duration moth bean variety RMO-2251 in Bikaner district has significantly enhanced the agricultural landscape for local farmers, particularly among the 68% of farmers who cultivate this essential kharif pulse crop. Traditionally, many farmers relied on local and non-recommended seed varieties, which often struggled under fluctuating weather conditions, leading to sub-optimal yields and economic challenges. The introduction of RMO-2251, known for its resilience and quick maturation, has provided a viable alternative that better meets the needs of farmers. As farmers have started to adopt the RMO-2251 variety, they have experienced remarkable increases in both yield and profitability. This improved variety is not only more productive but also offers higher economic returns as compared to local seeds. Consequently, there has been a drastic increase in the area dedicated to cultivating moth bean RMO-2251, as more farmers have recognized its advantages and the potential for greater financial stability.</p> <p><b>Impact:</b> The positive impact of this technology adoption extends beyond individual farms, contributing to improved food security in the region and promoting sustainable agricultural practices. By transitioning to the RMO-2251 variety, farmers are better equipped to adapt to climate variability, ensuring more reliable incomes and enhancing the overall resilience of Bikaner's agricultural sector.</p>                      |
| 3. | Cluster bean-RGC-1033 (Green manuring)                  | <p><b>Adoption of technology:</b> The adoption of the Cluster bean variety RGC-1033 for green manuring in the NICRA village of Kanasar had a significant &amp; positive impact on local agricultural practices. This variety, known for its nitrogen-fixing capabilities, has been integrated into farming system to enhance soil fertility and health. By sowing RGC-1033, farmers have experienced a reduction in the need for synthetic fertilizers, leading to cost savings and a more sustainable approach to nutrient management. Additionally, the use of this green manuring technique has improved the physical properties of the soil, including its structure and moisture retention, which are critical for crop growth.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



| SN | Name of intervention | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                      | <p><b>Impact:</b> Farmers in Kanasar village have reported increased yields from subsequent crops due to the enriched soil conditions created by the decomposition of the cluster bean plants. This practice not only supported better crop productivity but also promoted biodiversity and reduced soil erosion. The successful implementation of RGC-1033 in the region serves as a model for sustainable agricultural practices, highlighting the importance of technology adoption in enhancing food security and fostering environmental stewardship. Overall, the positive impacts of this initiative reflect the potential for cluster beans to transform agricultural productivity in similar farming communities.</p>                                                                                                                                                                                                                                                                                                                                                                        |
| 4. | Sirohi Breeding Buck | <p><b>Adoption of technology:</b> The demonstration on Sirohi breed aimed to showcase the benefits of this breed, which is known for its high productivity, adaptability, and good health traits. By introducing one high-quality breeding buck to local farmers, the project seeks to enhance the genetic quality of the goat population, ultimately leading to improved meat and milk production.</p> <p><b>Impact:</b> The impact of this technology adoption has been multifaceted. Farmers have reported an increase in the overall health and vitality of their goat herds, as well as improved reproductive performance, thanks to the introduction of the Sirohi genetics. This has led to higher yields and better quality produce, which directly translates to increased income for the farmers. Additionally, the successful demonstration has fostered a greater awareness of modern breeding practices, encouraging more farmers in the community to consider upgrading their livestock for better productivity.</p>                                                                    |
| 5. | Poultry birds        | <p><b>Adoption of technology:</b> The adoption of a livestock management initiative involving the distribution of 20 poultry birds to 20 farmers in the NICRA village during the 2023-24 period had a transformative impact on local poultry farming practices. This breed improvement program aimed to enhance the genetic quality and productivity of the poultry stock among participating farmers. By introducing high-quality birds, the initiative not only promoted better meat and egg production but also encouraged sustainable farming methods.</p> <p><b>Impact:</b> Farmers have reported significant improvements in both yield and income since integrating these improved breeds into their operations. The enhanced productivity of the new poultry stock has led to a steady supply of eggs and meat, boosting food security within the community. Additionally, the initiative has fostered knowledge sharing among farmers regarding best practices in poultry management, including feeding, housing, and health care, which has further enhanced overall flock performance.</p> |

## Churu-I

KVK Churu-I has been implementing Technology Demonstration Components since 2022-23. Category-wise progress of different modules carried out are as under: -

**Natural Resource Management:** The soil and water are two main factors pertaining to effective crop production in the NICRA village selected for technology demonstration. Demonstrations of short duration variety of cluster bean (RGC-1033) were carried out at 50 farmer's fields on 20.0ha of land (each of 0.4ha) under the Natural Resources Management component. The yield was 27.81% more

than that of the unidentified cluster bean cultivar. Soil Samples of 90 farmers' fields were tested and they were advised to apply nutrients in accordance with the recommendations provided in Soil Health Card.

To combat the saline irrigation water situation 20 demonstrations of mustard var.CS-60 (Salt tolerant) developed by ICAR-CSSRI, Karnal were conducted over 8.0ha area. Seed treatment with bio-inoculants viz. *Rhizobium*, PSB and soil treatment with *Trichoderma* after proper multiplication in vermicompost was also followed in all above demonstrations. Demonstration of wind breaker plants in north-west direction at 10 farmers' fields along with the use of Pusa Hydrogel in pits of plants conducted in NICRA Village. Use of Pusa Hydrogel improved water holding capacity of soil resulting in saving of 3-4 irrigations than control pits. To improve the organic carbon content of soil 5 demonstrations of vermicompost units were conducted, which resulted in return of Rs 4300- 4,600 per unit earned by the farmers.



**Demo on In-situ Soil moisture conservation**



**Field Demo on Cluster bean var. RGC-1033**

**Crop Production Module:** Cluster bean is drought tolerant, short duration, multi branches crops variety of cluster bean RGC-1033 was demonstrated at 50 farmers' fields in 20.0ha area during *Kharif* season 2023, which resulted in 27.81% higher yield as compared to existing variety of cluster bean. Farmers got a net return of Rs 17615/ ha with B: C ratio of 1.73 over the unidentified cultivar (Rs 9485/ha with 1.41 B: C ratio).

Fenugreek variety (AFG-3) was demonstrated at 10 farmers' fields covering 4.0ha area during *Rabi* season. This variety is improved and moderately resistant to powdery mildew which resulted in 22.76% higher yield as compared to existing variety of fenugreek. Farmers got a net return of Rs 57103 ha with B:C ratio of 2.67 over the unidentified cultivar (Rs 42056/ha with 2.30 B:C ratio). During *Rabi* season suitable for salt affected soil and saline water irrigation, demonstrations of mustard (variety CS-60) were conducted in 8.0ha area at 20 farmer's fields, which resulted in 18.67% higher yield as compared to existing variety. Farmers earned a net return of Rs 49669/ ha with B:C ratio of 2.46 over the unidentified cultivar (Rs 39672/ha with 2.28 B:C ratio).

**Livestock and Green fodder production:** Sustaining productivity of livestock in stress climatic condition is as difficult task due to scarcity of green fodder. To overcome this problem, demonstration of Napier var. CO-4 were conducted at the fields of 10 dairy farmers covering 1.0ha area. Results of these demonstrations were very exciting; such as availability of green fodder throughout the year, increase in milk production (8-10%) and average production of fodder recorded was 1990q/ha. As a new innovation in green fodder beet production; total 10 demonstrations of Fodder beet covering 0.1ha area were conducted involving 10 livestock owners. The average net return of these calculated was Rs 90250/ha with a B:C ratio of 2.20. Fodder beet can easily be grown under low temperature, salt affected soil with less attack of termite. An increased availability of nutritious and easily digestible green fodder during winter stress period for milking animals resulted in improvement in body weight, milk yields (8-10%) and cows timely conceived.

To mitigate the mineral deficiency in dairy animals a total 25 demonstrations of mineral mixture were demonstrated to 25 farmers' animals; which resulted in increase of 8.53% in milk production. Farmers earned a net return of Rs 11975 per year with B:C ratio of 1.29; while these values for control (non-supplemented mineral mixture) animal was Rs 9375 /year with 1.24 B: C ratio respectively. To manage endo and ecto-parasites in small ruminants two de-worming camps for animals were organized on 07.07.2023 and 11.10.2023 which covered 1912 animals (sheep and goat). It was observed that dewormed animals gained 5 to 8% higher body weight than that of non-dewormed animals.

**Institutional Interventions (Custom Hiring Centre):** Farm implements (seed-cum-fertilizer drill, reaper and bed maker, rotavator, seed dressing drum etc.) were provided to the small and marginal and needy farmers at reasonable rent on custom hiring basis in CHC of NICRA village. During 2023 and total 22 farmers were benefited and revenue of Rs 23050 was generated during the period through covering 129.0ha area. This technical intervention resulted in saving of time 1.5-2.0 hours /day and manpower (25-30%).



**FLD on fodder Beet root at Farmer's field**



**VCRMC meeting at Mitasar NICRA village**

**Capacity Building taken up (HRD):** Total 395 farmers (330 male and 65 farm women) actively participated in 18 different training programmes in area related to crop production, plant protection, horticultural crops management and kitchen gardening etc. in NICRA village. These trainings were organized prior to season and conductance of demonstration; as a result, the farmers were more aware and skilled about latest technologies related to the climate resilient practices.

**Extension Activities:** Total 07 programmes were organized involving a total 230 farmers (male 166 and 64 farm women). Major extension activities carried out in the year 2023 included were; exposure visit, workshop, field day, kisan gosthi, awareness camp, farmers' meeting, VCRMC meeting etc. three field days were organized on cluster bean, mustard and fenugreek crops in adopted villages.

### Rainfall scenario for the year 2023:

| Month                                       |                | Jun | July | Aug | Sept | Oct  | Nov | Dec | Annual (mm) |
|---------------------------------------------|----------------|-----|------|-----|------|------|-----|-----|-------------|
| Rainfall received in (mm)                   |                | 43  | 110  | 0   | 78   | 16.2 | 0   | 0   | 367.3       |
| No. of dry spells during kharif season 2023 | >10days        | 1   | -    | -   | 1    | -    | -   | -   | 2           |
|                                             | >15days        | -   | -    | -   | -    | -    | -   | -   | 0           |
|                                             | >20days        | -   |      | 1   | -    | -    | -   | -   | 1           |
| No. of intensive rain spells (2023-24)      | >60 mm per day | NIL | NIL  | NIL | NIL  | NIL  | NIL | NIL | NIL         |

During the reporting year annual rainfall recorded 367.3 mm

### Temperature characteristics of 2023 and stress experienced

| Temperature                                  |         | Normal Temp           | 2023                                       |                                                                                   |
|----------------------------------------------|---------|-----------------------|--------------------------------------------|-----------------------------------------------------------------------------------|
| Details of heat wave/ cold wave/frost events |         | 33°C                  | > 45°C                                     |                                                                                   |
|                                              |         | 9°C                   | 0.5°C to 4°C and 0°C                       |                                                                                   |
| Events                                       | Days    | Date                  | Interventions taken up                     | Output                                                                            |
| No. of heat wave events                      | >3 days | 11th to 13th May      | Supplementation of mineral mixture         | Incidences of mortality reduced, production of milk was maintained                |
| No. of cold wave events                      | >3 days | 18th to 23rd May      | Light irrigation at short intervals        | Leaf burning was reduced                                                          |
| No. of cold wave events                      | >3 days | 12, 15, 21 and 22 Jan | Managed by regular irrigation during frost | Cold injury was reduced and comparatively 12-15% yield was increased              |
| Frost event                                  | 1 day   | 11th Jan              | Spray of 0.1% Sulphuric acid               | Damage due to frost was reduced and comparatively 10-12% yield loss was decreased |



## Extreme events, high intensity rains and dry spells observed during 2023

| Extreme events | Period of occurrence (Date)                    | Duration of climate stress (days) | Area impacted by stress (ha) | Impact of weather on crop, crop stage                                                                  | Interventions taken up | Output/ Impact of technology                                                                                                                                              | Extreme events                                                                                      |
|----------------|------------------------------------------------|-----------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Dry spell      | 27 July to 14 Sept, 2023                       | 50                                | 650                          | Flowering and pod formation stage in Mung bean, Cluster bean and grain formation stage in Pearl millet | Crop                   | Foliar spray of TGA @ 100 ppm; Nano urea@ 4ml/lit water alone or with 0.5% ZnSO <sub>4</sub> at flowering and grain formation stage<br>Light life saving irrigation given | Yield increased by 15-18%                                                                           |
|                |                                                |                                   |                              | Severity of Collar rot in groundnut and root rot in cluster bean                                       |                        | Soil treatment with <i>Trichoderma</i> @ 10kg/ha mixed with 100 kg FYM or 50 kg Vermicompost                                                                              | 20 to 23 % reduction in rot problem                                                                 |
| Heat wave      | 11 <sup>th</sup> to 13 <sup>th</sup> May, 2023 | 3 Days                            | -                            | Animals got little bit suffered                                                                        | Livestock              | Supplementation of mineral mixture and Azolla                                                                                                                             | Incidences of mortality reduced, production of milk was maintained                                  |
| Heat wave      | 18 <sup>th</sup> to 23 <sup>rd</sup> May, 2023 | 6 Days                            | -                            | Chari-Bajra and Napier grass suffered                                                                  | Crop                   | Light irrigation at short intervals                                                                                                                                       | Leaf burning was reduced, with assured availability of green fodder                                 |
| Cold wave      | 12,15,21 & 22 Jan 2023                         | 4                                 | 350                          | Wheat, Barley, Mustard flowering to grain formation stage                                              | Crop                   | Managed by regular irrigation during incidence                                                                                                                            | Damage due to cold wave was reduced and comparatively 12-15 % yield was increased                   |
|                |                                                |                                   |                              |                                                                                                        | Livestock              | Feeding of Poly herbal mix (Sonth-15,+Methi-150+250g Gud)<br>Use of Cow Mat for animal sitting in shed                                                                    | Production of milk was maintained<br>Body temperature was maintained with comfort feeling to animal |
| Frost          | 11 Jan. 2023                                   | 1                                 | 350                          | Mustard flowering                                                                                      | Crop                   | Spray of 0.1 % Sulphuric acid                                                                                                                                             | Damage due to frost was reduced and comparatively 22-24% yield loss was minimized                   |



### Adoption of successful intervention in NICRA village and adjoining villages:

| Successful interventions                                    | Crop         | Variety  | Extent of adoption in the village in ha |
|-------------------------------------------------------------|--------------|----------|-----------------------------------------|
| <b>NRM</b>                                                  |              |          |                                         |
| Vermicomposting                                             | -            | -        | 5                                       |
| <b>CROP</b>                                                 |              |          |                                         |
| Drought tolerant and Short duration variety, multi branches | Cluster bean | RGC-1033 | 13                                      |
| <b>Livestock</b>                                            |              |          |                                         |
| Green fodder production technology                          | Fodder beet  | Geronimo | 5                                       |
| Napier production                                           | Napier grass | CO-4     | 3                                       |
| Total                                                       |              |          | 26                                      |

Above interventions were introduced in the village very first time; so adoption in the adjoining villages will emerge from next year.

### Popularization of Climate Resilient Varieties:

| Crop*        | Climate Resilient Varieties incorporated in the <i>Kharif</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Kharif</i> 2023 (ha) | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023-24 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Rabi</i> 2023-24 (ha) |
|--------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Pearl millet | HHB-299                                                                                         | 13                                                                                                | -                                                                                                | -                                                                                                  |
| Mung bean    | MH-421                                                                                          | 25                                                                                                | -                                                                                                | -                                                                                                  |
| Mustard      | -                                                                                               | -                                                                                                 | CS-60                                                                                            | 50                                                                                                 |

**Awards Received during the year for the work related to NICRA:** Nil

**Distinguished visitors to the NICRA village during the year:** Nil

### Amount mobilized through convergence from various departments

| S N | Intervention | Climate Resilient Technology | Convergence established with center / state (Name of the programme or department) | Coverage [No. of farmers/ Area (ha)] | Approx. amount (Rs) mobilized |
|-----|--------------|------------------------------|-----------------------------------------------------------------------------------|--------------------------------------|-------------------------------|
| 1.  | NRM          | Farm pond                    | Horti. Deptt. Churu                                                               | 1                                    | 12000                         |
| 2.  | NRM          | Thresher                     | Agri. Deptt. Churu                                                                | 1                                    | 100000                        |
| 3.  | NRM          | Soil health card             | Soil test lab Churu                                                               | 125                                  | 575                           |

| S N   | Intervention | Climate Resilient Technology | Convergence established with center / state (Name of the programme or department) | Coverage [No. of farmers/ Area (ha)] | Approx. amount (Rs) mobilized |
|-------|--------------|------------------------------|-----------------------------------------------------------------------------------|--------------------------------------|-------------------------------|
| 4.    | CROP         | Mini sprinkler               | Agri. Deptt. Churu                                                                | 2                                    | 144000                        |
| 5.    | CROP         | Mustard (CS-60 )             | Agri. Deptt. Churu                                                                | 50                                   | 70000                         |
| 6.    | CROP         | Mung bean (MH-421)           | Agri. Deptt. Churu                                                                | 75                                   | 90000                         |
| Total |              |                              |                                                                                   | 254                                  | 4,16,575                      |

### Publications and products/Video films etc. developed during the year: 3 nos

| Title                                                         | Type of publication | Reference          |
|---------------------------------------------------------------|---------------------|--------------------|
| Production technology of fenugreek                            | Pamphlet            | ICAR-NRCS, Ajmer   |
| Importance of mulching in rainfed cultivation                 | Pamphlet            | ICAR-CIAH, Bikaner |
| Production technology of cucurbitaceous crop under low tunnel | Pamphlet            | SKRAU, Bikaner     |

### Significant observation about the project as per the performance of interventions per adoption of intervention, per livelihood improvement etc.

| SN | Name of intervention                                                                    | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Introduction of short duration/drought tolerant variety (RGC-1033) of Cluster bean crop | <p><b>Adoption of technology:</b> Cluster bean is major kharif season crop of Churu district. About 53% farmers are growing cluster bean but they use local seed materials and some use recommend varieties which performed poorly in aberrant weather condition</p> <p><b>Impact:</b> Cluster bean variety RGC- 1033 is short duration and high yielding with tolerance against temperature stress.</p> <p><b>Economics:</b> Total 50 demonstrations were conducted for cluster bean during Kharif-2023. Variety RGC-1033 resulted in 27.81% higher yield as compared to existing variety. Farmers got a net return of Rs 17615/ha with B:C ratio of 1.73 over the unidentified varieties (Rs 9485/ha with 1.41 B: C ratio).</p> |
| 2. | Mitigation of mineral deficiency of dairy animals                                       | <p><b>Adoption of technology:</b> Daily feeding of mineral mixture increases production of milk in dairy animals. Intervention on above aspect has been demonstrated successfully in NICRA village since last two years.</p> <p><b>Impact:</b> Results revealed that incidence of mortality reduced, increase of 8.53% milk production. Farmers earned a net return of Rs 11975 per year with B:C ratio of 1.29; while these values for control group (non- mineral mixture supplemented) animal was Rs 9375/year with 1.24 B:C ratio respectively.</p> <p><b>Up scaling:</b> Total 100 dairy farmers from nearby NICRA village adopted this technology.</p>                                                                      |
| 3. | Introduction of salt tolerant mustard variety (CS-60)                                   | <p><b>Adoption of technology:</b> In general, soil and water are salt affected in NICRA village. This improved variety has effectively encouraged farmers due to salt tolerant characteristics. Overall, this technology not only benefitted individual farmer but also fostered an innovation and progress within the community.</p>                                                                                                                                                                                                                                                                                                                                                                                             |

| SN | Name of intervention | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                             |
|----|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                      | <p><b>Impact:</b> Mustard variety CS- 60 is tolerant against saline water and soil as well as high yielding.</p> <p><b>Economics:</b> Total 20 demonstrations were conducted in cluster bean during Rabi-2023 variety CS-60; which resulted in 18.67% higher yield as compared to existing variety. Farmers got a net return of Rs49669/ha with B:C ratio of 2.46 over the unidentified mustard varieties (Rs 39672 /ha with 2.28 B: C ratio).</p> |

## Hanumangarh-I

Performance of component demonstrations laid out by KVK Hanumangarh-I under different modules is as follows: -

**Natural Resource Management:** Total 40 demonstrations were conducted in 16.0ha area. Under *in-situ* conservation different activities like; sowing with multi crop bed planter for cotton and mustard crop for saving the irrigation water; use of soil tensiometer in cotton, wheat & mustard for management of irrigation water.

**Crop Production:** Total 70 demonstrations were conducted on green gram, cluster bean, mustard, pearl millet and gram covering 28.0ha area. During *kharif* season green gram variety MH-1142 was demonstrated at 10 farmers' fields in 4.0ha area. Crop diversification through pearl millet variety Dhanshakti demonstrated at 20 farmers' fields in 8.0ha area. It was observed that new short duration variety (MH-1142) performed better than local check, which yielded 13.22 % more than local check, resulting a net return of Rs 78583/ha with B:C ratio 3.37 as compared to local check (Rs 68194/ha with B:C ratio 2.93). New variety (RH-725) of mustard was demonstrated at 10 farmers' fields in 4.0ha area. It was observed that mustard new variety performed better than local, which yielded 10.10% more, resulting a net return of Rs 68914/ha with B:C ratio 3.01 as compared to local check (Rs 62590/ha with B:C ratio 2.72).



FLD on Cotton at Himawali village



FLD on Pearl millet at farmer's field

**Livestock and Green Fodder Production:** Total 100 demonstrations were conducted involving 100 livestock farmers. Introduced new fodder sorghum varieties (Anant, CSV-33 MF) and composite fish

culture. During *kharif* season fodder sorghum variety (CSV-33 MF) was demonstrated at 20 farmers' fields in 2.5ha area. It was observed that new sorghum variety performed better than local, which yielded 13.91% more in comparison to farmers' variety.

### **Institutional Interventions:**

**Custom Hiring Centre:** KVK formed VCRMV at village level; namely Sahid Bhagat Singh VCRMV, Hirnawali. KVK established a custom hiring centre at village level under NICRA project. Different agricultural implements have been used and CHC earned a revenue of Rs 42545/-only during the year 2023; which helped 137 farmers for timely completion of agricultural operations in 107.0ha area. With the help of custom hiring centre 69 farmers sowed the crop with multi crop seed cum fertilizer drill. Total 30 farmers ploughed their field using chisel plough and 32 farmers sowed the crop with multi crop bed planter.

**Capacity Building Activities:** Total 157 farmers (153 male and 4 farm women) actively participated in 6 different training courses in thematic areas related to farm pond based integrated farming system, integrated pest management in cotton, precision irrigation, site specific nutrient management technique in major rabi crops, plant protection technology of mustard, wheat and barley etc. These trainings were organized prior to season and conductance of demonstrations; as a result, the farmers were aware about latest technologies related to crop production, animal husbandry, diseases and pest management etc.



**FLD on Backyard Poultry at NICRA village**



**Field Day on Mustard at Himawali village**

**Extension Activities:** Total 8 programmes were organized involving total 188 partner farmers through exposure group meeting of SHG, method demonstrations, awareness programme, kisan gothi, field days and group meeting of VCRMV for CHC in entrepreneur mode etc. Three method demonstrations were organised on seed treatment; in which 32 farmers actively participated. Total two field days were organized on soil tensiometer in mustard and wheat crops.



### Rainfall scenario of NICRA village for the year 2023:

| <b>Kharif 2023</b>                                  |            | <b>June</b> | <b>July</b> | <b>Aug</b> | <b>Sept</b> | <b>Oct</b> | <b>Annual</b> |
|-----------------------------------------------------|------------|-------------|-------------|------------|-------------|------------|---------------|
| Rainfall received (mm)                              |            | 77          | 199         | 0          | 56          | 28         | 453           |
| No. of dry spells during kharif season              | >10days    | 1           | -           | -          | -           | 1          | 0             |
|                                                     | >15days    | -           | -           | -          | 1           | -          | 0             |
|                                                     | >20days    | -           | -           | 1          | -           | -          | 0             |
| No. of intensive rain spells                        | >60 mm/day | 0           | 1           | 0          | 0           | 0          | 0             |
| Water logging observed (days)                       |            | Nil         | 1           | Nil        | Nil         | Nil        | Nil           |
| Any other extreme events observed during the season |            | Heat wave   | Nil         | Nil        | Nil         | Nil        | Nil           |

During the reporting year annual average rainfall recorded was 453 mm; while rainfall received 77, 199, 00, 56 & 28 mm, respectively, in the months of June, July, August, September and October during the year 2023.

### Impact of contingency measures (Relate the dry spells with crop and growth stages):

| S. No. | Dry spell (no. of days) | Duration (from --- to---) | Crop name    | Crop stage affected | Intervention taken up* | Number of farmers involved | Impact on crop yields (α per ha) |      |                                   |
|--------|-------------------------|---------------------------|--------------|---------------------|------------------------|----------------------------|----------------------------------|------|-----------------------------------|
|        |                         |                           |              |                     |                        |                            | Farmers' practice                | Demo | % Increase over farmers' practice |
| 1      | 20                      | 3 to 23 July              | Cluster bean | Growing stage       | Irrigation             | 4                          | 10                               | 12   | 20                                |

### Climatic vulnerability 2023

| Extreme event | Period of occurrence (date) | Duration of climate stress (days) | Area impacted by climate stress (ha) | Impact of weather on crop stage      | Intervention taken up                          | Output/Impact of technology |
|---------------|-----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|------------------------------------------------|-----------------------------|
| Cold stress   | 11-12 Jan, 16 & 27 Jan 2024 | 4                                 | 759.75                               | Mustard at flowering & pod formation | Spray of H <sub>2</sub> SO <sub>4</sub> @ 0.15 | Crop protected from forest  |

**Adoption of successful intervention in the NICRA village and the adjoining villages:** Sowing Drought Resistant Variety of Mustard (RH-725) and Summer Deep Ploughing.

| Successful interventions                | Crop    | Variety                      | Extent of adoption in the village in ha |
|-----------------------------------------|---------|------------------------------|-----------------------------------------|
| <b>NRM</b>                              |         |                              |                                         |
| Summer deep ploughing                   | Mustard | RH-749, RH-725, 45S46, 45S42 | 1187 ha                                 |
| <b>CROP</b>                             |         |                              |                                         |
| Drought resistant Mustard var. (RH-725) | Mustard | RH-725                       | 22 ha                                   |





### Popularization of Climate Resilient Varieties: Mustard variety (RH-725).

| Crop*     | Climate Resilient Varieties incorporated in the <i>Kharif</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Kharif</i> 2023 (ha) | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Rabi</i> 2023 (ha) |
|-----------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Greengram | MH -1142                                                                                        | 2850                                                                                              | Mustard RH – 725                                                                              | 18500                                                                                           |

### Awards Received during the year for the work related to NICRA: Nil

### Distinguished visitors to the NICRA village during the year:

| Name of visitors                                 | Date                                         | Remarks                                                  |
|--------------------------------------------------|----------------------------------------------|----------------------------------------------------------|
| Sarpanch, Gram Panchyat , Hirnawali              | During Training and Technology Demonstration | Appreciate the CHC and other ongoing activities of NICRA |
| Director, Panchyat Samitti, Zone-2, Hanuamangarh | During Training and Technology Demonstration | Appreciate the CHC and other ongoing activities of NICRA |

### Publications and other products developed during the year: Nil

### Significant observations about the project per the performance of interventions per adoption of interventions per livelihood improvement etc: NA

| SN | Name of intervention                                              | Description of technology , adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Cluster bean HG 2-20 (Introduction of drought resistant variety ) | <p><b>Description of Technology:</b> The introduction of HG2-20 cluster bean variety has proven transformative for farmers in arid regions. Its drought tolerance, high yield, and superior quality have enhanced profitability and sustainability in clusterbean cultivation.</p> <p><b>Adoption of technology:</b> Farmers adopting H 2-20 variety have reported substantial increases in crop productivity, especially in areas with normal rainfall. This improved variety not only enhanced yield but also offered higher economic returns, making it a more viable option for local farmers. The transition to HG 2-20 has resulted in a significant expansion of the area under cluster bean cultivation, as farmers recognized the benefits of using a variety that is resilient to drought and adverse weather conditions (long dry spell).</p> <p><b>Impact:</b> The HG2-20 variety of cluster bean is suitable for timely sowing under normal fertility and rainfed conditions during the kharif season (June to July). It has a medium maturity period, taking 90–100 days to mature. Its productivity is superior to other varieties like RGC-936 and HG-365, as it is less affected by bacterial blight, alternaria blight, and root rot diseases. This variety performs well during prolonged dry spells, enhances soil fertility through nitrogen fixation, reduces dependency on chemical fertilizers, and ensures stable production in water-scarce areas, contributing to food security and climate resilience.</p> <p><b>Economics:</b> NICRA farmers achieved higher productivity (15.69q/ha) as compared to non-NICRA farmers (14.84q/ha), highlighting the positive impact of the drought-resistant variety HG2-20 under prevailing conditions. Their cost of cultivation was slightly lower (Rs 31472/ha) than that of non-NICRA farmers (Rs 32121/ha), likely due to optimized input use or reduced losses. Additionally,</p> |



| SN | Name of intervention                                       | Description of technology , adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                                            | NICRA farmers earned higher gross returns (Rs 60407/ha) as compared to non-NICRA farmers (Rs 57134/ha), reflecting improved productivity and market value. The benefit-cost ratio (BCR) for NICRA farmers group was also higher (1.92) than for non-NICRA farmers group (1.78), indicating better economic efficiency with the demonstrated technology.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. | Green gram MH- 1142 (Short duration varieties)             | <p><b>Description of the Technology:</b> MH-1142 green gram variety is suitable for sowing in the <i>kharif</i> season from June to July. It takes 63–70 days to mature. It is resistant to yellow mosaic, leaf curl, and leaf crinkle diseases, and moderately resistant to anthracnose and white mould diseases. It also has a lower incidence of white fly than other varieties.</p> <p><b>Adoption of technology:-</b> The adoption of the short-duration green gram variety MH-1142 in Hanumangarh district has significantly enhanced the agricultural landscape for local farmers. As farmers have started to adopt the MH-1142 variety, they have experienced remarkable increases in both yield and profitability. This improved variety is not only more productive but also offered higher economic returns as compared to others local green gram varieties. Consequently, there has been a drastic increase in the area dedicated to cultivating green gram variety MH–1142, as more and more number of farmers recognized its advantages and the potential for greater financial stability.</p> <p><b>Impact:</b> The impact of this technology adoption goes beyond individual farm profitability; it fosters greater food security in the region and encouraged sustainable farming practices. By shifting to the improved green gram variety, farmers are better equipped to adapt to climate variability, ensuring more stable incomes and contributing to the overall agricultural resilience of Hanumangarh district.</p> <p><b>Economics:</b> The NICRA initiative has shown significant positive impacts on farming outcomes. NICRA farmers achieved higher productivity (13.15q/ha) when compared to non-NICRA farmers (12.18q/ha), with lower cultivation costs (Rs 33192/ha vs Rs 35336/ha). Additionally, NICRA farmers earned higher gross returns of Rs 111775/ha versus Rs 103530/ha), highlighting the efficiency and economic benefits of the improved short-duration variety. These results revealed that the NICRA technology not only boosts productivity but also enhanced profitability by reducing input costs, offering a promising solution for sustainable farming.</p> |
| 3. | Mustard RH-725 (Introduction of drought resistant variety) | <p><b>Description of the Technology:</b> Mustard variety RH-725 is a high-yielding, drought-tolerant variety developed for regions prone to water scarcity. It is a dual-purpose variety suitable for oil extraction and seed production.</p> <p><b>Adoption of technology:</b> The adoption of the mustard variety RH-725 in the NICRA village has had a significant positive impact on local agricultural practices.</p> <p><b>Impact:</b> The RH-725 mustard variety is a game-changer in <i>Rabi</i> season cultivation, offering benefits like; low water requirements, high production potential, and cost-effectiveness. Its suitability for rainfed conditions allowed farmers to conserve water while maintaining high yields. The bold, healthy grains improve oil content and quality, making it appealing to both farmers and consumers. With reduced irrigation needs and lower seed costs compared to private sector varieties, RH-725 enhanced profitability. Its disease resistance and adaptability to local conditions have led to higher yields, boosting farmer incomes and supporting sustainable farming practices.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| SN | Name of intervention   | Description of technology , adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                        | <p><b>Economics:</b> The adoption of drought-tolerant mustard variety RH-725 by NICRA farmers has resulted in higher productivity (17.23q/ha) and greater economic returns (net profit of Rs 68914/ha) when compared to non-NICRA farmers (16.42 q/ha, net profit of Rs 62590/ha). The data suggests that drought-tolerant varieties can offer higher returns to the farmers , especially during water-scarce conditions, thus promoting sustainable farming practices.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4. | PMR (Pre Mixed Ration) | <p><b>Description of Technology:</b> Pre-mix Ration (PMR) is a carefully formulated feed mixture that includes various essential nutrients, minerals, vitamins, and other additives in a pre-measured and balanced form. It is intended to be mixed with the primary feed ingredients, such as grains or silage, to meet the nutritional needs of livestock. This balanced formulation ensures that animals, such as dairy cattle, poultry, and pigs, receive the right amount of energy, protein, and other nutrients, leading to improved health and productivity.</p> <p><b>Adoption:</b> The adoption of PMR has been widely promoted in both smallholder and commercial farming systems, especially in dairy farming. Farmers who adopt PMR often report an increase in their income due to higher yields and better quality produce (e.g., milk).</p> <p><b>Impact:</b> Pre-mix ration technology is a beneficial tool for improving the productivity, health, and sustainability of livestock farming. While the initial costs may be higher than traditional feed, the long-term benefits, including improved animal performance, cost savings, and higher profits, make PMR an attractive option for farmers looking to enhance their operations. By ensuring a balanced diet and preventing nutritional deficiencies, PMR plays a crucial role in advancing modern farming practices and promoting animal welfare.</p> <p><b>Economics:</b> NICRA Farmers achieved a higher Benefit-Cost Ratio (1.60) as compared to Non-NICRA farmers group (1.44), indicating that they experienced better economic returns by adopting the PMR technology. This difference in the B:C ratio might be due to factors like; improved management practices, better access to resources, or higher efficiency in nutrient utilization for NICRA farmers group. Both groups of farmers, however, showed similar gross returns from milk and by-products, but the cost of production was slightly lower for Non-NICRA farmers, which resulted in a lower BC ratio for their produce.</p> <p>In summary, the adoption of PMR technology yields strong economic returns, with NICRA farmers showing a better cost-benefit performance due to possible supplementary advantages or support systems.</p> |

## Jaisalmer-I

Performance of component demonstration laid out by KVK Jaisalmer-I under different modules is as follows:

**Natural Resource Management:** During the year 2023, KVK Jaisalmer-I organized 30 vermicompost demonstrations involving 30 partner farmers; they used vermicompost to raise the crops and improved the soil fertility. By this demonstration 3.6 tonnes of vermicompost was recycled and hence saved the cost of Rs 7920.

**Crop production:** Total 25 demonstrations were conducted on cluster bean, moth bean covering 20.0ha area. During *Kharif* season 2023, short duration variety of moth bean RMO-257 was

demonstrated at 25 farmer's field in 10.0ha area, which resulted in 37.28% more yield than local farmer's variety. Farmers those who have sown the short duration variety RMO-257 earned a net return of Rs 12189/ha with 1.84 B:C ratio in comparison to local farmers' variety (Rs 5707/ha with 1.67 B:C ratio 1.63). Improved variety of Cluster bean RGC-936 was demonstrated at 25 farmers' fields in 10.0 ha area, which resulted in 30.29% more yield than local variety. Farmers earned a net return of Rs 28016/ha with 1.78 B:C ratio in comparison to local farmers' variety (Rs 19875/ha & B:C ratio 1.45).



**Demo on Vermicompost unit for NICRA farmers**



**Demo on Sirohi goat breed for NICRA farmers**

Total 40 demonstrations were conducted on cumin and 20 demonstrations on Isabgol covering 40.0ha and 20.0ha area, respectively during *Rabi* season 2023. Improved varieties GC-4 of cumin was demonstrated at 40 farmer's fields in 10.0ha area, which resulted in 19.74% more yield than local cumin variety. Farmers those who have sown the improved variety earned a net return of Rs 223688/ha with 1.31 B:C ratio in comparison to farmers' local variety (Rs 209663/ha with 1.25 B:C ratio). Improved variety of Isabgol RI-1 was demonstrated at 20 farmers' fields in 10.0ha area, which resulted in 15.50% more yield than local farmer's variety. Farmers earned a net return of Rs 87450/ha with 1.45 B: C ratio in comparison to farmers' local cumin variety (Rs 75720/ ha with B: C ratio 1.16).

**Livestock Production:** Total 10 demonstrations were conducted. Sirohi goat breed was demonstrated to livestock farmers under NICRA project; as this breed performs well. To upgrade the goat breed, 5 breeding buck and 11 Sirohi goat units (10+1) have been established in the NICRA village during 2023-24, and total 30.0ha area specific mineral mixture were demonstrated in the NICRA village during 2023-24. Milk production was increased by 24.98 litres per lactation cycle per animal when compared to Non-NICRA farmers. Also productive and reproductive performance of NICRA village animals were found better as compared to Non-NICRA village.

### **Institutional Interventions:**

**Custom Hiring Centre:** For CHC establishment selection of site and planning has been done at adopted NICRA village in Jogidas ka gaon, Jaisalmer according to ICAR-CRIDA Hyderabad guidelines. Different



agricultural implements (seed drill, harrow, battery operated sprayer, fertilizer broad- caster, wheel hoe, baby solar dryer, cumin seed drill) performed very well helping 80 farmers for timely completion of agricultural operations covering 170.0 ha area during the year under report.

**Capacity Building Activities:** Total 220 farmers (161 male and 59 farm women) actively participated in 7 different training courses in thematic area related to crop production, Natural resource management, capacity building activities; mainly covered improved crop production in cluster bean, cumin and moth bean integrated pest management practices in cumin etc. These trainings were organized prior to season and conductance of demonstration; as a result, the farmers were aware about latest technologies related to crop production, animal production, diseases and pest management etc.



**On-campus training of NICRA farmers**



**Off-campus training of NICRA farmers**

**Extension Activities:** Total 11 programs were organized involving total 717 partner farmers (476 male and 241 farm women) through kisan choupal, kisan goshti awareness programs, VCRMC meeting, advisory services and kisan mela etc.

#### **Rainfall scenario for the year 2023-24:**

| 1.2 | Rainfall              | Normal RF(mm) | Normal Rainy days (number) | Normal Onset (specify week and month) | Normal Cessation (specify week and month) |
|-----|-----------------------|---------------|----------------------------|---------------------------------------|-------------------------------------------|
|     | SW monsoon (June-Sep) | 198.9         | 14                         | July Last week                        | 2nd week Sept                             |
|     | NE Monsoon(Oct-Dec)   | 25            | 3                          |                                       |                                           |
|     | Winter (Jan- March)   | 1             | 0                          |                                       |                                           |
|     | Summer (Apr-May)      | 12            | 1                          |                                       |                                           |
|     | Annual                | 236.9         | 18                         |                                       |                                           |

During the reporting year annual rainfall recorded 236.9 mm.



### Impact of contingency measures taken up in the village (Relate the dry spells with crop and their growth stages):

| S<br>N | Dry spell/<br>heat<br>wave/cold<br>wave/frost (no. of days) | Duration<br>(from ---<br>to-----) | Crop<br>name | Crop stage<br>affected                                                                                                | Intervention<br>taken up*                                                                           | Number<br>of<br>farmers<br>involved | Impact on crop yields (q/ha)                                  |                                                                            |                                          |
|--------|-------------------------------------------------------------|-----------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------|
|        |                                                             |                                   |              |                                                                                                                       |                                                                                                     |                                     | Farmers'<br>practice                                          | Demo                                                                       | Increase<br>over<br>farmers'<br>practice |
| 1      | Drought/dry spell                                           | 08.07.2023 to 30.9.2023           | Custer bean  | Vegetative stage                                                                                                      | Weather based advisory by DAMU unit of KVK                                                          | 30                                  | Without life saving irrigation                                | Applied life saving irrigation during drought condition and improved yield | 15-20%                                   |
| 2      | Cold stress                                                 | 08.01.24 to 10.01.24              | Cumin        | Slightly low the vegetative growth of cumin crop and more prone to cumin blight disease due to cool and humid weather | Organised Kisan choupal on irrigation management practices as per forecasted weather based advisory | 24                                  | More prone to cumin blight disease and thus yield was reduced | Applied irrigation was reduced the damaged of cold stress in cumin crops   | 10-12%                                   |

### Adoption of successful interventions in the NICRA village & adjoining villages:

| Successful interventions                                 | Crop               | Variety            | Extent of adoption in the village in ha (2023) |
|----------------------------------------------------------|--------------------|--------------------|------------------------------------------------|
| <b>NRM</b>                                               |                    |                    |                                                |
| Vermi compost unit                                       | Vermi compost unit | Vermi compost unit | 30                                             |
| <b>CROP</b>                                              |                    |                    |                                                |
| Short duration variety                                   | Moth bean          | RMO-257            | 25                                             |
| Drought tolerant variety                                 | Cluster bean       | RGC-936            | 25                                             |
| High yielding variety                                    | Cumin              | GC-4               | 50                                             |
| <b>Livestock</b>                                         |                    |                    |                                                |
| Introduction of Sirohi breed Bucks for breed improvement | Sirohi breed       | Sirohi             | 20                                             |
| Feed management of goat with–Area specific minl mixt.    | Sirohi breed       |                    | 30                                             |

Several successful interventions under NICRA project have been adopted in Jogidas ka Gaon village in Jaisalmer district. In 2023-24, short duration varieties of moth bean (RMO-257) have been sown over 10.0ha, cluster bean (RGC-936) has been sown in 10.0ha, cumin (GC-4) has been sown on 20.0ha area. Area specific mineral mixture was demonstrated in the adopted village. For animal breed improvement one Sirohi breeding buck and 10 Sirohi goat units have been established in village.

### Popularization of Climate Resilient Varieties:

| Crop        | Climate Resilient Varieties incorporated in the <i>Kharif</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Kharif</i> 2023 (ha) |
|-------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Clusterbean | RGC 936                                                                                         | 42                                                                                                |
| Moth bean   | RMO-257                                                                                         | 30                                                                                                |
|             | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023 plan of the State Department   | Approx. area brought under the variety by the state department during the <i>Rabi</i> 2023 (ha)   |
| Cumin       | GC-4                                                                                            | 450                                                                                               |

**Awards Received during the year for the work related to NICRA:** Nil

### Distinguished visitors to the NICRA village during the year:

| Name of the person                    | When the visit occurred | Significant comments/ suggestions |
|---------------------------------------|-------------------------|-----------------------------------|
| Dr. Arun Kumar, V.C<br>SKRAU, Bikaner | April month 2024        | Interaction with NICRA farmers    |

**Amount (Rs) mobilized through convergence from various departments:** Nil

**Publications and products/Video films etc., developed during the year:** Nil

**Significant observation about the project per the performance of interventions per adoption of intervention per livelihood improvement etc:**

| SN | Name of intervention                            | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Cluster bean var. RGC 936 (improved variety)    | <p><b>Adoption of technology:</b> Cluster bean is the major <i>kharif</i> crop in Jaisalmer district. About 58% farmers are growing cluster bean but they use the local seed and up to some extent non recommended varieties which perform poorly in aberrant weather conditions.</p> <p><b>Impact:</b> In normal rainfall area resulted in 37.28% more yield than local variety. A drastic increase in area under cluster bean RGC 936 variety was recorded.</p> |
| 2. | Moth bean var. RMO-257 (Short duration variety) | <p><b>Adoption of technology:</b> Moth bean is major pulse <i>kharif</i> crop in Jaisalmer. About 32% farmers growing moth bean crop, but they use local seed and up to same extent non recommended varieties which perform poorly in aberrant weather conditions.</p> <p><b>Impact:</b> Moth bean variety RMO-257 resulted in 37.28% more yield than local variety. A drastic increase in area under moth bean variety RMO-257 was observed.</p>                 |



| SN | Name of intervention                            | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. | Cumin GC-4 (Drought tolerant/ improved variety) | <p><b>Adoption of technology:</b> Cumin is the major <i>Rabi</i> crop of Jaisalmer district. Old varieties have lower yield potential as well as poor tolerance.</p> <p><b>Impact:</b> Cumin variety GC-4 resulted in 19.74% more yield than local cumin variety.</p>                                                                                                                                                                                                                                                                                                                                                                                                     |
| 4. | Sirohi goat unit                                | <p><b>Adoption of technology:</b> In a demonstration involving 10 farmers with 100 animals, conducted in a NICRA village of Jogidas ka gaon, increased live weight was observed with the animals being crossed with elite Sirohi buck to an extent of 37.50% over local goat breed. It has also recorded higher net returns (Rs 4720/buck) and B:C ratio (1.39) than local goat units.</p> <p><b>Impact:</b> The Introduction of Sirohi buck for breed Improvement has not only helped in increasing the growth rate, meat yield but also alleviated problems of low live weight of local breeds in NICRA village Jogidas ka gaon in Jaisalmer district of Rajasthan.</p> |
| 5. | Area specific mineral mixture                   | <p><b>Adoption of technology:</b> Mineral mixture supplementation improved productive and reproductive performance of local as well as Sirohi breed of goats and thus adopted by majority of livestock owners.</p> <p><b>Impact:</b> Milk production was increased by 24.98 litres per lactation cycle per animal when compared to Non-NICRA farmers group. Reproductive problems like; anoestrus, repeat breeding, silent heat, prolapse of uterus etc., occurrence in dairy animals reduced drastically in the village. Higher conception rate was also observed with first dose of insemination from Sirohi breeding buck.</p>                                         |

## Jhunjhunu

KVK, Jhunjhunu has successfully organized demonstrations on different components. Details are categorized under different modules during 2023.

**Natural Resource Management:** During the year 2023, KVK Jhunjhunu organized 180 demonstrations on 72.0ha area involving 180 partner farmers. Major interventions in natural resource management were; *in-situ* moisture conservation practices, ground water conservation by drip and mini-sprinkler and soil health improvement. Deep ploughing was practiced before rain to restrict run-off of rain water and to conserve moisture, which resulted in 20.58 per cent higher yield of green gram than control. Net income of Rs 25700/ha with B:C ratio 2.20 as compared to control (Rs 24900/ha with B:C ratio 1.88) was recorded.

Five demonstrations on *in-situ* moisture conservation using plastic mulch in watermelon were conducted at farmers' fields; which increased yield by 28.80% with a net income of Rs 259740/ha & higher B:C ratio (2.99) as compared to control practice (Rs180380/ha with B:C ratio 2.47). Fifty-one demonstrations on *ex-situ* moisture conservation using mini sprinkler in onion and wheat were demonstrated for judicious use of irrigation water. Results revealed that less quantity of irrigation water were required using mini sprinkler in wheat and onion. Due to mini sprinkler interventions in wheat (DBW-187) crop yield increased by 15.72% which resulted a net returns of Rs 58536 /ha with B:C

ratio of 2.14, as compared to control practice (Rs 38642/ha with B:C ratio 1.69), in onion 17.30% higher yield was recorded in demonstration than control practice.

Fifty demonstrations on 20.0ha area on soil health management were demonstrated in combination with resilient cultivars; soil test based nutrient application, gypsum application to reduce soil pH, green manuring in *kharif* by growing dhaincha to increase soil fertility to obtain higher production in *rabi* crops and use of vermi-compost/compost. Demonstrations on gypsum application in mustard for soil reclamation were conducted at 10 farmers' fields. The results indicated that mustard yield was increased by 16.16% in comparison to farmer's practice and earned a net return of Rs 77530 /ha with maximum 3.96 B:C ratio.

**Crop Production Module:** Total 328 demonstrations on climate resilient cultivars were conducted on 125.2ha area including cluster bean (RGC 1033 & 1066), green gram (MH-1142), cowpea (RC-19), chickpea (GNG-2144), mustard (PM-30), barley (RD-2786), fenugreek (Afg-3), onion (NHRDF Red-4) and wheat (Raj-4238) involving 126 partner farmers. The yield of cluster bean variety RGC-1033 demonstrations was 19.35% higher than control group, which resulted a net profit of Rs 67482/ha with 3.23 B: C ratio. Similarly yield of cowpea and green gram demonstrations was, 19.36 and 20.50%, higher than control group, respectively with highest B:C ratio of 1.52 and 2.20, respectively. Net returns was also the highest (Rs10840/ha and 30953/ha, respectively) in both crops as compared to local crop varieties of cowpea and green gram (Rs 9633 /ha and 22083 /ha).



**Demo on Vermicompost at Chakwas village**



**Demo on Barley var. RD-2786 at Mdansar village**

Twenty-one demonstrations in 8.40ha area were conducted on bio-fortified variety of pearl millet at farmers' fields. Results indicated that yield of pearl millet was 12.25% higher when compared to control field of farmers. Net return was also highest (Rs 26100 /ha with B:C ratio of 2.57) as compared to control group (Rs 22400/ha with B:C ratio of 1.89). Thirty demonstrations on chickpea (GNG-2144) and thirty demonstrations on mustard (PM-30) were conducted at farmers' fields in 12.0 and 12.0ha area, respectively. It was observed that yield of demonstration plots was higher by 15.89 and 11.60%, respectively over control plots of chickpea and mustard crops. Net returns was also high



(Rs 64237/ha and 69061/ha, respectively with B:C ratio of 2.62 and 3.00) in both crops as compared to local check (Rs 45064/ha and 55312/ha with B:C ratio of 2.01 and 2.46).

Twenty-four demonstrations were conducted on high yielding variety in fenugreek (Afg-3) in 9.60ha area. It was observed that yield of demonstration plots was higher by 19.37% over control plot of fenugreek. Net return was also highest (Rs 49536 with B: C ratio of 2.55) as compared to control group (Rs 33836/ha with B:C ratio of 1.98).

Thirty demonstrations were conducted on salinity tolerant cultivar in barley (RD-2786) covering 12.0ha area. It was observed that yield of demonstration plots was higher by 15.35% over local check of barley. Net return was also high (Rs 55860 with B: C ratio of 2.25) as compared to local farmers' barley variety (Rs 38562 /ha with B:C ratio of 1.79).

Twenty-three demonstrations were conducted on high yielding varieties of onion (NHRDF Red-4) on 9.20ha area. It was observed that yield of demonstration plots was higher by 17.30% over local check of onion. Net return was also high (Rs 276232 with B: C ratio of 3.35) as compared to local onion variety under check (Rs 208810 /ha with B:C ratio of 2.64).

Twenty-eight demonstrations were conducted on terminal heat stress management in wheat (DBW-187) on 11.20ha area. It was found that foliar spray of TGA increased yield up to 15.72% over farmers' practice. Net returns earned was high Rs 58536/ha with 2.14 B:C ratio as compared to wheat sown in control group plots (Rs 38642/ha with 1.69 B:C ratio).

**Livestock and Fodder Production:** Total 202 demonstrations were conducted on livestock & fodder production including, 121 demonstrations on green fodder (pearl millet Chari in summer season & fodder oat in *Rabi* season) for round the year feeding of green fodder. Total 69 demonstrations on mineral mixture to mitigate mineral deficiency in milking cattle and goats and 12 demonstrations on breed up gradation in goat by Sirohi breeding buck. Results indicated that those animals were fed with green fodder round the year produced higher milk by 19.52%; which resulted a net returns of Rs 62000/animal/year with maximum B:C ratio of 2.51 in comparison to control (Rs 48200/animal/year with B:C ratio of 2.08). Total 69 animals (cattle and goat) were involved during the year under mineral mixture demonstration to mitigate mineral deficiency. Mineral mixture demonstration results indicated positive effect on health status and cattle milk production enhanced by 13.72%; which resulted a net returns of Rs 75000/animal/year with maximum B:C ratio of 3.01 in comparison to control group (Rs 67000/animal/year with maximum B:C ratio of 2.69).

To upgrade the goat breed, Sirohi buck (12) provided in the NICRA village. Weight of one-year-old progeny of Sirohi buck and local breed was recorded and results revealed that average body weight of one-year-old progeny of Sirohi buck was 32.50 kg with net return Rs 4650 per year & B:C ratio 1.86 in comparison to year old progeny of local goat breed with 27.58kg average body weight, net return of Rs 3946 per year and B:C ratio 1.49 was recorded.



## Institutional Interventions:

**Custom Hiring Centre:** Different agricultural equipment's (reaper binder, tractor operated power sprayer, post hole digger, weighing machine, bund former, chaff cutter, seed cleaner, reversible land leveller, Rotavator, seed cum fertilizer drill machine, seed treatment drum and knapsack sprayer-battery operated) are available at CHC and performing well. A revenue of Rs 6100/-only generated by benefiting 79 farmers for timely completion of agricultural operations during 2023-24.

**Capacity Building Activities:** Total 196 farmers (155 male and 41 farm women) were trained through 6 different training courses on various thematic areas scientific cultivation of vegetables, integrated insect pest management, integrated crop management, water management and natural farming awareness programme etc.) related to crop, livestock, and vegetable production etc.



**Training programme on Drone for spraying**



**Field day on Chick pea at Chakwas village**

**Extension Activities:** Total 15 programmes were organized which involved 549 partner farmers through method demonstrations, field days, group discussions and awareness programmes. Four field days were organized on *cluster bean*, *onion*, chickpea and wheat in which 94 farmers and 29 farm women actively participated. Two drone demonstrations were organized about nutrient and pesticide spraying in crops; in which 70 farmers and 12 farm women actively participated. Four kisan goshti were organized at farmer field on different topics in which 156 farmers and 29 farmer women participated. Five awareness programmes organized in which 134 partner farmers and 25 farm women actively participated.

## Rainfall scenario of the year 2023-24:

| Month                                                 |         | Jun | July | Aug | Sep | Oct | Nov | Dec | Jan | Annual |
|-------------------------------------------------------|---------|-----|------|-----|-----|-----|-----|-----|-----|--------|
| Rainfall received in (mm)                             |         | 84  | 203  | 13  | 47  | 31  | 10  | 0   | 0   | 388    |
| No. of dry spells during <i>kharif</i> season 2023-24 | >10days | 0   | 0    | 0   | 0   | -   | -   | 0   |     | 00     |
|                                                       | >15days | 0   | 0    | 0   | 1   | -   | -   | 0   |     | 01     |
|                                                       | >20days | 0   | 0    | 01  | 1   | -   | -   | -   |     | 02     |



| Month                                                                             |                                                 | Jun | July | Aug | Sep | Oct | Nov | Dec | Jan | Annual |
|-----------------------------------------------------------------------------------|-------------------------------------------------|-----|------|-----|-----|-----|-----|-----|-----|--------|
| No. of intensive rain spells (2023)                                               | >60 mm per day                                  | 0   | 0    | 0   | 0   | 0   | 0   | 0   |     | 00     |
|                                                                                   | Waterlogging/Flooding observed (number of days) | -   | -    | -   | -   | -   | -   | -   | -   | -      |
| Any other extreme events (Heat wave, Cold wave, frost) observed during the season | Heat waves (March 2024)                         |     |      |     |     |     |     |     |     |        |

### Impact of contingency measures (Relate the dry spells with crop and growth stages):

| SN | Dry spell (no. of days) | Duration (from --- to---) | Crop name    | Crop stage affected               | Intervention taken up*                                                                                                   | Number of farmers involved | Impact on crop yields |       |                                 |
|----|-------------------------|---------------------------|--------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------|-------|---------------------------------|
|    |                         |                           |              |                                   |                                                                                                                          |                            | Farmers' practice     | Demo  | Increase over farmers' practice |
| 1  | Dry spell (45 days)     | 01/08/23-14/09/23         | Green gram   | Flowering and Pod formation stage | Drought tolerant & YVMV resistant varieties                                                                              | 30                         | 5.49                  | 6.62  | 20.58                           |
|    |                         |                           | Cow pea      | Flowering and Pod formation stage | Short duration varieties                                                                                                 | 30                         | 5.37                  | 6.41  | 19.36                           |
| 2  | Dry spell (30 days)     | 23/09/23-17/10/23         | Cluster bean | Flowering and Pod formation stage | Drought tolerant & short duration varieties                                                                              | 32                         | 15.45                 | 18.44 | 19.09                           |
| 3  | Heat Stress             | March 2024                | Onion        | Bulb formation                    | Mitigation of terminal heat/moisture stress in onion through resilient var. & frequent irrigation through mini sprinkler | 23                         | 336.4                 | 393.9 | 17.09                           |
| 4  | Terminal Heat stress    | March 2024                | Wheat        | Grain formation                   | Mitigation of terminal heat stress in wheat through heat tolerant variety                                                | 30                         | 41.78                 | 48.24 | 15.46                           |

During consecutive dry spell of 45 days (01 August to 14 September) supplementary irrigation was applied in green gram and cow pea in irrigated with animal type farming system typology. In rainfed condition drought tolerant varieties of green gram (MH-421), cowpea (RC-19) and cluster bean (RGC-1066) performed very well and produced 20.58, 19.36 and 19.09 per cent higher yield, respectively than control group crop varieties. To overcome terminal heat stress in wheat, heat tolerant variety DBW-187 recorded about 15.46 per cent higher production in comparison to control wheat varieties. In onion to mitigate terminal heat/ moisture stress in through resilient variety and frequent irrigation through mini sprinkler which increased onion yield 17.09% as compared to local onion variety of farmers.

### Adoption of successful intervention in NICRA village and adjoining villages:

| Successful interventions including crops and varieties | Extent of adoption in the village in ha. |                         |           |                         |           |                         |           |                         |           |                         |           |                         |           |                         |           |                         |           |                         |           |                         |
|--------------------------------------------------------|------------------------------------------|-------------------------|-----------|-------------------------|-----------|-------------------------|-----------|-------------------------|-----------|-------------------------|-----------|-------------------------|-----------|-------------------------|-----------|-------------------------|-----------|-------------------------|-----------|-------------------------|
|                                                        | 2013                                     |                         | 2014      |                         | 2015      |                         | 2016      |                         | 2017      |                         | 2018      |                         | 2019      |                         | 2020      |                         | 2021      |                         | 2022      |                         |
|                                                        | Area (ha)                                | No. of farmers involved | Area (ha) | No. of farmers involved | Area (ha) | No. of farmers involved | Area (ha) | No. of farmers involved | Area (ha) | No. of farmers involved | Area (ha) | No. of farmers involved | Area (ha) | No. of farmers involved | Area (ha) | No. of farmers involved | Area (ha) | No. of farmers involved | Area (ha) | No. of farmers involved |
| Short duration and drought tolerant var.               | 25                                       | 10                      | 45        | 35                      | 60        | 25                      | 10        | 45                      | 35        | 60                      | 55        | 120                     | 65        | 135                     | 70        | 165                     | 80        | 210                     | 100       | 300                     |
| Green manuring                                         | 5                                        | 7                       | 7         | 10                      | 5         | 5                       | 7         | 7                       | 10        | 5                       | 08        | 20                      | 10        | 25                      | 12        | 35                      | 25        | 60                      | 40        | 80                      |
| Mineral mixture                                        | 100                                      | 170                     | 97        | 210                     | 120       | 100                     | 170       | 97                      | 210       | 120                     | 120       | 280                     | 135       | 310                     | 150       | 360                     | 180       | 420                     | 220       | 500                     |
| Gypsum application                                     | 22                                       | 20                      | 30        | 35                      | 35        | 22                      | 20        | 30                      | 35        | 35                      | 42        | 60                      | 45        | 65                      | 50        | 75                      | 60        | 85                      | 80        | 120                     |
| Crop diversification                                   | 20                                       | 25                      | 45        | 55                      | 65        | 20                      | 25        | 45                      | 55        | 65                      | 80        | 102                     | 85        | 110                     | 90        | 125                     | 125       | 160                     | 140       | 190                     |

### Successful interventions have been adopted in NICRA & adjoining villages are:

**Short duration and drought tolerant varieties in Green gram & Cowpea:** Average annual rainfall of district is 416 mm which is received by uneven distributed pattern. In *kharif* season short duration of rain and long dry spell is very common which is major crops production challenge in *kharif* season. Krishi Vigyan Kendra Jhunjhunu introduced short duration and drought tolerant varieties in NICRA village which were highly popularized in NICRA village as well as in the nearby villages.

**Green manuring:** Soils of district are sandy loam and low fertile which is limiting factor for higher productivity. Green manuring by growing dhaincha was introduced in NICRA village which is highly popularized and adopted by several farmers.

**Mineral deficiency in dairy animals is a common problem in the village, due to mineral deficiency** low milk production and long inter-calving period was more in dairy animals. To combat the mineral deficiency in dairy animals, mineral mixture and urea molasses mineral bricks were provided to the animal owners resulted 11 to 17% milk production increased with decrease in inter-calving period and

common diseases. This intervention has been adopted by more than 800 livestock owners in the adjoining villages of Jhunjhunu district.

**The underground water of selected village is slightly saline;** according to soil sample analysis, recommendation of gypsum application was used for soil reclamation. Adoption of this intervention has been found in increasing trend in 22.0 ha (2013) to 80. ha (2023) area in adjoining village.

**As the mustard crop is highly infested by orobanche parasitic** results low productivity of crop. For crop diversification by onion and fenugreek were implemented as a replacement of mustard crop. This intervention has been adopted by 950 farmers at large scale in NICRA and the adjoining villages.

### Popularization of Climate Resilient Varieties:

| Crop*        | Climate Resilient Varieties incorporated in the <i>Kharif 2023</i> plan of the State Department  | Approx. area brought under the variety by the state department during the <i>Kharif 2023</i> (ha)  |
|--------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Green gram   | MH-421                                                                                           | 3500                                                                                               |
| Cow pea      | RC-19                                                                                            | 4000                                                                                               |
| Cluster bean | RGC-1066                                                                                         | 15000                                                                                              |
| Crop*        | Climate Resilient Varieties incorporated in the <i>Rabi 2023-24</i> plan of the State Department | Approx. area brought under the variety by the state department during the <i>Rabi 2023-24</i> (ha) |
| Wheat        | Raj-4238                                                                                         | 16000                                                                                              |
| Barley       | RD-2715                                                                                          | 6000                                                                                               |
|              | RD-2786                                                                                          | 1500                                                                                               |
| Fenugreek    | AFG-3                                                                                            | 1500                                                                                               |

The climate resilient varieties of green gram (MH-421), cowpea (RC-19), cluster bean (RGC-1066) have been incorporated in State Agriculture Department *Kharif* 2023 plan and has covered 3500, 4000 and 15000ha area, respectively. Similarly, under climate resilient varieties of wheat (Raj-4238), barley (RD-2715, RD-2786) and fenugreek (Afg-3) have been incorporated in the *Rabi* 2023-24 plan of the State Department and has covered 16000, 6000, 1500 & 1500ha area, respectively in Jhunjhunu district of Rajasthan.

**Awards Received during the year for the work related to NICRA:** Nil

### Distinguished visitors to the NICRA village during the year:

| Name of the person                                              | When the visit occurred | Significant comments/ suggestions   |
|-----------------------------------------------------------------|-------------------------|-------------------------------------|
| Dr. Vijaypal Kaswan, Deputy Director, Dept. of Horti. Jhunjhunu | 20.07.2023              | Visited NICRA village Interventions |
| Dr. Rajendra Singh Lambai, Project Director ATMA, Jhunjhunu     | 27.08.2023              | Visited NICRA village Interventions |

### Amount (Rs) mobilized through convergence from various departments:

| S N | Activity/ Intervention                             | Coverage<br>[No. of farmers/<br>Area (ha)] | Convergence established with<br>(Name of the programme or<br>department) | Approx. amount<br>(Rs) mobilized |
|-----|----------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------|----------------------------------|
| 1   | Mini sprinkler to increase water<br>Use efficiency | 10                                         | 10                                                                       | 500000                           |
| 2   | Sprinkler system                                   | 05                                         | 05                                                                       | 100000                           |
| 3   | Vermi-compost                                      | 03                                         | -                                                                        | 20000                            |
| 4   | Farm implements                                    | 04                                         | -                                                                        | 200000                           |

**Publications and other products developed during the year: Nil**

**Awards Received during the year for the work related to NICRA: 2023-24: Nil**

**Significant observations about the project/ the performance of interventions/Adoption of interventions/ livelihood improvement etc:**

| Significant observations                                                                      | Performance of interventions                                  | Adoption of interventions                        | Livelihood improvement                    |
|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------|-------------------------------------------|
| Short duration varieties of cowpea                                                            | 18.59 % higher yield than control group                       | Adopted by nearly 350 farmers                    | Higher net return than local crop variety |
| Drought tolerant varieties of green gram                                                      | 19.02 % higher yield than control group                       | Adopted by nearly 340 farmers                    | Higher net return than local crop variety |
| Light & frequent irrigation by mini sprinkler in wheat & onion mitigated terminal heat stress | 15.46 & 18.56% higher yield than control groups, respectively | Adopted by total 180 & 250 farmers, respectively | Higher net return than local crop variety |
| Sirohi breed produce higher meat than local goat breed                                        | 13.42% higher milk yield than control group                   | Adopted by nearly 120 goat farmers               | Higher net return than local crop variety |
| Feeding of mineral mixture to animals produce higher yields                                   | 14.36% higher meat yield than local goat                      | Adopted by total 800 goat farmers                | Higher net return than local crop variety |

## Jodhpur-I

**Natural Resource Management:** Interventions taken up in farming system typologies during the year 2023-24: Under this module three demonstrations on low cost rainwater harvesting structure (with HDPE sheet) to conserve rain (roof) water and utilize in nutri-garden. In arid western Rajasthan, the resource-poor smallholders usually do not have adequate irrigation facilities and hence they mostly adopt rainfed or dryland agriculture. Besides, surface water resources are meagre and quality of groundwater resources is degrading with fast-declining groundwater levels due to their overexploitation. The dryland agriculture depends entirely on rainfall, which is low and erratic. In



absence of adequate rainwater during *rabi* season, the poor smallholders are unable to produce fruits and green and leafy vegetables to fulfil nutritional requirements of their families. Thus, fresh vegetables do not remain available to resource-poor farm families in rural areas throughout the year. Recently, concept of nutri-garden has started getting popularity due to its capability to address malnutrition problems of farm families particularly farm women. The purpose of demonstration unit was to make aware the farmers and farm-women of arid-region about importance of nutri-garden to provide nutritional security to their families in addition to have source of additional income. By this intervention increased the availability of vegetable and fruits round the year ensuring nutritional security of the farm families. The B:C ratio of Nutri-garden was observed 2.12.



**Demo on Pearl millet var. HHB-229**



**Demo on Cumin var. GC-4 at Lawaria village**

**Crop Production Module:** Total 75 demonstration were conducted in 30.0ha area at 75 partner/beneficiaries farmers' fields during *Kharif* 2023 and *Rabi* 2023-24.

**Pearl millet:** The bio-fortified Pearl millet variety HHB-299 was demonstrated at 25 farmers' fields in 10.0ha area at Lawari village. The biofortified variety HHB-299 performed nicely with average yield of 12.50q/ha. in demonstration which resulted 21.95% increase in yield over local pearl millet variety yield (10.25q/ha.). The B:C ratio of demonstration was 2.80; while B:C ratio of local variety was 2.20.

**Mung bean:** The high yielding moong variety MH-421 was demonstrated at 25 farmers' fields in 10.0ha area of NICRA-TDC adopted Lawari village of Bhopalgarh block in Jodhpur district of Rajasthan. The soil is fertile with good water holding capacity and good rainfall was received during the crop season. The moong variety MH-421 recorded better production with average yield of 6.50q/ha. in demonstration which resulted 23.80% increase in yield over local variety yield (5.25q/ha.). The B:C ratio of demonstration plot was 3:65 in comparison to local moong variety (3.25).

**Cumin:** The high yielding, wilt resistant cumin variety GC-4 was demonstrated at 25 farmer's fields in 10,0ha area of NICRA-TDC adopted Lawari village of Bhopalgarh block in Jodhpur district of Rajasthan. The soil is fertile with good water holding capacity. The cumin variety GC-4 gave better production with average yield of 8.50 q/ha in demonstration which resulted 25.92% increase in yield over local cumin



variety yield (6.75q/ha.). The B:C ratio of demonstration plot was 2.82; while B:C ratio of local cumin variety was 2.16.

**Livestock: Farming system typology – Rainfed with animals** (E-W direction, scientific housing, MNFB and mineral mixture Buffalo). In this farming system, improved low-cost scientific housing for buffalo along with mineral mixture and MNFB was demonstrated in NICRA adopted village. This type of housing system provides comfortable microclimate to the animals during summer and winter. Scientific housing system helps in maintain temperature inside and helps to maintain lower maximum temperature and higher minimum temperature than conventional animal shelters. Scientific housing constructed from asbestos sheet, iron angle and locally available material *kheep* (locally available material). The Size of one shed was 20ft x 15ft x 10.7ft. The temperature is reducing inside 3-5°C in comparison to other animal shed. The approximate cost of one shed was Rs 10,000/-only including thatching materials. Net return was increased from Rs 13600/- to 23100/- per lactation/animal. After calving buffaloes were deworming with albendazole @ 3 gm/animal. Along with housing system minerals mixture supplements was given to milking animal @ 50gm/animal/day with concentrate. During the month of March -July (lean month) feeding of MNFB @ 2 blocks (2.0kg each)/week. The control group fodder containing bajara (Pearl millet) kutti, dry grasses, crushed cotton and til (sesame) cake. A highly significant increased milk production, fat percentage and peak milk yield were recorded. In reproductive performances; like sign of oestrus, conception and post-partum reproductive complications were; 85%, 80% and 5% in treatment group and 60%, 50% and 25% in control groups, respectively. It was concluded that MNFB being a good source of energy, protein and minerals improved milk yield, milk fat, general health status and reproductive performance. The B:C ratio was recorded 1:1.3 and 1:1.2 in NICRA-TDC livestock technology adopted farmers' animals and non-NICRA farmers' livestock, respectively.

**Farming system typology – Rainfed with animals (Feeding Manger-Goat):** For the feeding of goat, feeding manger demonstration was given to the goat farmer because feeding cost is highest expenses in goat farming. Feeding manger decreased the wastage and parasitic exposure. One feeding manger is sufficient for 5 adult goats. The fodder losses prevented approximately 400-500kg from one manger per year. The cost of feeding manger was Rs 2500/-per unit. The net return was increase Rs 14000/- to 19000/- per unit in comparison to conventional feeding.

**Farming system typology- Irrigated with animal (Cow mat and Mineral Mixture-cross bred cow):** The population of cross bred cow is increasing day by day in the area. In the housing system flooring is important for the productivity of animal. To reduce the stress of cross bred KVK, Jodhpur-1 demonstrated cow mats and mineral mixture supplements. Mats provide cushioning and absorb the shock of animal. The soft surface of mat encourages cows to lie down for longer periods of time and reduced risk of injuries and fall due to an anti-slip surface. Cow mats helped in improving the health of a cow's udder, legs and claws. The minerals mixture was feed @ 50gm /animal/day. Milk production

increased by 10-12% in cross breed cows rearing with cow mat and minerals mixture. The net return increased from Rs 18125/- to 26250/- per lactation/cow in technology adopted by livestock owners.

**Farming system typology- Irrigated with animal (Napier & Minerals Mixture-Buffer):** In arid region of Rajasthan, availability of green fodder is limited. In NICRA-TDC adopted village having irrigation facility, hence, conducted demonstrations of Napier grass and minerals mixture feeding to the buffaloes. Green fodder is an economic source of nutrients for the dairy animals. It helps in improving digestibility of crop residues under the mix farming system. It also helps in maintaining good health and breeding efficiency and helps in reducing the cost of milk production, cooling effect on the animal body. Demonstrations of Napier and mineral mixture were conducted at NICRA village to minimize the climatic stress through feeding of green fodder. The green fodder was fed @ 10.-kg/animal/day along with minerals mixture @ 50gm/ animal/day. The net profit increase ranged between Rs18500/- to 28500/animal/lactation through adoption of green fodder feeding along-with mineral mixture.

**Custom Hiring Centre:** Custom Hiring Centre (CHC) had been established at adopted NICRA villages *i.e.* Purkhawas, Lunawas & Lawari according to ICAR-CRIDA-Hyderabad guidelines. CHC was operational in NICRA village and is being managed by VCRMC. Different agricultural implements (harrow, knapsack sprayer, water tanker, cultivator, seed cum fertilizer drill etc.). An amount of Rs 1700 mobilised through total 15 farmers benefited by covering 30.0ha area. There are total 03 VCRMC in 03 villages and an amount of Rs Rs 310044/-only had been generated by these VCRMC in adopted villages.

**Capacity building programme:** Total 210 partner farmers (103 farmers & 107 farm women) were trained through 07 training courses in several thematic areas related to crop diversification and details of the programmes conducted as given below: -

| Theme                                                    | No. of training programmes | Number of beneficiaries |        |       | Name of Village |
|----------------------------------------------------------|----------------------------|-------------------------|--------|-------|-----------------|
|                                                          |                            | Male                    | Female | Total |                 |
| Improved practice of cumin cultivation (07.11.2023)      | 01                         | 25                      | 0      | 25    | Lawari          |
| Establishment & Management of nutri-garden (16.07.2023)  | 01                         | 22                      | 11     | 33    | Lawari          |
| Importance of Vermi Compost in Nutri-Garden (12.10.2023) | 01                         | 18                      | 05     | 23    | Nandiyan Kalan  |
| Drudgery reduction farm implement (09.02.2024)           | 01                         | 0                       | 49     | 49    | Nandiyan Kalan  |
| Integrated farming system (12.10.2023)                   | 01                         | 08                      | 17     | 25    | Lawari          |
| Nursery Management (21.09.2023)                          | 01                         | 10                      | 22     | 32    | Nandiyan Kalan  |
| Nutritional management of dairy animal (27.12.2023)      | 01                         | 20                      | 03     | 23    | Lawari          |



**Provided planting material to NICRA Farmers**



**On-campus training of NICRA Farmers**

**Extension Activities:** Total 3 programmes were organized involving 122 partner farmers through technology day, agricultural innovation expos (visits, kisan mela), meri mati mera desh awareness programmes, animal health camp, agro-advisory services, dignitaries' visits, diagnostic field visits and expert visits, etc.

#### **Rainfall scenario of the year 2023-24:**

| <b>Kharif 2023</b>                                  |           | <b>Jun</b> | <b>Jul</b> | <b>Aug</b> | <b>Sept</b> | <b>Oct</b> | <b>Nov</b> | <b>Dec</b> | <b>Annual</b> |
|-----------------------------------------------------|-----------|------------|------------|------------|-------------|------------|------------|------------|---------------|
| Rainfall received (mm)                              |           | 186.5      | 115.8      | 8.3        | 54.7        | 0          | 0          | 0          | 365.3         |
| No. of dry spells during <i>kharif</i> season 2023  | > 10 days | Nil        | 01         | Nil        | 01          | Nil        | Nil        | Nil        | Nil           |
|                                                     | > 15 days | Nil        | Nil        | Nil        | Nil         | Nil        | Nil        | Nil        | Nil           |
|                                                     | > 20 days | Nil        | Nil        | 01         | Nil         | Nil        | Nil        | Nil        | Nil           |
| No. of intensive rain spells                        | > 60 mm/d | 18<br>June | -          | -          | -           | -          | -          | -          | -             |
| Water logging observed (days)                       |           | Nil        | Nil        | Nil        | Nil         | Nil        | Nil        | Nil        | Nil           |
| Any other extreme events observed during the season |           | -          | -          | -          | -           | -          | -          | -          | -             |

During the reporting year annual average rainfall recorded 365.3mm comparing to an average rainfall of Jodhpur district 318mm, while rainfall received 186.5mm, 115.8mm, 8.3mm, & 54.7mm, respectively in the month of June, July, August & September. Two dry spells of more than 10 days and one dry spell > 20 observed during June, July & August month of rainy season. Only one intensive rain spells observed, one rainfall on 18<sup>th</sup> June (103.3mm) occurred during the year 2023.

#### **Impact of contingency measures (Relate the dry spells with crop and growth stages):**

During consecutive dry spell of >10 days observed the 01<sup>st</sup>-12<sup>th</sup> July, 2023, 01<sup>st</sup>-14<sup>th</sup> Sept 2023 along with one dry spell of more than 20 days in the month of August 2023 from 01<sup>st</sup>-20<sup>th</sup> August 2023; drought tolerant varieties of Pearl millet (HHB 299), green gram (MH-421) was sown by farmers over 20.0ha area. Cumin crop (var.GC-4), 25 demonstrations were conducted involving 25 partner/beneficiary farmers covering 10.0ha area.



| S N | Dry spell (no. of days) | Duration (from --- to---)                                                                     | Crop name                  | Crop stage Affected                                                        | Intervention taken up*                                                                                                                                                  | Number of farmers involved | Impact on crop yields (q per ha) |      |                                   |
|-----|-------------------------|-----------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------|------|-----------------------------------|
|     |                         |                                                                                               |                            |                                                                            |                                                                                                                                                                         |                            | Farmers' practice                | Demo | % Increase over farmers' practice |
| 1.  | >10 Days                | 01 <sup>st</sup> -12 <sup>th</sup> July, 2023<br>01 <sup>st</sup> -14 <sup>th</sup> Sep 2023, | Pearl millet<br>Green gram | Growing and maturity stage in pearl millet crop affected due to dry spell. | Adopted drought tolerant variety. Provide life-saving irrigation.                                                                                                       | 50                         | -                                | -    | -                                 |
| 2.  | >15 Days                | 1 <sup>st</sup> -18 Aug 23                                                                    | -                          | Flowering and pod maturity stage of mung bean in affected the crop.        | Foliar spray of 1-3 % Nano Urea (urea) along with @ 0.5 % ZnSO <sub>4</sub> at flowering & seed filling stage to enhance ability of crop to withstand terminal drought. |                            | -                                | -    | -                                 |
| 3.  | >20 days                | 1 <sup>st</sup> -20 <sup>th</sup> Aug 2023                                                    | -                          | -                                                                          | -                                                                                                                                                                       | -                          | -                                | -    | -                                 |

### Adoption of successful intervention in NICRA village and adjoining villages:

| Successful interventions | Crop                                                 | Extent of adoption in the village in ha (2023) | No of farmers |
|--------------------------|------------------------------------------------------|------------------------------------------------|---------------|
| NRM                      |                                                      |                                                |               |
| CROP                     | Pearl millet (HHB-299)                               | 145                                            | 363           |
|                          | Mung bean (MH-421)                                   | 192                                            | 480           |
|                          | Cumin (GC-4)                                         | 135                                            | 338           |
|                          | Nutri-garden (Rain water harvest based Nutri-garden) | -                                              | 11            |
| Livestock                | E-W orientation of animal shed                       | -                                              | 25            |
|                          | Multi-Nutrient Feed Block                            | -                                              | 45            |
|                          | Minerals Mixture                                     | -                                              | 60            |
|                          | Cow Mat                                              | -                                              | 20            |

Several successful interventions under NICRA project have been adopted in Jodhpur district. In the year 2023-24, Bio-fortified pearl millet (var. HHB-299), green gram (var. MH-421), have been sown in 145.0ha & 192.0, respectively by 363 and 480 partner farmers during *Kharif*-2023. Wilt tolerant variety of cumin (GC-4), has been demonstrated over 135.0ha involving 338 farmers during *Rabi*-2023-24. Improved low cost scientific housing for buffalo along with mineral mixture and MNFB was demonstrated to 25, 60 and 45 practicing farmers, respectively in NICRA adopted villages. To reduce



the stress of crossbred cows, demonstrations on cow mats was conducted involving to 20 dairy farmers. Mats provide the cushioning and absorbed the shock of animals. Total 11 demonstrations were conducted on rainwater harvesting based nutri garden at NICRA adopted villages.

### Popularization of Climate Resilient Varieties:

Plan of the State Department have been covered climate resilient variety demonstration (mini kits) variety of pearl millet (MPMH-17/HHB-299), green gram (GM-4, MH-421) and moth bean (RMO-435 & RMO 2251) in 5750,1120 & 2700ha area, respectively.

| Crop*        | Climate Resilient Varieties incorporated in the <i>Kharif 2023</i> plan of the State Department | Area brought under the var.- by the state department during the <i>Kharif 2023</i> (ha) |
|--------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Pearl millet | MPMH-17/HHB299                                                                                  | 5750                                                                                    |
| Green gram   | GM-4/IPM-02-3/MH-421/IPM-02-14                                                                  | 1120                                                                                    |
| Moth bean    | RMO-435/RMO-257/RMO-2251                                                                        | 2700                                                                                    |
| Ber          | Gola/Apple                                                                                      | 320                                                                                     |
| Crop*        | Climate Resilient Varieties incorporated in the <i>Rabi- 2023</i> plan of the State Department  | Area brought under the var. by the state department during the <i>Rabi 2023</i>         |
| Cumin        | GC-4                                                                                            | 980                                                                                     |

### Significant observations about the project/the performance of interventions/adoption of interventions/ livelihood improvement etc:

| SN | Name of Intervention        | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Mineral mixture supplements | <p><b>Adoption:</b> Farmers feed their animal's mineral mixture. KVK covered 11 farmers under this project for supplementation of mineral mixture.</p> <p><b>Impact:</b> It was observed that 5.88% milk yield increased over control animal. It was also observed that the digestibility of animals adopted under mineral mixture supplementation was increased and improved the picca habit. Animals come in heat regularly.</p> <p><b>Economics:</b> Farmers earned a net return Rs 2400 per animal with BC ratio 1.42. On other side farmers got net returns of Rs 2100/- from control milking animal with BC ratio 1.37.</p> <p><b>UP Scaling:</b> Farmers used mineral mixtures with concentrate regularly and nearby 220 villagers started using such type of practice.</p> |
| 2. | Multi-nutrient feed block   | <p><b>Adoption:</b> Sixteen farmers for 123 animals are using MNFB technology.</p> <p><b>Impact:</b> For improvement of rumination and supplementation of multi-nutrient, during this year 123 animals were fed MNFB.</p> <p><b>Economics:</b> Milk production increase 8.10 percent and cost benefit ratio was 1.54 in comparison to control dairy animals.</p> <p><b>UP Scaling:</b> Dairy farmers and shepherd feed their animals. Farm women were trained for making MNFB at home made. Total 35 farm women came for training to prepare the MNFB at NICRA village.</p>                                                                                                                                                                                                        |



| SN | Name of Intervention                   | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. | Rain water harvest based Nutri -garden | <p><b>Adoption:</b> Total 36 percent farm women adopted this technology</p> <p><b>Impact:</b> Rainwater harvesting offers a valuable tool to deal with most of the problems related to water scarcity and has been widely adopted in the western Rajasthan. 10 demonstration units were established at NICRA village.</p> <p><b>Economics:</b> 42 percent increase in green vegetables availabilities as well as improvement in nutritional status of farm women. This intervention has also become a source of additional income for farm families.</p> |

## Nagaur-I

Performance of component demonstration laid out by KVK Nagaur-I under different modules is as follows:

**Crop production:** Total 170 demonstrations were conducted on green gram, cluster bean, sorghum cumin, wheat and mustard covering 68.0ha area. Improved variety of green gram (MH-1142) was demonstrated at 40 farmers' fields in 16.0ha area during *Kharif* season 2023 at Deshwal & Amarpura village, which resulted in 24.58% higher yield as compared to Dinkar seeds. Farmers who have sown the improved variety earned a net return of Rs 58379/ha with 3.19 B:C ratio in comparison to farmers' variety (Rs 44046/ ha with B:C ratio 2.81).

High yielding fodder variety of sorghum (CSV-15) was demonstrated at 40 farmers' fields over 16.0ha area, which resulted in 17.12% higher yield as compared to local farmers' variety. Farmers earned a net return of Rs 18922/ ha with B:C ratio of 1.77 over the local cultivar (Rs 13958/ha with 1.60 B:C ratio). Short duration variety of cluster bean (RGC-1033) was demonstrated at 40 farmers' fields in 16.0ha area, which resulted in higher yield than local variety. Farmers earned a net return of Rs 30678/ha with 2.31 B: C ratio in comparison to farmers' variety (Rs 19283/ ha with B: C ratio 1.87).

Wilt resistant high yielding variety of cumin (GC-4) was demonstrated during *Rabi* 2023-24 at Deshwal village at 10 farmers' fields in 4.0ha area, which resulted in 19.42% higher yield as compared to local variety. Farmers those who have sown the improved cumin variety earned a net return of Rs 185541/ha with 5.34 B:C ratio in comparison to farmers' local variety (Rs 149996/ha with B:C ratio 4.63).

High yielding variety of mustard (NRCHB-101) was demonstrated during *Rabi*-2023 at Deshwal and Amarpura village at 20 farmers' fields in 8.0ha area, which resulted in 22.87% higher yield as compared to local variety. Farmers earned a net return of Rs 52509/ ha with B:C ratio of 2.67 over the local cultivar (Rs 38689/ha with 2.68 B:C ratio). Wheat variety (DBW187) which is resistant against leaf rust and leaf blight diseases was demonstrated at 20 farmers' fields in 8.0ha area, which resulted in more yield than local variety. Farmers earned a net return of Rs 65252/ha with 2.66 B: C ratio in comparison to farmers' variety (Rs 49164/ ha with B: C ratio 2.29).



**FLD on Clusterbean var. RGC-1033 at field**



**FLD on Sorghum var. CSV-15 at farmer's field**

**Livestock production:** Total 50 demonstrations on methionine-mineral chelated and vitamin for assured bioavailability in increasing milk production in milch animals. Sirohi breeding buck was demonstrated to dairy farmers under NICRA project. Methionine-mineral chelated & vitamin for assured bioavailability and increasing milk production was demonstrated involving 40 buffaloes owing to 40 livestock farmers, which resulted in more milk than farmers' practices. Farmers earned a net return of Rs 61732/lactation with 2.02 B:C ratio in comparison to control group (Rs 46280/lactation with B:C ratio 1.84).

Sirohi breeding buck to upgrade the goat breed was demonstrated at 10 farmers' in 120 goat animals, which resulted in more animal production than Marwari goat. Farmers earned a net return of Rs 104400/unit with 2.19 B:C ratio in comparison to Marwari local goat (Rs 41420/ha with B:C ratio 1.59).

### **Institutional Interventions:**

**Custom Hiring Centre:** Selection of site and planning has been done for the establishment of CHC in April 2022 at adopted NICRA village Deshwal, Nagaur according to ICAR-CRIDA Hyderabad guidelines. Different agricultural implements (rotavator, tractor operated spray machine and seed cum fertilizer drill) performed very well which revenue generation of Rs 20481/- by helping 44 farmers for timely completion of agricultural operations covering 100.0ha area during the year 2023-24.

**Capacity Building Activities:** Total 187 farmers (170 farmers and 17 farm women) actively participated in 7 different training courses related to crop production, livestock and horticultural crops management etc. in NICRA village. Capacity building activities mainly covered crop production, livestock and horticulture etc. These trainings were organized prior to season and demonstrations resulted in the farmers' awareness about latest technologies related to crop production, horticulture and livestock etc.

**Extension Activities:** Total 07 programmes were organized involving 211 partner farmers (186 farmers and 11 farm women) through awareness programmes on rain water harvesting and VCRMC meetings, field day of cluster bean, green gram sorghum, cumin, mustard, and wheat crops.



FLD on mineral mixture at Deshawal village



Off-campus training of NICRA Farmers

### Rainfall scenario for the year 2023:

| Month                                                                             |                                             | Jun   | Jul   | Aug | Sept | Annual |
|-----------------------------------------------------------------------------------|---------------------------------------------|-------|-------|-----|------|--------|
| Rainfall received in (mm)                                                         |                                             | 232.0 | 182.0 | 0.0 | 66.0 | 581.0  |
| No. of dry spells during <i>kharif</i>                                            | >10days                                     | 0     | 0     | 0   | 01   |        |
|                                                                                   | >15days                                     | -     | -     | -   | -    | -      |
|                                                                                   | >20days                                     | -     | -     | 01  | -    |        |
| No. of intensive rain spells                                                      | >60 mm per day                              | 01    | 01    | 0   | 0    |        |
|                                                                                   | Waterlogging/Flooding observed (no.of days) | -     | -     | -   | -    | -      |
| Any other extreme events (Heat wave, Cold wave, frost) observed during the season |                                             | -     | -     | -   | -    | -      |
| Contingency measures adopted during the season                                    |                                             | Nil   | Nil   | Nil | Nil  |        |

During the reporting year annual rainfall recorded 581.0 mm.

### Impact of contingency measures taken up in the village (Relate the dry spells with crop and their growth stages):

| Temperature (°C)        |         | Normal Temp (°C)      | 2023-24                                      |                                                                    |
|-------------------------|---------|-----------------------|----------------------------------------------|--------------------------------------------------------------------|
| No. of heat wave events |         | 33°C                  | 44°C                                         |                                                                    |
| No. of cold wave events |         | 9°C                   | 2-5°C                                        |                                                                    |
| Events                  | Details | Date                  | Interventions taken up                       | Output                                                             |
| No. of heat wave events | >3 days | 11 May to 13 May 2023 | Supplementation of mineral mixture and water | Incidences of morbidity reduced, production of milk was maintained |
|                         | >5days  | -                     |                                              |                                                                    |
|                         | >7days  | -                     |                                              |                                                                    |
|                         | >10days | -                     |                                              |                                                                    |

| Temperature (°C)        |         | Normal Temp (°C)  | 2023-24                                                                                                                                                  |                                          |
|-------------------------|---------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| No. of cold wave events | >3 days | 14 to 17 Jan 2023 | Spray of cons. H <sub>2</sub> SO <sub>4</sub> @1 litre in 1000 litre of water per ha & Managed by proper irrigation during frost incidence in cumin crop | comparatively 12-15% yield was increased |
|                         | >5days  | -                 |                                                                                                                                                          |                                          |
|                         | >7days  | -                 |                                                                                                                                                          |                                          |
|                         | >10days | -                 |                                                                                                                                                          |                                          |

### Adoption of successful interventions in the NICRA village & the adjoining villages:

| Successful interventions                                                                         | Crop         | Variety                | Extent of adoption in the village in ha |
|--------------------------------------------------------------------------------------------------|--------------|------------------------|-----------------------------------------|
| <b>NRM</b>                                                                                       |              |                        |                                         |
| Deep ploughing                                                                                   | Field crop   | -                      | 40                                      |
| Soil health card                                                                                 | Field crop   | -                      | 20                                      |
| Vermi-compost                                                                                    | Field crop   | -                      | 10                                      |
| <b>CROP</b>                                                                                      |              |                        |                                         |
| Short duration variety                                                                           | Moong bean   | MH-1142                | 16                                      |
| Short duration & high yielding variety                                                           | Cluster bean | RGC-1033               | 16                                      |
| High yielding variety of sorghum                                                                 | Sorghum      | CSV-15                 | 16                                      |
| Improved & high yielding variety and is resistant to <i>Fusarium</i> wilt                        | Cumin        | GC-4                   | 4                                       |
| Improved & high yielding variety                                                                 | Mustard      | NRCHB-101              | 8                                       |
| Variety was resistance against leaf rust and leaf blight diseases of wheat                       | Wheat        | DBW-187                | 8                                       |
| <b>Livestock</b>                                                                                 |              |                        |                                         |
| Mineral chelated & vitamin for assured bioavailability. Better utilization of absorbed nutrients | Buffalo      | Mineral mixture        | 40 Animal                               |
| Adaptability to any environment, good weight gain and high in demand                             | Goat         | Sirohi (Breeding buck) | 20                                      |

Several successful interventions under NICRA project have been adopted in Deshwal & Amarpura Village in Nagaur district. In *Kharif* 2023-24, drought tolerant and short duration varieties of green gram (MH-1142) has been sown in 16.0ha, sorghum (CSV-15) has been sown in 16.0ha, cluster bean (RGC-1033) has been sown in 16.0ha. In *Rabi* 2023-24, heat tolerant and disease resistant varieties of cumin (GC-4) has been sown in 4.0ha, mustard (NRCHB-101) has been sown in 8.0ha, wheat (DBW-187) has been sown in 8.0ha. Ten breeding buck (Sirohi) have been demonstrated for the goat



breed improvement and mineral mixture for increasing milk production in animals. Improved reproductive efficiency and reduced inter-calving period, increased productive life of animals in NICRA village.

### Popularization of Climate Resilient Varieties:

| Crop*        | Climate Resilient Varieties incorporated in the <i>Kharif</i> - 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Kharif</i> -2023 (ha) | Climate Resilient Varieties incorporated in the <i>Rabi</i> -2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Rabi</i> 2023 (ha) |
|--------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Green gram   | MH-1142                                                                                           | 55000                                                                                              | -                                                                                              | -                                                                                               |
| Cluster bean | RGC-1033                                                                                          | 148500                                                                                             | -                                                                                              | -                                                                                               |
| Sorghum      | CSV-15                                                                                            | 1855                                                                                               | -                                                                                              | -                                                                                               |
| Mustard      | -                                                                                                 | -                                                                                                  | NRCHB-101                                                                                      | 15000                                                                                           |
| Cumin        | -                                                                                                 | -                                                                                                  | GC-4                                                                                           | 51000                                                                                           |
| Wheat        | -                                                                                                 | -                                                                                                  | DBW-187                                                                                        | 550                                                                                             |

### Significant observations about the project/the performance of interventions/adoption of intervention /livelihood improvement etc:

| SN | Name of intervention                                           | Description of technology, adoption and impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Green gram – MH-1142<br>(Short duration variety of Moong bean) | <p><b>Adoption of technology:</b> Green gram is the major <i>kharif</i> crop in Nagaur district which is being grown in 643140ha area with 416629 metric tons' production.</p> <p><b>Impact:</b> In normal rainfall area it gives higher returns. A good increase in area under green gram variety MH-1142.</p> <p><b>Economics:</b> B:C ratio of demonstration variety (MH-1142) was found 3.19 while B:C ratio of local variety was 2.81. Net return from demonstration variety was Rs 58379/ha whereas net return from local variety was found Rs 44046/ha. Gross return from demonstration variety was Rs 85024/ha, while gross return from local variety was found Rs 68396/ha.</p> <p><b>Up scaling:</b> Green gram variety (MH-1142) has shown good production potential as compared to another local variety. Its area has also increased as compared to previous year.</p>                                                                                   |
| 2. | Cluster bean-RGC-1033 (Short duration & high yielding variety) | <p><b>Adoption of technology:</b> Cluster bean is the major <i>Kharif</i> crop of Nagaur district which is being grown in 71382ha area with 117397 metric tons' production. Old varieties have lower yield potential as well as poor tolerance.</p> <p><b>Impact:</b> Cluster bean variety RGC-1033 is high yielding with good tolerance against stresses.</p> <p><b>Economics:</b> B:C ratio of demonstration variety (RGC-1033) was found 2.31, whereas B:C ratio of local variety was 1.87. Net return of demonstration variety was Rs 30678/ha, while net return from local variety was Rs 19283/ha. Gross return from demonstration variety was Rs 54288/ha, while gross return from local variety was found Rs.42314/ha.</p> <p><b>Up scaling:</b> Cluster bean variety (RGC-1033) was most liked by the farmers as it gives higher yield and productivity. This is also consumed as vegetable. State Department of Agriculture also promoted this variety.</p> |

| SN | Name of intervention                                                                                       | Description of technology, adoption and impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. | Sorghum -CSV-15<br>(High yielding variety)                                                                 | <p><b>Adoption of technology:</b> Sorghum is the major <i>Kharif</i> fodder crop in Nagaur district which is being grown over 30319ha area with 21284 metric tons' production.</p> <p><b>Impact:</b> It gives higher return in normal rainfall area. A drastic increase was recorded in area under Sorghum variety CSV-15 in Nagaur district.</p> <p><b>Economics:</b> B:C ratio of demonstration variety (CSV-15) was recorded 1.77, whereas B:C ratio of local variety was 1.60. Net return from demonstration variety was Rs 18922/ha, while net return from local variety was found Rs13958/ha. Gross return of demonstration variety was Rs 43572/ha and respective gross return from local variety was recorded Rs 37308/ha.</p> <p><b>Up scaling:</b> Sorghum variety (CSV-15) was most liked by the farmers as it gives higher fodder yield and productivity. It is also used for livestock feeding purpose. State Department of Agriculture also promoted this sorghum variety.</p> |
|    | Cumin – GC-4<br>(Wilt resistant high yielding variety)                                                     | <p><b>Adoption of technology:</b> Cumin is the major <i>Rabi</i> crop in Nagaur district which is being grown over 46751ha area with 30537 metric tons' production.</p> <p><b>Impact:</b> It gives higher return in normal irrigation conditions. A good increase in area under cumin variety GC-4 was recorded in Nagaur district.</p> <p><b>Economics:</b> B:C ratio of demonstration variety (GC-4) was found 5.34, whereas B:C ratio of local variety was 4.63. Net return from demonstration variety was Rs185541/ha and net return from local variety was found Rs149996/ha. Gross return from demonstration variety was Rs 228291/ha, while gross return from local variety was found Rs 191296/ha.</p> <p><b>Up scaling:</b> Cumin variety (GC-4) has shown good production potential as compared to another local variety. Its area was also increased as compared to previous year.</p>                                                                                            |
|    | Mustard-NRCHB-101<br>(Late sown, irrigated & Rainfed conditions)                                           | <p><b>Adoption of technology:</b> Mustard is the major <i>Rabi</i> crop of Nagaur district which is being grown in 35494ha area with 46735 metric tons' production. Old varieties have lower yield potential as well as poor tolerance.</p> <p><b>Impact:</b> Mustard variety NRCHB-101 is high yielding with good tolerance against stresses.</p> <p><b>Economics:</b> B:C ratio of demonstration variety (NRCHB-101) was found 2.67, whereas B:C ratio of local variety was 2.28. Net return from demonstration variety was Rs 52509/ha, while from local variety it was found Rs 38689/ha. Gross return from demonstration variety was Rs 84009/ha and gross return from local variety was recorded Rs 68839/ha.</p> <p><b>Up scaling:</b> Mustard variety (NRCHB-101) was most liked by the farmers as it gives higher yield and productivity. That's why the area under this mustard variety NRCHB-101 has increased significantly in Nagaur district.</p>                              |
|    | Wheat – DBW-187<br>(Resistant against the important diseases of the region like leaf rust and leaf blight) | <p><b>Adoption of technology:</b> Wheat is the major <i>Rabi</i> crop in Nagaur district which is being grown over 17518ha area with 48070 metric tons' production.</p> <p><b>Impact:</b> It gives higher return in irrigated area. A good increase in area under wheat variety DBW-187 was recorded in Nagaur district.</p> <p><b>Economics:</b> B:C ratio of Demonstration variety (DBW-187) was found 2.66, with B:C ratio of local variety was 2.29. Net return from demonstration variety was Rs 65252/ha, whereas net return from local variety was found Rs 49164/ha. Gross return from demonstration variety was Rs104502/ha, while gross return from local variety was found Rs 87199/ha.</p> <p><b>Up scaling:</b> Wheat variety (DBW-187) improved the nutrition value in food and also its consumption was increased as previously villagers were not aware about this bio-fortified wheat variety.</p>                                                                          |

| SN | Name of intervention | Description of technology, adoption and impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. | Sirohi goat unit     | <p><b>Adoption of technology:</b> Ten breeding buck provided in NICRA village for earning the household food security of small, marginal and landless families resulted in 10 units of Sirohi goat breed.</p> <p><b>Impact:</b> Establishment of Sirohi goat unit not only resulted in livelihood security but also provided partial employment to farm women, small, marginal, landless farmers and rural youth of Nagaur district.</p> <p><b>Economics:</b> Sirohi breed buck resulted more twin kids as compared to another local breed, more suitable and adjustable in the environment of Nagaur. Sirohi goat produces kids two times in a year and also demandable for meat purpose.</p> <p><b>Up scaling:</b> Goat rearer liked Sirohi goat breed as it gives high meat production as well as milk production. Sirohi buck has good fertility rate.</p> |

## Pali-I

Krishi Vigyan Kendra Pali-I has implemented technology demonstration components. Component wise performance is as under:-

**Natural Resource Management:** KVK Pali conducted one demonstration of chickpea variety RSG 974 in 10.0ha area involving 10 partner farmers during the year 2023-24. Major intervention carried out was *ex-situ* moisture conservation in NICRA village. Farmers followed the improved seed practices by observing improved result in 10.0 ha area after intervention. Yield of *ex-situ* moisture conservation demo was 16.8qt/ha (24.4%) higher than local farmers' practice with B:C ratio of 2.97.

**Crop Production Module:** The demonstrations were conducted on wheat and green gram. Karan Vandana variety of wheat cultivated in 20.0ha area by involving 20 farmers, which resulted in 25.2% increase in crop yield over local check with higher B:C ratio of 3.10 as compared to local check (2.76) and average net return was Rs 82811/ha.

The demonstration was conducted at farmers' fields over 15.0ha area for green gram variety GM-6 involving 15 farmers. Thus, results showed an increase of 29.5% yield over local check with higher B:C ratio of 2.8 as compared to local check (2.4) and average net return was Rs 35448/ha.



FLD on Wheat var. Karan Vandana at farmer's field



FLD on Green gram var. GM-6 at Gajangarh



**Institutional Interventions:** VCRMC committee was constituted and the said committee frequently conducted meetings regarding the progress and future planning of the project. Farmers are continuously updated regarding the climate resilient technologies such as; drought tolerant and short duration variety, natural resource management technologies, abiotic and biotic stresses and KVK conducting frontline demonstrations (FLDs), trainings, method demonstrations, field days, kisan goshties etc. on improved technologies to mitigate the climate change.

**Custom Hiring Centre:** Different agricultural implements (seed cum fertiliser duster cum blower, seed dressing drum, sprayer, etc.), performed very well which earned a revenue of Rs 3410/- by helping 161 farmers for timely completion of agricultural operations covering 51.0ha area.

**Capacity Building Activities:** Total 111 partner farmers and farm women were trained through 4 training courses in four thematic areas related to conservation agriculture under rainfed condition package, method of different design of water harvesting, improved method of cultivation under rainfed and saline condition, resource conservation technology, pest and disease management, etc. in village.



**Off-campus training at Gajgarh village**



**VCRMC meeting of NICRA farmers**

**Extension Activities:** Total 10 programmes were conducted by involving 299 partner farmers (212 males and 87 farm women), through various thematic activities conducted in NICRA village. KVK Pali I organised 10 awareness cum demonstrations in which 82 farmers actively participated, 3 field days organized on chickpea and green gram crops in adopted villages.

### Rainfall scenario of the year 2023:

| Kharif 2023                                     |            | Jun   | Jul   | Aug | Sept | Oct | Annual |
|-------------------------------------------------|------------|-------|-------|-----|------|-----|--------|
| Rainfall received in (mm)                       |            | 256.5 | 303.5 | 00  | 40.3 | 0   | 637.7  |
| No. of dry spells during kharif season 2023     | >10days    | 0     | 0     | 0   | 0    | 0   |        |
|                                                 | >15days    | 0     | 0     | 0   | 0    | 0   |        |
|                                                 | >20days    | 0     | 0     | 1   | 0    | 0   |        |
| No. of intensive rain spells                    | >60 mm/day | 0     | 0     | 0   | 0    | 0   |        |
| Water logging observed (days)                   |            |       |       | Nil | Nil  |     | Nil    |
| Any other extreme events observed during season |            |       | Nil   | Nil | Nil  |     | Nil    |

Number of dry spells more than 10days in July; dry spells more than 20 days in August. One intensive rainfall spell occurred in the month of October, 2023. During the reporting year annual rainfall recorded 637.7 mm; while rainfall received 256.5, 303.5, 00, 40.3 and 00mm, respectively in the months of June, July, August, September and October in 2023.

### Impact of contingency measures (Relate the dry spells with crop and growth stages):

| SN | Dry spell (no. of days) | Duration (from --- to---) | Crop name         | Crop stage affected | Intervention taken up*                               | Number of farmers involved | Impact on crop yields (q/ha)      |
|----|-------------------------|---------------------------|-------------------|---------------------|------------------------------------------------------|----------------------------|-----------------------------------|
|    |                         |                           |                   |                     |                                                      |                            | % Increase over farmers' practice |
| 1  | More than 20 days       | 29 July to 14 Sep., 2023  | Green gram (GM-6) | Pod filling stage   | Use of drought tolerant varieties                    | 28                         | 21.35%                            |
| 2  | More than 20 days       | 29 July to 14 Sep., 2023  | Sesame RT351      | Pod filling stage   | Use of drought tolerant and short duration varieties | 25                         | 32.22%                            |

One dry spell of more than 20 days in month of August and September drought tolerant varieties of green gram (GM-6) and sesame (RT-351) was sown over 20.0ha farmers' fields; which resulted in 40% increase in crop yield of demo variety 3.5qt/ha as compared to local check (2.5qt/ha) in green gram. Thus, results revealed an increases of 40% and 35%, respectively in green gram and sesame crop yields.

### Significant observations about the project/ the performance of interventions/adoption of interventions/livelihood improvement etc:

| SN | Name of Intervention                                          | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | GM-6 (Short duration and high yielding variety of Green gram) | <p><b>Adoption of technology:</b> Green gram is the major <i>Kharif</i> crop in the Pali. About 66 per cent farmers are growing green gram but they use the local seed and up to some extent non-recommended varieties which perform poorly in aberrant weather conditions.</p> <p><b>Impact:</b> It gives higher return. A drastic increase in area under green gram variety GM-6 was observed in Pali district.</p> <p><b>Economics:</b> Average net profit of Rs 35448/ha and other farmers got only Rs 25258/ha (additional return of Rs.10190/ha under demonstration over local check).</p> <p><b>Up-scaling:</b> In <i>Kharif</i> 2023 total 71 farmers adopted GM-6 from surrounding 7 villages and covered 59.0ha area. Farmers are willing to procure green gram seed from KVK Pali for growing GM-6 variety in coming crop season.</p> |
| 2  | RSG-974 (Rainfed variety of chickpea)                         | <p><b>Adoption of technology:</b> Chickpea is the major <i>Rabi</i> crop in Pali. About 74 per cent farmers are growing crop, but they use the local seed and up to some extent non-recommended varieties which perform poorly in aberrant weather conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



| SN | Name of Intervention                        | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                             | <p><b>Impact:</b> RSG-974 gives higher return and free from wilt disease. A drastic increase in area under cumin variety of RSG-974 was observed in Pali district.</p> <p><b>Economics:</b> Average net profit of Rs 58364/ha was earned from this variety while, non-NICRA farmers got only Rs 43755/ha (additional return of Rs 14609/ha under demonstration over local check).</p> <p><b>Up-scaling:</b> In <i>Rabi</i> 2023-24 total 34 farmers adopted RSG-974 variety from surrounding 7 villages and covered 47.0ha area. Farmers are willing to procure the seed from KVK Pali for growing RSG-974 variety in next crop season.</p>                                                                                                                                                                                                      |
| 3  | Karan Vandana<br>(Rainfed variety of wheat) | <p><b>Adoption of technology:</b> wheat is the 3<sup>rd</sup> major <i>Rabi</i> crop in the Pali district. About 42 per cent farmers are growing wheat but they use the local seed and up to some extent non-recommended varieties which perform poorly in aberrant weather conditions.</p> <p><b>Impact:</b> Karan Vandana gives higher returns and drought tolerant cultivar. A drastic increase in area under wheat variety of Karan Vandana was observed in Pali district.</p> <p><b>Economics:</b> Yield increased drastically from Karan Vandana variety about 25.2 percent due to increase in yield farmer's income also increased significantly.</p> <p><b>Up-scaling:</b> Karan Vandana is a high yielding and drought tolerant wheat variety. This wheat cultivar has become popular among farmers in short time in Pali district.</p> |

## Sirohi

KVK, Sirohi has implemented technology demonstration components of NICRA under various technological thematic area during 2023. Details are given here under:

**Natural Resources Management:** Total 25 demonstrations were conducted over 10.00ha area by involving 25 farmer families' fields. Farmers earned Rs 32546/ha to Rs 34257/ha through field bunding and deep ploughing practices.

**Crop Production Module:** Total 105 demonstrations were conducted in 32.50ha area. In *kharif* short duration and draught tolerant green gram (IPM-410-3) was demonstrated at 25 Farmers' fields covering 10.0ha area. This variety is high yielding and moong yellow vein mosaic virus resistant. Short duration summer green gram MH-1142 was demonstrated at 25 farmer's fields in 10.0ha area. During the season farmer earned Rs 32546/ha to Rs 34257/ha from summer green gram crop. Farmers earned a net income of Rs 31284/ha to Rs 39039/ha from green gram crop and both the interventions performed very well.

Total 25 demonstrations were conducted in *Rabi* (2023). Farmers earned from gram crop Rs 60893/ha to Rs 64228/ha. For gram crop in improved variety seed, line sowing and various aspects



FLD on Chilly var. Arka Meghana at field



FLD on Sirohi goat unit at farmer's field

under NICRA-TDC in adopted village were implemented. In *Rabi* season 10 demonstrations on chilly (Arka Meghana) and 5 demonstrations on onion (NHRDF-4) were demonstrated at 15 farmers' fields covering 1.5ha area. Total 2500 tomato sapling were demonstrated to 25 farmers covering 1.0ha area under crop diversification from which farmers earned good income and nutritional security as well.

**Livestock Production:** Total 58 demonstrations were conducted for breed improvement, mineral mixture supplement (50). Total 8 Sirohi breeding bucks were provided to the dairy farmer in NICRA village. Farmers having goat breed and Sirohi buck for improvement of goat breed in adopted village under NICRA project. Another 25 farmers were provided improved poultry breed of Pratapdhan under backyard poultry units for improvement in livelihood security.

**Institutional Interventions:** Total 20 demonstrations were conducted on various implements at custom hiring centre; including disc harrow, power sprayer, disc plough, knapsack sprayer, seed cum fertilizer drill, rotavator involving 119 partner farmers and farm women for timely completion of agriculture operation covering 112.0ha area during the year under report.

**Capacity Building Activities:** Total 232 farmers (206 male and 26 Farm women) actively participated in 08 different training courses in thematic area related to crop production, livestock, horticulture, home science and plant protection on different type of training programme at farmers' field to help in enhancing latest technology and skill development. Total 232 participants improved knowledge in agriculture and applied at own field and increased income.



Input distribution to NICRA Farmers: KVK Sirohi



On-campus training of NICRA Farm women

**Extension Activities:** Total 09 extension activities were organized viz; field days, method demonstration, awareness program and celebration of different special days) were organized by KVK Sirohi. Large number of farmers and farm women actively participated in these activities. Method demonstration on seed treatment, solar processing unit and waste decomposer were organized in which 152 partner farmers and 141 farm women actively took part in these activities. Total 02 awareness programs viz; parthenium control and management and caring and vaccination of dairy animal and local breed improvement were organized and large number of farmers and farm women actively participated in these activities.

### Rainfall scenario of the Year 2023:

| Month                                                                             |                                             | June  | July  | Aug | Sept  | Oct | Nov  | Dec       | Jan       | Annual |
|-----------------------------------------------------------------------------------|---------------------------------------------|-------|-------|-----|-------|-----|------|-----------|-----------|--------|
| Rainfall received in (mm)                                                         |                                             | 314.5 | 175.5 | 2.5 | 152.5 | 1.5 | 20.5 | 0.0       | 0.0       | 667    |
| No. of dry spells during <i>kharif</i> season                                     | >10days                                     | 01    | 0     | 0   | 0     | 0   | 0    | 0         | 0         | 01     |
|                                                                                   | >15days                                     | 0     | 01    | 0   | 0     | 0   | 0    | 0         | 0         |        |
|                                                                                   | >20days                                     | 0     | -     | 01  | -     | -   | -    | -         | -         | 01     |
| No. of intensive rain spells (2023)                                               | >60 mm per day                              | 02    | 01    | 0   | 01    | 0   | 0    | 0         | 0         | 4      |
|                                                                                   | Waterlogging/Flooding observed (no of days) | Nil   | -     | -   | -     | -   | -    | -         | -         | -      |
| Any other extreme events (Heat wave, Cold wave, frost) observed during the season |                                             | Nil   | Nil   | Nil | Nil   | Nil | Nil  | Cold wave | Cold wave | -      |

One dry spell of more than 15 days occurred during July and one dry spell of more than 20 days occurred during August. Total Rainfall recorded was 667.0mm with distribution as 314.5, 175.5, 2.5 and 152.5mm, in the months of June, July, August and September months, respectively during the year 2023.

### Impact of contingency measures taken up in the village

| S. No | Dry spell/ heat wave/cold wave/frost ( no. of days) | Duration (from --- to-----) | Crop name                               | Crop stage affected        | Intervention taken up*                                                                             | Number of farmers involved | Impact on crop yields (q/ha) |               |                                 |
|-------|-----------------------------------------------------|-----------------------------|-----------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------|----------------------------|------------------------------|---------------|---------------------------------|
|       |                                                     |                             |                                         |                            |                                                                                                    |                            | Farmers' practice            | Demo          | Increase over farmers' practice |
| 1     | Frost                                               | 24.12.2023-24.12.2023       | Chilli, Tomato, Papaya, Mustard, Castor | Vegetative, & mature stage | Issue advisory to frequent light irrigation to crop, spray of 0.1 % H <sub>2</sub> SO <sub>4</sub> | 50                         | 400 kg chilli                | 500 kg chilli | 25 % yield increase of chilli   |

### Adoption of successful interventions in NICRA village & adjoining villages

| Successful interventions  | Crop                        | Variety    | Extent of adoption in the village in ha |
|---------------------------|-----------------------------|------------|-----------------------------------------|
| NRM                       |                             |            |                                         |
| Summer Deep ploughing     | Green gram                  | MH-1142    | 25                                      |
| Field bunding             | Green Gram                  | IPM-410-3  | 25                                      |
| CROP                      | Mustard                     | GNG-2144   | 25                                      |
| Short duration Variety    | Green gram                  | IPM-410-3  |                                         |
| Improved vegetables       | Chilli, onion Tomato        |            | 40                                      |
| Livestock                 | Mineral mixture             |            |                                         |
| Improvement of Goat Breed | Sirohi Buck for improvement | Sirohi     | 8 demo                                  |
| Backyard poultry          | Poultry breed               | Pratapdhan | 25 demo                                 |

### Popularization of Climate Resilient Varieties

| Crop*             | Climate Resilient Varieties incorporated in the <i>Kharif</i> 2023 plan of the State Deptt. | Approx. area brought under the variety by the state department during the <i>Kharif</i> 2023 (ha) | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023 plan of the State Deptt. | Approx. area brought under the variety by the state department during the <i>Rabi</i> 2023 (ha) |
|-------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Summer green gram | MH-1142                                                                                     | 50                                                                                                | Wheat Raj-4238, Raj-4120                                                                  | 100                                                                                             |
| Green gram        | IPM-410-3                                                                                   | 50                                                                                                | Castor GCH-4 & 7                                                                          | 120                                                                                             |
| Chilli            | Arka Meghana                                                                                | 5                                                                                                 | Mustard- RH-0406                                                                          | 40                                                                                              |
| Gram              | NHRDF-4                                                                                     | 5                                                                                                 | Gram-GNG-2144,                                                                            | 57                                                                                              |

**Awards Received during the year for the work related to NICRA:** Nil

**Distinguished visitors to the NICRA village during the year:** Nil

**Publications and products/Video films etc., developed during the year:** Nil

**Significant observations about the project/ Performance of interventions/ Adoption of interventions/ Livelihood improvement:**

| SN | Name of Intervention                                                | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                     |
|----|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Short duration and drought tolerant varieties in <i>kharif</i> crop | <p><b>Adoption of Technology:</b> More than 70 % farmers have adopted drought tolerant variety of summer green gram (MH-1142) and short duration variety IPM-410-3 of green gram. Total 50 farmers have adopted drought tolerant varieties of <i>Kharif</i> crop for economic gains.</p> <p><b>Impact:</b> This variety performed well in adverse climatic conditions and increased in green gram production up to 25 to 30 per cent.</p> |



| SN | Name of Intervention                                     | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                                          | <p><b>Economics:</b> Farmers earned Rs 32546 to 34257/ha from green gram variety MH-1142 which was 25% more than the local farmers.</p> <p><b>Up scaling:</b> Expanded to 100 farmers in 3<sup>rd</sup> years. Developed business models for climate resilient agriculture inputs for crop production.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 2. | Line sowing and improved varieties of gram in Rabi crops | <p><b>Adoption of Technology:</b> Demonstration of improved variety of gram GNG-2144 and adoption of line sowing and integrated nutrient and climate resilient agriculture practices.</p> <p><b>Impact:</b> increased in gram production up to 15%. Reduced soil degradation and increased nutrient efficiency.</p> <p><b>Economics:</b> Farmers earned Rs 60893 Rs to 64228/ha using Chickpea GNG-2144 variety.</p> <p><b>Up Scaling:</b> Expanded to 100 farmers in year 2<sup>nd</sup> and 500 farmers by 3<sup>rd</sup> year in Sirohi district.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. | Breed improvement of Goat                                | <p><b>Adoption of technology:</b> For earning the household food security of small, marginal and landless families. Farmers having goat breed and 8 Sirohi buck for improvement of goat breed in adopted village under NICRA project.</p> <p><b>Impact:</b> Demonstration of Sirohi breeding buck not only resulted in nutritional improvement but also provided breed improvement, partial employment to farm women, small, marginal, landless farmers and rural youth of Sirohi district.</p> <p><b>Economics:</b> Farmers earned an income of Rs 23300 from meat and milk production.</p> <p><b>Up-scaling:</b> Expanded to 50 farmers in year 2 and 75 farmers by year 3.</p>                                                                                                                                                                                                                                                                                                                                                |
| 4. | Poultry Breed                                            | <p><b>Adoption of technology:</b> 25 farmers have adopted poultry breed for backyard poultry units.</p> <p><b>Objective:</b> Enhanced poultry productivity and income for rural farmers through adoption of improved poultry breed.</p> <p><b>Impact:</b> Increased poultry productivity: 30% increase in egg production and 25% increase in meat production.</p> <p>Improved income: 40% increase in average monthly income per farmer through established backyard poultry units.</p> <p>Enhanced food security: Increased access to protein-rich food for rural households.</p> <p>Empowerment: Women farmers benefited from improved livelihoods.</p> <p><b>Economic:</b> Farmers earned income of Rs 25000/ unit</p> <p><b>Up-scaling:</b> Expanded to 100 farmers in year 2 &amp; 500 farmers by year 3.</p> <p>Established demonstration units for training and capacity building. Partner with local poultry associations and government agencies. Developed business models for sustainable feed and input supply.</p>  |
| 5. | ZnSO <sub>4</sub> Application                            | <p><b>Adoption of technology:</b> Application of ZnSO<sub>4</sub> in mustard for increasing of oil percentage and stress management in wheat.</p> <p><b>Impact:</b> Around 20 farmers are using ZnSO<sub>4</sub> in crop production especially in mustard and wheat.</p> <p><b>Economics:</b> After application of ZnSO<sub>4</sub> in mustard and wheat farmers earned Rs 65000 to 68000/ha from mustard crop and Rs 71250 to 76220/ha wheat crop. Which was 30% higher as compared to local farmers' mustard income of Rs 42700 to 44570/ha.</p> <p><b>Up-scaling:</b> A successful intervention of demonstration of effectiveness of zinc sulphate (ZnSO<sub>4</sub>) application in mustard and wheat crops, resulting in increased oil percentage and stress management. Total 20 farmers benefited from this intervention, which earned 30% higher income as compared to local farmers. Up-scaling aims to expand this intervention to 500 farmers covering 500.0ha of land and increasing crop production and income.</p> |



## Haryana State

### Bhiwani

National Innovations in Climate Resilient Agriculture Project of the ICAR is being implemented by KVK, Bhiwani under CCSHAU, Hisar. Two villages i.e Lohani and Dhareru of Bhiwani district were selected under this project in which different modules were taken up. Different types of interventions were taken during the period January to December 2023. Module wise progress is reported here under:-

**Natural Resource Management:** *In-situ* moisture conservation measures were taken with reference to rainfall and climate vulnerability, crop growth, soils etc. FIRB method was demonstrated by taking improved seeds of wheat (DBW-303) and Bt cotton using cotton seed drill, cotton fertilizer drill, tractor mounted sprayer and missile cultivator. In wheat, 40 demos were demonstrated by selecting 20 farmers from each village and in cotton 30 farmers were selected for demonstration. Conservation tillage intervention was taken up by 10 cotton growers in which micro irrigation technology was demonstrated. Critical inputs provided were cotton seed drill, cotton fertilizer drill and tractor mounted sprayer.

**Crop Production Module:** KVK Bhiwani achieved significant farmer response for interventions related to crop production during *Kharif* 2023 and *Rabi* 2023-24 seasons. High yielding varieties- in *Rabi* season, high yielding wheat variety DBW-303 was demonstrated at farmers' field. Total 40 demos, 20 farmers from each village were selected under this intervention. Drought tolerant/improved/insect pest resistant varieties: under this intervention, cotton variety Bt cotton was selected for management of pink boll worm and sucking pests. The results showed that use of pheromone traps was effective in management of pink boll worm. From 30 demonstrations the average yield recorded was 15.2q/ha, which was about 27% increase in yield than farmer's practice.

**Flood/salt/frost tolerant varieties:** mustard variety RH-725 was demonstrated in frost affected areas and 50 farmers were selected from both villages. An average yield of 19.75q/ha was obtained from



FLD on INM in Cotton at Lohani village



FLD on mineral mixture for milch animals



demonstrations with 20.2% increase than farmer's practice. Crop diversification: keeping in view the low organic carbon status of the soils in NICRA villages, summer moong variety MH-421 was demonstrated under this intervention of crop production which gave 24% higher yield than farmer's practice. Chickpea variety HC-6 was also taken under this intervention of crop production.

**Integrated Nutrient Management:** Keeping in view the status of the soils in NICRA villages, Bt cotton was demonstrated under this intervention of crop production involving 20 farmers having 20 demos. The average cotton crop yield was recorded 16.4q/ha, which was about 31% higher than farmer's practice. Under integrated crop management total 20 demonstrations each of INM and IPM were conducted at 40 farmers' fields in which 31% higher yield was obtained than local, respectively from INM intervention and 28% from IPM intervention. However, 22% higher yield was obtained than farmers practice in cluster bean and 20% higher in integrated crop management from pearl millet. Under plant growth regulator 12 demonstrations were conducted at 12 farmers' fields, in which cotton crop yields recorded was 15.9q/ha, it was 27.5% higher yield than local farmer's practice for using Planofix as PGR intervention. It helps in enlarging boll size, increasing and improving the quality and yield of cotton bolls.

#### **Livestock and fodder production:**

**Introduction of new fodder variety:** Improved seed of multi cut sorghum variety Mahyco was demonstrated at 40 farmers' fields of Lohani village. Results of this variety recorded 287q/ha as compared to 182q/ha from local fodder crop. Under improved feeding mineral mixture with calcium were demonstrated to 48 livestock farmers under this intervention. The intervention related to animal nutrition and animal health i.e. use of mineral mixture @ 50 g/animal/day in diet was demonstrated to the farmers having milch animals. In this demonstration increased milk yield per day was observed with the animals being supplemented with balanced mineral mixture to an extent of 18.75% over local farmers practice for not using the mineral mixture to lactating animals. It had also recorded increased net returns (32.3%) than local practice. Usage of mineral mixture for animals has increased from 15-20% to 60-70% among farmers in NICRA village of Bhiwani district. To create awareness among farmers, various extension activities were organized. More than 50 livestock farmers participated in different activities and benefitted by the technological knowledge provided. Mineral mixture demonstrations results indicated positive effect on health status and cattle milk production enhanced in all the dairy animals those were given mineral mixture in their daily diet. Moreover, in this year incidences of lumpy skin disease increased in cattle; especially in indigenous cattle breeds. To aware farmers about the disease, several awareness programmes were organized and vaccination drive was also initiated in the NICRA village for control of this fatal skin disease.

**Institutional Interventions:** The KVK provided different machinery under custom hiring centres to farmers; so that the mechanization can be promoted among farmers. Different agricultural

implements (cotton seed drill, cotton fertilizer drill, tractor mounted sprayer and missile cultivator) were purchased in this project. Total 50 farmers were benefitted from this intervention for timely completion of agricultural operations. Crop specific and weather-related advisories were shared to farmers via mobile messages.

**Capacity Building:** Total 23 on and off-campus one day trainings were organised under capacity building programme in Lohani and Dahreru covering about 750 farmers and 20 farm women under thematic areas of fruit production technology, natural farming, livestock and dairy management, crop production, natural resource management, integrated Pest management, integrated nutrient management and soil health management. Four days training was organised at KVK campus on integrated farming system in which 30 farmers were given training on IFS model. Also, two days training was organised at KVK Bhiwani on natural farming involving 80 participants.



Field Day on Cluster bean at village Lohani



Kisan Gosthi at NICRA village Dhareru

**Extension activities:** Activities such as field days on *kharif* and *rabi* crops given for demonstration, method demonstrations, group meetings on crop management, awareness campaign on Jal shakti abhiyan, baag lagao abhiyaan, natural farming and soil health management were conducted in NICRA villages. Agro-advisory services on every Tuesday and Friday and celebration of different special days like; World environment day, 95th ICAR foundation and technology day, kisan diwas and World earth day were organized by KVK Bhiwani. Total 20 kisan goshthi including LIFE mission activities were organized in which 450 males and 150 females actively participated. Regular field visits to FLDs given to farmers of NICRA village and farmer scientist interaction programmes were organised for the farmers. Field days on cotton, moong, cluster bean, pearl millet, wheat, chickpea, mustard were organized at farmer's field in NICRA adopted villages.

**Rainfall status:** About 357.5 mm annual rainfall was received during the year 2023. There were 4 dry spells of >10 days, 3 dry spells of >15 days and 1 dry spells of >20 days during *kharif* season 2023 and one intensive rain spell in the month of July.



### Rainfall characteristics for the year 2023:

| Month                                                                         |                                             | Jun | Jul   | Aug  | Sept | Octo | Nov | Dec | Jan | Annual |
|-------------------------------------------------------------------------------|---------------------------------------------|-----|-------|------|------|------|-----|-----|-----|--------|
| Rainfall received in (mm)                                                     |                                             | 46  | 179.1 | 22.3 | 10.5 | 0    | 3.3 | 0   | 0   | 357.5  |
| No. of dry spells during <i>kharif</i> season                                 | >10days                                     | 1   | 1     | 1    | -    | -    | -   | -   | -   | -      |
|                                                                               | >15days                                     | -   | -     | -    | -    | -    | -   | -   | -   | -      |
|                                                                               | >20days                                     | 1   | 1     | -    | -    | -    | -   | -   | -   | -      |
| No. of intensive rain spells                                                  | >60 mm per day                              | -   | 1     | -    | -    | -    | -   | -   | -   | -      |
|                                                                               | Waterlogging/Flooding observed (no of days) | -   | -     | -    | -    | -    | -   | -   | -   | -      |
| Any other extreme events (Heat wave, cold wave, frost) observed during season |                                             | -   | -     | -    | -    | -    | -   | -   | -   | -      |

### Impact of contingency measures (Relate the dry spells with crop and growth stages):

| SN | Dry spell (no. of days) | Duration (from --- to---) | Crop name | Crop stage Affected | Intervention taken up*                  | Number of farmers involved | Impact on crop yields (q) ha) |      |                    |
|----|-------------------------|---------------------------|-----------|---------------------|-----------------------------------------|----------------------------|-------------------------------|------|--------------------|
|    |                         |                           |           |                     |                                         |                            | Farmers' practice             | Demo | % Increase over FP |
| 1  | > 10 days               | 1 Dec-31 Dec              | Wheat     | Growing stage       | Suggested Irrigations at critical stage | 40                         | 46                            | 43   | 6.9                |
| 2  | > 20 days               | 1 Jan- 31 Jan             | Wheat     | Vegetative stage    | Suggested Irrigations at critical stage | 10                         | 52                            | 48   | 8.3                |

### Amount mobilized through convergence from various departments:

| Activity/ Intervention | No. of farmers involved | Coverage Area (ha) | Convergence established with (Name of prog or deptt) | Approx. amount mobilized |
|------------------------|-------------------------|--------------------|------------------------------------------------------|--------------------------|
| Seed Production        | 50                      | 100                | HARCOFED                                             | -                        |
| Forage seed production | 40                      | 80                 | NSC                                                  | -                        |

### Publications and other products developed during the year: NIL

### Popularization of Climate Resilient Varieties:

| Crop  | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023-24 plan of the State Department | Area brought under the variety by the state department during the <i>Rabi</i> 2023-24 (000 ha) |
|-------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Wheat | DBW-303 (High Yielding)                                                                          | 2500                                                                                           |

Wheat variety (DBW-303) has been demonstrated in the *Rabi* plan of Haryana State Agriculture Department covering 2500ha area.



### Significant observations about the project/the performance of interventions/ adoption of interventions/livelihood improvement etc:

| SN | Name of Intervention   | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Climate resilient IFS  | <p><b>Adoption of technology:</b> Dairying along with agriculture provides assured income. Total 50 farmers have adopted IFS.</p> <p><b>Impact:</b> By adopting IFS farmers easily overcome the loss caused due to crops by adverse climatic conditions, as there is assured income from other enterprises.</p> <p><b>Economics:</b> Farmers earned additional income of Rs 2.50lakh/annum.</p> <p><b>Up-scaling:</b> Due to success of IFS in the existing climatic situation, 50 more farmers of adjoining villages have adopted IFS in Bhiwani district.</p>                                                                           |
| 2. | Use of Mineral Mixture | <p><b>Adoption of technology:</b> Total 48 farmers are using mineral mixture for their dairy animals.</p> <p><b>Impact:</b> Use of mineral mixture results increase in milk yield in addition to meet out mineral nutrient requirement of the animals; thereby increasing the lactation period of the dairy animals.</p> <p><b>Economics:</b> This intervention resulted in an increase of 9-10 per cent milk yield of lactating dairy animals.</p> <p><b>Up-scaling:</b> This intervention has been up-scaled in five nearby villages having similar agro-climatic situations in convergence with State Animal Husbandry Department.</p> |

## Fatehabad

Fatehabad district was selected under this project in which different modules were taken up and under these modules different types of interventions were taken from the period January to December 2023. Module wise progress is reported here under:

**Soil Health Improvement Through Demonstration on Summer Moong:** A total of 40 demonstrations were conducted in summer moong covering 16.0ha area. During *Kharif* season moong variety MH 421 was demonstrated at 20 farmers' fields in 8.0ha area, which gave 12.38% higher yield as compared to the local variety (SML-668). Farmers earned a net return of Rs 57400/ha with B:C ratio of 3.27 in comparison to the local cultivar (Rs 48000/ha with 2.94 B:C ratio).

### Crop Production:

**Disease Management in Guar:** A total of 20 demonstrations were conducted on disease management in guar crop covering 8.0ha area. During *Kharif* season guar variety HG 2-20 was demonstrated at 20 farmers' fields in 8.0ha area, which gave 10.60% higher yield as compared to local farmers; variety. Farmers earned a net return of Rs 59200/ha with B:C ratio of 3.80 over the local cultivar (Rs 52200/ha with 3.55 B:C ratio).

**Para wilt management in Bt Cotton:** A total of 20 demonstrations were conducted on para wilt management in Bt cotton using cobalt chloride covering an area of 20.0ha. The application of cobalt



chloride was found effective, which gave 16.66% higher yield as compared to farmer practice. Farmers earned a net return of Rs 21700/ha with B:C ratio of 1.41 over the local cultivar (Rs 10000/ha with 1.18 B:C ratio).



**Demo on summer Moong var. SML-668 at field**



**Demo on Wheat var. KRL-210 at Bodiwali**

**Salt tolerant Wheat variety:** A total of 20 demonstrations were conducted on salt tolerant wheat variety covering an area of 20.0ha. During *Kharif* season salt tolerant wheat variety KRL-210 was demonstrated at 20 farmers' fields in 8.0ha area, which gave 15.38% higher yield as compared to local variety (HD-2967). Farmers earned a net return of Rs 39250/ha with B:C ratio of 2.50 over the local cultivars of wheat (Rs 32550/ha with 2.35 B:C ratio).

**Bio-Fortified Pearl Millet Variety:** A total of 10 demonstrations were conducted on Bio-fortified pearl millet variety covering an area of 4.0ha. During the season Bio-fortified pearl millet variety HHB-299 was demonstrated at 10 farmers' fields in 4.0ha area, which gave 2.17% higher yield as compared to farmers' practice. Farmers earned a net return of Rs 43750/ha with B:C ratio of 3.92 as compared to local cultivars of pearl millet (Rs 42000/ha with 3.71 B:C ratio).

### **Institutional Interventions:**

**Custom Hiring Centre** established at adopted village under NICRA i.e. Bodiwali and Banmandori. The occurrence of rainfall in the villages is limited so the time for field preparation and sowing is limited and hence the implements are purchased for timely agricultural operations. In order to address this problem a CHC was established in NICRA village and is being managed by VCRM. A tractor-mounted cultivator has been used well during the year 2023; which helped 130 farmers for timely completion of agricultural operations covering 52.0ha area. With the help of custom hiring centre, a total of 202 farmers were benefitted through the use of tractor-mounted cultivator, tractor-mounted spray pump, spring balance and platform weighing balance. A total revenue of Rs 9000/- only was generated through the CHC during the year under report.

**Capacity Building Activities:** A total of 350 farmers (male 263 and farm women 87) actively participated in 8 different training courses in thematic areas related to direct seeded rice, resource conservation technology, integrated pest management, integrated disease management, weather

forecasting, integrated nutrient management, soil health improvement and kitchen gardening etc. in NICRA adopted villages. Capacity building activities mainly covered natural resource management, crop management, resource conservation technology, soil health improvement, pest and diseases control etc., as a result of these trainings, farmers got to know about latest technologies related to crop production, animal husbandry, diseases and pest management etc.



**On-campus training of NICRA farmers: KVK Fatehabad**



**Field day on Green gram at Bamandori village**

**Extension Activities:** A total of 6 programmes were organized involving 215 farmers through exposure visit and field days through various thematic activities conducted in NICRA villages. KVK Fatehabad organised strengthening VCRM bi-monthly meetings at NICRA villages, Rainwater harvesting, diagnostic field visits, organized field days on wheat, guar, summer moong and cotton. Exposure visit was organized for GBPUAT Pantnagar. Awareness programme were also conducted in the NICRA villages.

### Rainfall, Temperature and Relative Humidity scenario for the year 2023

| Month          | Rainfall (mm) | Temperature (°C) |         | Relative Humidity (%) |
|----------------|---------------|------------------|---------|-----------------------|
|                |               | Maximum          | Minimum |                       |
| January 2023   | 0             | 20.1             | 2.0     | 48                    |
| February 2023  | 0             | 28.4             | 4.7     | 53                    |
| March 2023     | 17            | 31.1             | 10      | 46                    |
| April 2023     | 1             | 41               | 11.7    | 9                     |
| May 2023       | 7             | 44.2             | 16.5    | 11                    |
| June 2023      | 36            | 41.8             | 17.5    | 23                    |
| July 2023      | 43.9          | 39.7             | 23.5    | 45                    |
| August 2023    | 9.5           | 36.2             | 25.1    | 72                    |
| September 2023 | 7.5           | 35.3             | 20.9    | 81                    |
| October 2023   | 10            | 34.4             | 15.1    | 53                    |
| November 2023  | 2.5           | 31.4             | 8.5     | 47                    |
| December 2023  | 0             | 24.5             | 3.5     | 34                    |

During the year 2023, the annual average rainfall recorded was 134.4mm comparing to an average rainfall of Fatehabad district was 395.6 mm, while rainfall received was 17 mm, 36 mm, 43.9 mm, & 9.5 mm, respectively in the month of March, June, July & August. Five dry spells of more than 10 days and two dry spells > 20 days were observed during May, August & September month of the year. Total two intensive rain spells were observed in the month of June and July, respectively.

### Impact of contingency measures taken up in the village (Relate the dry spells with crop and growth stages)

| S. No | Dry spell/ heat wave/cold wave/frost (no. of days) | Duration (from --- to -----)                                                                       | Crop name | Crop stage affected | Intervention taken up*             | Number of farmers involved | Impact on crop yields (q/ha) |                  |                                 |
|-------|----------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------|---------------------|------------------------------------|----------------------------|------------------------------|------------------|---------------------------------|
|       |                                                    |                                                                                                    |           |                     |                                    |                            | Farmers' practice            | Demo             | Increase over farmers' practice |
| 1     | Dry spell (31 days)                                | 19 <sup>th</sup> June to 28 <sup>th</sup> June, 6 <sup>th</sup> August and 25 <sup>th</sup> August | Cotton    | Reproductive stage  | Spray of Cobalt Chloride @ 2g/200l | 20                         | 9.00                         | 10.50            | 16.6%                           |
| 2     | Frost (>18 days)                                   | 2nd Jan to 20 <sup>th</sup> Jan                                                                    | Wheat     | Jointing stage      | Light irrigation was suggested     | 20                         | Without Light irrigation     | Light irrigation | 11%                             |

During the consecutive dry spells of >10 days were observed i.e. 19th to 28th June and one dry spell of >20 days in the month of 6th to 25th Aug of the rainy season; drought tolerant variety green gram (MH-421) was sown by farmers over 65.0ha area. While in the winter season, frost (18 days) had affected the wheat crop. The light irrigation was suggested for controlling the damage which resulted in 11 percent higher yield as compared to farmers practice who did not follow the contingency measures.

### Adoption of successful interventions in the NICRA village & the adjoining villages

| Successful interventions                      | Crop         | Variety   | Extent of adoption in the village in ha |
|-----------------------------------------------|--------------|-----------|-----------------------------------------|
| <b>NRM</b>                                    |              |           |                                         |
| In-situ moisture conservation in Summer Moong | Summer Moong | MH-421    | 65                                      |
| <b>CROP</b>                                   |              |           |                                         |
| Disease Management in Guar                    | Guar         | HG2-20    | 15                                      |
| Parawilt management in Cotton                 | Cotton       | Bt Cotton | 62                                      |
| Salt tolerant wheat variety                   | Wheat        | KRL-210   | 36                                      |
| Bio-fortified Pearl millet variety            | Pearl millet | HHB-299   | 18                                      |
| <b>Livestock</b>                              |              |           |                                         |
| Sorghum high yielding variety                 | Sorghum      | Haryali   | 43                                      |



The various successful interventions have been adopted under NICRA project in Fatehabad district. In the year 2023-24, *in-situ* moisture conservation was taken over 65.0ha area; using summer moong var. MH-421. The bio-fortified pearl millet variety (HHB-299) was brought under cultivation in 18.0ha area by the farmers. The disease and physiological disorder was managed in guar and cotton through the use of streptocycline and copper oxychloride and cobalt chloride in 62.0 and 36.0ha, respectively by the adjoining village farmers. During the *Rabi* season, a salt tolerant wheat variety (KRL-210) was successfully adopted in the salt affected area of 36.0ha. While in the livestock segment, a multicut high yielding fodder variety (Haryali) of sorghum was sown over 43.0ha area in the neighbouring villages of NICRA adopted villages.

**Awards Received during the year for the work related to NICRA:** Nil

**Distinguished visitors to the NICRA village during the year:** Nil

**Amount (Rs) mobilized through convergence from various departments:** Nil

**Publications:** Sunil kumar, Amit kumar, S. K. Singh, Annu & O.P Kamboj (2023). Impact of Intervention made through FLDs on summer moong & animal feed supplement using mineral mixture in NICRA adopted villages of Fatehabad district. *In International Conference on strategies for global food and nutritional security, sustainability and wellness climate resilient agriculture for food security and sustainability*, held at CCS HAU Hisar from December, 4-6, 2023, pp. 346.

**Significant observation about the project per the performance of interventions per adoption of intervention per livelihood improvement etc**

| SN | Name of intervention                  | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Wheat KRL-210 (Salt tolerant variety) | <p><b>Adoption of technology:</b> Wheat is the major <i>Rabi</i> crop in Fatehabad district. About 95% farmers are growing wheat but they use the own saved seeds and up to some extent non recommended varieties which perform poorly in salt affected soils.</p> <p><b>Impact:</b> In salt affected soils the variety perform much better than the own saved seeds. A drastic increase in yield was observed under salt tolerant wheat variety KRL-210. The mean yield of salt tolerant wheat variety (KRL-210) was found 3000kg/ha, as compared to farmers' practice (HD-2967) which was 2600kg/ha and found 15.38 percent higher than that of non-NICRA farmers. A higher net income of Rs 39250/ha was obtained in comparison to non-NICRA farmers (Rs 32550/ha). The B: C ratio of demonstration was 2.50 as compared to 2.35 in farmers' practice.</p> <p><b>Performance of interventions:</b> Total 20 farmers adopted KRL 210 under at NICRA village resulting others farmers of villages willing to procure the variety seed from KVK/Govt. agencies for growing KRL-210 improved variety families under FST-4 (Irrigated with Animal) situation in <i>Rabi</i> 2023-24.</p> <p><b>Livelihood improvement:</b> Wheat is the major <i>Rabi</i> crop in Fatehabad district. About 87 per cent farmers are growing wheat crop, but they use the local seed and up to some extent non recommended varieties which perform poorly in aberrant weather conditions in Fatehabad. district</p> |



| SN | Name of intervention                                           | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. | Summer Moong MH-421 (Short duration variety /improved variety) | <p><b>Adoption of technology:</b> Green gram is major pulse crop and grown in Fatehabad. About 45% farmers grow green gram, but they use old variety (SML-668) seed which is long duration and susceptible to yellow vein mosaic virus and perform badly in aberrant weather conditions.</p> <p><b>Impact:</b> Green gram variety MH-421 is short duration and high yielder. It is also resistant to YVMV and high return variety. A drastic increase in area under green gram variety MH-421 was recorded. The mean yield of summer moong (MH-421) was found to be 1180kg/ha, as compared to farmers' practice (SML-668) which was 1050kg/ha and found to be 12.38 percent higher than that of non-NICRA farmers. A higher net income of Rs 57400/ha was obtained in comparison to non-NICRA farmers (Rs 48000/ha). The B:C ratio of demonstration was 3.27 as compared to 2.94 in farmers' practice.</p> <p><b>Performance of interventions:</b> Total 40 farmers adopted MH-421 at NICRA village resulting others farmers of villages willing to procure the variety seed from HAU/Govt. agencies for growing. MH-421 improved variety families under FST-4 (Irrigated with Animal) situation.</p> <p><b>Up-scaling:</b> MH-421 is a high yielding and short duration variety of moong bean. This cultivar has become very popular among farming community families under FST-4 (Irrigated with Animal) situation of Fatehabad district.</p> |
| 3. | Sorghum-Haryali (Improved variety)                             | <p><b>Adoption of technology:</b> Sorghum is the major fodder and grain crop in <i>kharif</i> season of Fatehabad district. Old varieties have lower yield potential as well as poor tolerance.</p> <p><b>Impact:</b> Sorghum variety Haryali is multi-cut and high yielding with good tolerance against stresses. The variety Haryali gave 1600q/ha of fodder which was higher as compared to other local fodder varieties which were utilized earlier.</p> <p><b>Up-scaling:</b> Haryali is a high yielding and multi-cut variety of sorghum. This cultivar has become popular among farming community families under the FST-4 (Irrigated with Animal) situation of Fatehabad district.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4. | Pearl millet –HHB-299 (Bio-fortified/Improved variety)         | <p><b>Adoption of technology:</b> Pearl millet is the major grain and fodder crop in <i>kharif</i> season of Fatehabad district. Old varieties have lower yield potential as well as poor nutrition value.</p> <p><b>Impact:</b> Pearl millet variety HHB 299 gave higher returns and in the village the farmers are taking nutritious diet because of higher contents of zinc and iron as compared to other local pearl millet varieties.</p> <p><b>Performance of interventions:</b> The mean yield of bio-fortified pearl millet (HHB-299) was 2350kg/ha as compared to farmers' practice with no spray was 2300kg/ha, which was 2.17 percent higher than that of non-NICRA farmers. A higher net income of Rs 43570/ha was obtained in comparison to non-NICRA farmers (Rs 42000/ha). B:C ratio of demonstration was 3.92 as compared to 3.71 in farmers' practice.</p> <p><b>Up-scaling:</b> HHB-299 is a highly nutritious variety of pearl millet. This HHB-299 pearl millet cultivar has become popular among farmers of Fatehabad district.</p>                                                                                                                                                                                                                                                                                                                                                                                        |
| 5  | Cobalt Chloride spray in Cotton (@ 2g/200l water)              | <p><b>Adoption of technology:</b> Cotton is a cash crop and sown in large area of Fatehabad District. Para wilt occurrence is a serious physiological disorder in cotton. The spray of cobalt chloride prevented its occurrence.</p> <p><b>Impact:</b> The spray of cobalt chloride has prevented the farmers from huge economic losses.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



| SN | Name of intervention                                             | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                                                  | <p><b>Performance of interventions:</b> The mean yield of cobalt chloride sprayed cotton was 1050kg/ha as compared to farmers' practice without spray in cotton was 900kg/ha, which was 16.66 percent higher than that of non-NICRA farmers. A higher net income of Rs 21700/ha was obtained in comparison to non-NICRA farmers (Rs 10000/ha). B: C ratio of demonstration was 1.41 as compared to 1.18 in farmers' practice.</p> <p><b>Livelihood improvement:</b> The farmers successfully earned higher net returns under NICRA and adjoining villages under FST-4 (Irrigated with Animal) situation in the Fatehabad.</p>                                                                                                                                                                                                                                                                         |
| 6  | Disease Management in Guar (Streptocycline + Copper oxychloride) | <p><b>Adoption of technology:</b> Guar is the major fodder and grain crop in <i>kharif</i> season of Fatehabad district. It is severely affected by bacterial leaf blight. Old varieties have lower yield potential as well as poor tolerance of diseases.</p> <p><b>Impact:</b> The spray of <i>Streptocycline</i> and Copper oxychloride in guar has prevented the farmers from a huge economic loss.</p> <p><b>Performance of interventions:</b> The variety HG-2-20 has given 10.60 percent higher yield as compared to local variety grown by the farmers. Farmers earned a net return of Rs 59200/ha with B:C ratio of 3.80 over the local guar cultivars (Rs 52200/ha with 3.55 B:C ratio).</p> <p><b>Livelihood improvement:</b> The farmers gained higher returns under NICRA villages &amp; adjoining villages under FST-4 (Irrigated with Animal) situation in the Fatehabad district.</p> |

## Hisar

Krishi Vigyan Kendra Hisar has implemented technology demonstration components through various modules during 2023-24. Components wise performance reports are given here under: -

**Natural Resource Management:** Under NRM, total 38 demonstrations were conducted in 14.8ha area involving 38 partner farmers. The major interventions under *in-situ* moisture conservation were carried out viz., laser land levelling and ridge sowing of cotton to minimise runoff and conserved soil moisture. With efforts of KVK Hisar, NICRA village has achieved a significant progress in adoption of laser land leveller by farmers due to which cotton yield increased by 9.6 per cent over control field and resulted in a net profit of Rs 23840/ha with B:C ratio of 1.40 as compared to a net profit of Rs16350/ha with a B: C ratio of 1.2 was achieved by adopting farmers practice. As a result of this intervention area under laser land levelling increased significantly in NICRA and the adjoining villages and in turn Hisar district. Total 8 demonstrations on ridge planting in cotton by covering 2.80ha area which resulted an increase in a yield 10.6% over flat sowing and resulted in a net profit of Rs 43810/ha with B:C ratio of 1.8 as compared to a net profit of Rs 35160/ha with a B:C ratio of 1.60 was achieved by adopting farmers' practice.

**Crop Production:** KVK Hisar achieved significant farmer response on crop production interventions in year 2023-24. Total 230 Demonstrations were conducted in *kharif* and *rabi* season on climate resilient variety and crop diversification by covering 90.0ha area involving 230 partner farmers.



**Demo on Laser Land leveller at NICRA village**



**Demo on Mustard var. RH-725 at village Bhodia Khara**

In *kharif* season total 20 demonstrations on para wilt management in cotton was conducted with spray of cobalt chloride @ 5g in 500 litre of water by covering 8.0ha area which resulted an increase of yield by 9.3% over local check with higher average net return Rs 1824/- and B:C ratio (1.30) as compared to local check (1.20).

In *Rabi* season total 40 demonstrations on frost resistant mustard variety RH-725 were conducted covering 16.0ha area involving 40 partner farmers. The result showed that the average yield (21.5 q/ha) recorded higher by 8.7% with highest net returns of Rs 82430/ha and higher B:C ratio of (3.3) as compared to local check (3.1). Total 25 demonstrations on wheat variety suitable for limited irrigation were conducted in 10.0ha area which resulted in 5.5% increase in average yield (53.4 q/ha) with maximum net returns of Rs 87745/ha with higher B:C ratio of (3.0) as compared to local check (2.8). Total 25 demonstrations on improved variety of wheat (WH1124) to “reduce the effect of terminal heat stress” were conducted covering 10.0ha area which resulted in 7.2% increase in average yield (50.2q/ha) with higher net returns of Rs 79640/ha and B: C ratio of (2.7) as compared to local check (2.6).

Under crop diversification total 20 demonstrations on heat tolerant variety (HC-6) of chickpea were conducted in 5.0ha area which resulted an increase of yield by 12.5 % over local check with higher average net returns of Rs 97065/ha with B:C ratio (4.1) as compared to local check (3.6). For salt affected area total 40 demonstrations on barley crop were conducted covering an area of 16.0ha which resulted an increase of yield by 7.7% over local check with higher average net returns of Rs 43000/ha with B:C ratio (2.0) as compared to local check (1.9).

Total 29 demonstrations on salt tolerant variety of wheat were conducted with improved variety KRL-210 & KRL-213 by covering an area of 10.0ha. The results showed an increase of average yield of KRL-210 (55.2q/ha) by 7.3% over local check with higher average net returns of Rs 89725/ha with B:C ratio (2.9) as compared to local check (2.8) but average yield of KRL-213 (47.5q/ha) was - 8.2% less than local check (51.4 q/ha).

**Livestock and Green Fodder Production:** Total 70 demonstrations on mineral mixture supplements were conducted involving 35 livestock owners to increase milk yield and improve livestock health this year. It was observed that the 8.4% increase in milk yield in milch animals and earned higher returns of Rs 165500/animal/year.

**Institutional Interventions:** E-mausam platform and village level weather station (rainfall) in NICRA village was started by KVK Hisar. The phone message and WhatsApps groups were created for sharing information on various crops advisories to 250 partner farmers in adopted villages.

**Custom Hiring Centre:** Different agricultural implements (power weeder, battery operated spray pump, wheel hand hoe, seed treatment drum, solar operated spray pump, multi crop planter, national seed cum fertilizer drill etc.) are performing satisfactorily and helped 30 partner farmers for timely completion of agricultural operations covering 65.0 ha area during the year 2023-24.

**Capacity Building Activities:** Total 412 farmers and 30 farm women were trained through 13 different training courses in several thematic areas related to crops and livestock managements in NICRA. Capacity building activities covered crop management, integrated nutrients managements, weed management, livestock management, natural resource management and pest and disease management etc.



On-campus training on Frost Management in Mustard



Kisan Gosthi at NICRA village Kohli

**Extension Activities:** Total 6 different extension activities (drone demonstrations, field days' awareness campaign, exposure visit, seminar and celebration of different special days) were organized by the KVK Hisar involving 1968 partner farmers and 143 farm women. Three field days was organised on mustard, wheat and chickpea which was attended by 90 farmers. Method demonstrations on soil sampling were organised in which 33 farmers actively took part. Five campaigns viz., soil and water testing, pink boll-worm management, tree plantation campaign, parthanium eradication and awareness campaigns were organized in NICRA village large number of famers and farm women participated in these activities.

### Rainfall characteristics for the year 2023-24

| Month                                                                             |                                                 | June | July | Aug | Sep  | Octo | Nov | Dec | Jan                          | Annual |
|-----------------------------------------------------------------------------------|-------------------------------------------------|------|------|-----|------|------|-----|-----|------------------------------|--------|
| Rainfall received in (mm)                                                         |                                                 | 34.6 | 116  | 7.8 | 14.2 | 19.2 | 5.5 | 0   | 0                            | 265.5  |
| No. of dry spells during kharif season 2023                                       | >10days                                         | 2    | -    | -   | -    | 1    | -   | -   | -                            |        |
|                                                                                   | >15days                                         | -    | -    | 1   | 1    | 1    | -   | -   | -                            |        |
|                                                                                   | >20days                                         | -    | -    | -   | -    | 0    | 1   | 1   | 1                            |        |
| No. of intensive rain spells (2023)                                               | >60 mm per day                                  | -    | -    | -   | -    | -    | -   | -   | -                            |        |
|                                                                                   | Waterlogging/Flooding observed (number of days) |      |      |     |      |      |     |     |                              |        |
| Any other extreme events (Heat wave, Cold wave, frost) observed during the season | Cold wave                                       |      |      |     |      |      |     |     | 22                           |        |
| Contingency measures adopted during the season                                    | Terminal heat stress in Wheat                   |      |      |     |      |      |     |     | Drone spray of NPK (13:0:45) |        |

Two dry spell of more than 15 days occurred during August- September and two dry spells of >10 days during June. In January incident of cold wave was observed for 22 days from 3-25 January.

### Impact of contingency measures taken up in the village (Relate the dry spells/floods/heatwave/cold wave/etc., with crops and their growth stages)

| S. No | Dry spell/ heat wave/cold wave/frost ( no. of days) | Duration(from --- to-----) | Crop name              | Crop stage affected                                                                  | Intervention taken up*               | Number of farmers involved | Impact on crop yields (q/ha) |      |                                 |
|-------|-----------------------------------------------------|----------------------------|------------------------|--------------------------------------------------------------------------------------|--------------------------------------|----------------------------|------------------------------|------|---------------------------------|
|       |                                                     |                            |                        |                                                                                      |                                      |                            | Farmers' practice            | Demo | Increase over farmers' practice |
| 1     | >15                                                 | 22 August to 19 Sept.      | Clusterbean and cotton | Poor seed germination and boll drops in resulted into significant reduction in yield | Adoption of Drought tolerant variety | 30                         | -                            | -    |                                 |



| S. No | Dry spell/ heat wave/cold wave/frost ( no. of days) | Duration(from --- to-----)             | Crop name | Crop stage affected                               | Intervention taken up* | Number of farmers involved | Impact on crop yields (q/ha) |      |                                 |
|-------|-----------------------------------------------------|----------------------------------------|-----------|---------------------------------------------------|------------------------|----------------------------|------------------------------|------|---------------------------------|
|       |                                                     |                                        |           |                                                   |                        |                            | Farmers' practice            | Demo | Increase over farmers' practice |
| 3.    | Heat stress                                         | 15-18 April, 12-15 May, 20-23 May 2023 | sorghum   | Germination stage of cotton and Growth of sorghum | Irrigation             | 18                         | -                            | -    | -                               |

Two dry spell of more than 15 and 20 days in June, August, September were observed. Adequate contingency measures were advised to the farmers. No significant loss of yield was noticed as the alternate sources of irrigation were available to cope the water deficit observed in the crops. During *rabi* season in month of January the cold wave was observed. Mustard and wheat crop was highly affected by cold wave. Light irrigation was suggested to the famers to cope up the situation. Early sown mustard crop was more affected than time and late sown crop.

### Adoption of successful interventions in NICRA village & adjoining villages

| Successful interventions                                                                 | Crop    | Variety | Extent of adoption in the village in ha |
|------------------------------------------------------------------------------------------|---------|---------|-----------------------------------------|
| Laser land leveller                                                                      | Cotton  |         | 55 ha                                   |
| Introduction of frost resistant variety                                                  | Mustard | RH 725  |                                         |
| Performance of wheat variety (WH 1142) under limited irrigated condition                 | Wheat   | WH 1142 | 20 ha                                   |
| Demonstration of improved cultivar of wheat to reduce the effect of terminal heat stress | Wheat   | WH 1124 | 12 ha                                   |
| Demonstrations on salt tolerant variety of wheat under saline soil                       | Wheat   | KRL 210 | 15 ha                                   |
| Mineral Mixture                                                                          |         |         |                                         |

Three successful interventions under NICRA project have been adopted in adjoining areas. The Laser land levelling has been found very useful and the area has increased from 10.0ha to 55.0ha from 2021 to 2023. Salinity and heat stress tolerant variety is very successful intervention in adjoining village influenced by NICRA adopted village.

### Popularization of Climate Resilient Varieties:

The climate resilient varieties, mustard (RH-749, RH-725) and wheat variety (WH 1142), salinity tolerant variety KRL 210 have been demonstrated in the *Rabi*-2023-24 in Hisar district of Haryana.



| Crop*   | Climate Resilient Varieties incorporated in the <i>Kharif</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Kharif</i> 2023 (ha) | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023 plan of the State Department | Approx. area brought under the variety by the state department during the <i>Rabi</i> 2023 (ha) |
|---------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Moong   | MH 421 (Short duration)                                                                         | 520 ha                                                                                            | --                                                                                            | --                                                                                              |
| Mustard | -                                                                                               | -                                                                                                 | RH 725 & RH 749 (Frost Resistant)                                                             | 570 ha                                                                                          |
| Wheat   | -                                                                                               | -                                                                                                 | WH 1142 (Resistant to terminal heat stress)                                                   | 42 ha                                                                                           |
| Wheat   |                                                                                                 |                                                                                                   | Salinity tolerant variety of Wheat KRL 210                                                    | 35 a                                                                                            |

**Awards Received during the year for the work related to NICRA: NIL**

**Distinguished visitors to the NICRA village during the year:**

| Name of visitors                                                                                                    | Date       | Remarks                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Prof. BR Kamboj, Vice Chancellor, CCS HAU, Hisar<br>Sh. Bhavya Bishnoi (MLA),<br>Dr. BS Mandal, DEE, CCS HAU, Hisar | 03.08.2023 | Visited and appreciated the NICRA <i>Kharif</i> demonstrations, gave valuable suggestions regarding the activity in NICRA villages. |
| Prof. BR Kamboj, Vice Chancellor, CCS HAU, Hisar,<br>Dr. BS Mandal, DEE, CCS HAU, Hisar                             | 03.03.2024 | Visited the demonstration on climate resilient varieties of wheat & mustard and appreciated the work.                               |
| Sh. Sudhir Rajpal (ACS-DoA, DA&FW, Govt. of Haryana)                                                                | 30.06.2023 | Visited the NICRA demonstrations at KVK farm & interacted with the progressive farmers & provided valuable suggestions              |

**Amount (₹) mobilized through convergence from various departments: Nil**

**Publications and other products developed during the year: NIL**

**Significant observations about the project/the performance of interventions/ adoption of interventions/ livelihood improvement etc:**

| SN | Name of Interventions                        | Description of technology, Adoption of interventions and Livelihood improvement                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Salinity tolerant variety of Wheat (KRL 210) | <p><b>Adoption of technology:</b> Total 43 percent farmers have adopted salinity tolerant variety of wheat KRL-210.</p> <p><b>Impact:</b> This salinity tolerant variety KRL-210 has been proved boon for famers having light and salt affected soil, which increase yield by 8-10 percent as compared to traditional wheat variety.</p> <p><b>Economics:</b> These varieties resulted in higher net returns and BC ratio.</p> <p><b>Up-Scaling:</b> The farmers of two adjoining village have adopted this wheat variety for higher economic gains.</p> |



| SN | Name of Interventions              | Description of technology, Adoption of interventions and Livelihood improvement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. | Crop diversification with chickpea | <p><b>Adoption of technology:</b> Before starting of NICRA project farmers of the village preferred wheat and mustard in <i>Rabi</i> season; now farmers are growing low water requiring crops like; chickpea (HC-6) and castor crops.</p> <p><b>Impact:</b> Crop diversification help in horizontal expansion of crops resulted into efficient utilization of the natural resources.</p> <p><b>Economics:</b> The high net returns and BC ratio was recorded with growing different crops and it also helps in maintaining the soil health.</p> <p><b>Up-Scaling:</b> Total 68 percent farmers of two adjoining village have adopted these varieties for crop diversification.</p>                                                                                                                                                                                                        |
| 3  | Use of Mineral Mixture             | <p><b>Adoption of technology:</b> Before the start NICRA project a very few farmers were feeding mineral mixture to the animals. Method demonstration of the mineral mixture in the animal feeds was carried out to motivate the farmers under the NICRA projects as a result more than 75% of the farmers are using mineral mixture for animal feeding.</p> <p><b>Impact:</b> The incorporation of mineral mixtures increased 15 to 17% of the milk yield and decreased the disease incidences.</p> <p><b>Economics:</b> The farmers feeding mineral mixture to animals get more milk production which resulted into higher net returns and BC ratio.</p> <p><b>Up-Scaling:</b> In adjoining village the awareness and demand for mineral mixture has increased. About 80 percent of the dairy farmers have now started feeding mineral mixture to their all categories of livestock.</p> |

## Mahendergarh

Performance of component demonstration laid out by KVK Mahendergarh under different modules is as follows: -

**Natural Resource Management:** Water & soil resources are the limiting factors for successful cultivation of crops in NICRA villages selected for technology demonstration. There are instances of either complete failure or low productivity. Cluster bean has been second important *Kharif* season crop grown by the farmers. Majority of farmers' do not harvest good crop of cluster bean due to climatic constraints and poor resources. Selective cultivar of short duration cluster bean varieties suitable for rainfed cultivation can prove beneficial for obtaining better yield & returns and improve soil fertility. Demonstrations were therefore conducted on improved short duration cluster bean variety HG2-20 at Gadania and Bairawas villages on farmers' fields at NICRA villages during *Kharif* 2023. Results of demonstrations indicated that 18.37% and 24.71% higher yield and net returns of Rs 6950 and Rs 9070/ha were, respectively obtained by adoption of the technology over non- NICRA farmers at village Gadania and Bairawas respectively.

Cultivation of such crops in irrigated with animal farming system typology is required which can meet household as well as livestock need. Irrigated conditions can be exploited for cultivation of crops and varieties helpful in meeting household & livestock needs. Improved wheat variety WH-1142 is drought tolerant, resistant to yellow rust, early sowing (25 October- 05 November) restricted irrigation (two irrigations) and medium inputs condition can be successfully grown in situations of limited

irrigation. Wheat will be helpful in addressing nutrition problem and nutritive straw feed to livestock also. Demonstrations on cultivation of wheat WH-1142 were conducted at Gadania and Bairawas villages involving farmers; fields of two NICRA villages in *Rabi* 2023-24. Performance of the wheat variety in terms of water saving, yield and returns indicated better profitability than non-NICRA farmers' grown variety.

**Crop production:** During the *Kharif* season of 2023, a total of 60 demonstrations were conducted on green gram, pearl millet and groundnut, covering 24.0ha area. Cultivation of crops and varieties which are not suitable for rainfed conditions do not produce substantial yield & returns. NICRA villages farmers cultivated long duration varieties/hybrids of pearl millet and cluster bean in *Kharif* season. Pulse crops are not in practice of cultivation. Cultivation of short duration pulse crops can provide better yield & returns under such conditions. Cultivar of green gram can be one of the options. Short duration varieties of green gram are available which can be successfully grown in rainfed conditions. Demonstrations were therefore conducted on green gram variety MH-421 at Gadania and Bairawas villages on farmers' fields during *Kharif* 2023. Green gram variety MH-421 was successfully grown in NICRA villages and performed better than non-NICRA farmers' practice.



**FLD on Cluster bean var. HG-2-20 at farmer's field**



**FLD on Pearl millet var. HHB-67 at farmer's field**

Occurrence of dry spells of 10-20 days during crop growing season is main climatic constraints in both NICRA villages. Farmers' of the NICRA villages cultivate long duration private sector hybrids (Pioneer, Tata seeds, Pro Agro seeds) which can't escape dry spells & do not yield better under such conditions. Moisture retention of soils of these villages is too low resulting into moisture stress. Keeping in the view the advantage of cultivation of short duration crop hybrids/varieties which can escape dry spells & can perform better, demonstrations on pearl millet hybrid HHB 67 Improved were conducted at farmers' fields in two NICRA villages. during at Gadania and Bairawas location covering 8.0ha area. Average yield & returns of demonstration plots were recorded & compared with non-NICRA farmers' practice. Demo plots performed 5.88% and 15.20% higher yield and earned an additional net income of Rs 2565 and 5225/ha with cultivation of crop hybrid HHB 67 improved at village Gadania and Bairawas respectively.

Cultivation of such crops in irrigated with animal farming system typology is required which can meet household as well as livestock need. Irrigated conditions can be exploited for cultivation of crops and varieties helpful in meeting household & livestock needs. Pearl millet hybrids having 67-day



maturity period can be successfully grown in situations of limited irrigation. Pearl millet hybrid HHB 67 (Improved) matures in 65-70 days. Cultivation of HHB 67 (improved) will be helpful in addressing nutrition problem and nutritive straw suitable for feeding to livestock also. Demonstration on cultivation of pearl millet hybrid HHB 67 (Improved) were conducted at Gadania and Bairawas villages farmers' fields of two NICRA villages in *kharif* 2023. Performance of the hybrid in terms of yield and returns indicated better profitability than non- NICRA farmers' grown pearl millet hybrids.

Water resources though available in limited amount can be utilized for raising more profitable crops by applying need based irrigations. NICRA villages selected for technology demonstrations have tube well water resources in some pockets. Cultivation of improved varieties of groundnut with improved practices could be the best option for increasing farm income under irrigated without animal farming typology. Demonstrations on improved variety of groundnut GNG 19 were conducted at ten farmers' fields during *Kharif* 2023. Data recorded on yield and returns in demonstration plots indicated better profitability of the crop than non-NICRA farmers.

During the *Rabi* season of 2023-24, a total of 60 demonstrations were conducted on mustard crop covering 24.0ha area. Mustard covers maximum cropped area in the district as well as in NICRA villages in *Rabi* season. Productivity of the crop is very low (q/ha) in NICRA villages. Improper selection of crop varieties for cultivation is one of the factors of low productivity. Most of the farmers grow crop varieties of private sector having more water requirement. Selection and cultivation of varieties suitable for rainfed/ limited irrigation water conditions will be helpful in increasing crop productivity. Demonstrations were, therefore, conducted at farmers' fields of NICRA villages on mustard variety RH-725 which is recommended for cultivation under rainfed conditions. Mustard variety RH-725 grown in demonstration plots of NICRA farmers performed better than varieties grown by non- NICRA farmers. Mild frost was experienced which did not affect performance of RH-725 adversely in comparison to varieties raised by non-NICRA farmers. Similarly, moisture stress experienced during crop growing season did not affect performance of RH-725 much in comparison to other mustard crop varieties.

**Livestock and fodder production:** Farmers' domesticate unidentified breeds of livestock having low productive potential. Scarcity of green fodder & feeding with low nutritive feed further determines the productivity. Sustaining productivity of livestock in rainfed conditions is a difficult task as there remains scarcity of green fodder. Livestock and milch animals in particular can be provided feed supplements (mineral mixture) for improving milk production and livestock health, Mineral mixture was provided to dairy farmers domesticating & milch animals to observe the impact of the technology. Feeding of mineral mixture (50 g/animal/day) for a period of 10 months provided additional milk of 240lit and 232 lit per lactation and earned net returns of Rs 9735 and 12760 Rs/annum, respectively at village Gadania and Bairawas.

### **Institutional Interventions:**

**Custom Hiring Centre:** Place finalized for the CHC establishment at newly selected NICRA village, selection of site and planning has been done for the establishment of CHC at newly adopted NICRA villages in April 2022 at Gadania and Bairawas, Mahendergarh according to ICAR-CRIDA Hyderabad guidelines. Different agricultural implements (seed cum fertilizer drill, multicrop planter, spray



machine etc.) performed very well which earned revenue of Rs 1760/- only by helping 88 farmers for timely completion of agricultural operations covering 35.2 ha area during the year under report.

**Capacity Building Activities:** Total 468 farmers (279 male and 189 farm women) actively participated in 12 different training courses in thematic area related to natural resource management, crop production and livestock management etc in NICRA villages. Capacity building activities mainly covered crop production practices, pest and diseases control, livestock management, soil and water management etc. These trainings were organized prior to season and conductance of demonstration; as a result, the farmers are being aware about latest technologies related to above topics.



**FLD on Mineral mixture at Gadania NICRA village**



**Off-campus training at Bairawas NICRA village**

**Extension Activities:** Total 18 programmes were organized involving total 690 partner farmers (531 male and 159 farm women) through method demonstration awareness programmes, VCRMC meeting, group meetings, kisan gosthi, field visits, expert lecture and field days etc during 2023-24.

#### **Rainfall Characteristics of 2023 and stress experienced:**

| Rainfall                                      |                | Normal RF | 2023-24  |
|-----------------------------------------------|----------------|-----------|----------|
| Annual rainfall (mm)                          |                | -         | 666.0 mm |
| June                                          |                | -         | 106.0 mm |
| July                                          |                | -         | 277.0 mm |
| August                                        |                | -         | 46.5 mm  |
| September                                     |                | -         | 30.0mm   |
| Total <i>Kharif</i> rainfall                  |                | -         | 494.0mm  |
| Total <i>rabi</i> rainfall                    |                | -         | 110.0 mm |
| No. of rainy days                             |                | -         | 44       |
| No. of dry spells during <i>kharif</i> season | >10days        | -         | 00       |
|                                               | >15days        | -         | 01       |
|                                               | >20days        | -         | 01       |
| No. of intensive rain                         | >60 mm per day | -         | 00       |



### Impact of contingency measures taken up in the village (Relate the dry spells/floods/heat wave/cold wave/etc., with crops and their growth stages)

| Extreme events        | Period of occurrence (Date)    | Duration of climate stress (days) | Area impacted by climatic stress (ha) | Impact of weather on crop , crop stage                                                                                                                                                                                                                                                                                                                                                                        | Interventions taken up |                                                                                                                                                                    | Output/ Impact of technology                             |
|-----------------------|--------------------------------|-----------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Drought/<br>dry spell | 04-18.08.2023                  | 15<br>24                          | 294.0                                 | Dry spell of 15 days in during first fortnight of August put a check on boot stage of pearl millet and flowering stage of groundnut crop.<br><br>Dry spell in last week of August and first half of September affected flowering and anthesis stage in pearl millet and peg formation and pod development stage in groundnut crop.<br><br>Livestock productivity decreased due to lack of fodder availability | NRM                    | Demonstrations on cultivation of short duration cluster bean variety HG 563                                                                                        | Substantial production along with soil health management |
|                       | 24.08.2023 – 16.09.2023        |                                   |                                       |                                                                                                                                                                                                                                                                                                                                                                                                               | Crop                   | Demonstrations on cultivation of short duration and drought tolerant pearl millet hybrid HHB 67<br>Improved Life saving irrigation in groundnut demonstration crop | 12 % yield advantage<br>Better profitability             |
|                       |                                |                                   |                                       |                                                                                                                                                                                                                                                                                                                                                                                                               | Livestock              | Emphasis on balance feeding by supplementation of mineral mixture                                                                                                  | Sustaining productivity                                  |
| Heat stress           | 11-15.05.2023<br>20-23.05.2023 | 05<br>04                          |                                       | Productivity of livestock reduced due to heat stress                                                                                                                                                                                                                                                                                                                                                          | Livestock              | Follow up of heat stress management practices (arrangement of drinking water, shed management)                                                                     | Check on productivity reduction during heat stress       |

### Adoption of successful interventions in the NICRA village & the adjoining villages:

| Successful interventions | Crop            | Variety     | Extent of adoption in the village in ha (2023) |
|--------------------------|-----------------|-------------|------------------------------------------------|
| NRM                      |                 |             |                                                |
|                          | Cluster bean    | HG 2-20     | 42                                             |
|                          | Wheat           | WH 1142     | 35                                             |
| CROP                     | Green gram      | MH 421      | 23                                             |
|                          | Pearl millet    | HHB 67 Imp. | 38                                             |
|                          | Mustard         | RH 725      | 82                                             |
| Livestock                | Mineral mixture | -           | 80                                             |

Several successful interventions under NICRA project have been adopted in Gadania and Bairawas villages in Mahendergarh district. Drought tolerant and short duration varieties of green gram (MH-421) has been sown over 23.0ha area, Pearl millet (HHB 67 imp.) has been sown over 38,0ha area, Cluster bean (HG 2-20) has been sown covering 42.0ha area. Eighty farmers have used the mineral mixture as feed supplement and green fodder for animal health improvement.

### Popularization of Climate Resilient Varieties:

| Crop*                | Climate Resilient Varieties incorporated in the Kharif 2023 plan of the State Department | Approx. area brought under the variety by the state department during the Kharif 2023 (ha) | Climate Resilient Varieties incorporated in the Rabi 2023 plan of the State Department | Approx. area brought under the variety by the state department during the Rabi 2023 (ha) |
|----------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Pearl millet-Mustard | HHB-67 Improved                                                                          | 1250                                                                                       | RH-725                                                                                 | 1250                                                                                     |
|                      | HHB-299                                                                                  |                                                                                            |                                                                                        |                                                                                          |
| Cluster bean-Wheat   | HG 2-20                                                                                  | 160                                                                                        | WH-1142                                                                                | 120                                                                                      |
|                      | HG-563                                                                                   |                                                                                            |                                                                                        |                                                                                          |
| Green gram-Wheat     | MH-421                                                                                   | 280                                                                                        | WH-1142                                                                                | 60                                                                                       |
| Sesame-Wheat         | RT-351                                                                                   | 45                                                                                         | WH-1142                                                                                | 45                                                                                       |
| Groundnut-Wheat      | GJG-19                                                                                   | 20                                                                                         | WH-1142                                                                                | 20                                                                                       |

### Awards Received during the year for the work related to NICRA:

Best poster presentation award in XXII Biennial National Symposium on Climate Smart Agronomy for Resilient Production Systems and Livelihood Security held by ICAR-CCARI, Goa

### Distinguished visitors to the NICRA village during the year:-2023-24: Nil

### Amount (Rs) mobilized through convergence from various departments

| Village name         | Technology scaling up/out                       | No. of farmers reached | Coverage (ha) / number | Convergence with the programme                                        | Approx. amount mobilised |
|----------------------|-------------------------------------------------|------------------------|------------------------|-----------------------------------------------------------------------|--------------------------|
| Gadania and Bairawas | Skill development program on nursery management | 05                     | -                      | Self-employment assistance to SC rural youth By Government of Haryana | 60100                    |

### Publications and products/Video films etc., developed during the year: Two



### Significant observation about the project per the performance of interventions per adoption of intervention per livelihood improvement etc:

| SN | Name of intervention                                                  | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Cultivation of cluster bean for restoring soil fertility              | <p><b>Adoption of technology:</b> The adoption of the Cluster bean variety HG2-20 for short duration in the NICRA village of Gadania and Bairawas has had a significant positive impact on local agricultural practices. This crop, known for its nitrogen-fixing capabilities, has been integrated into farming systems to enhance soil fertility and health. By sowing HG 2-20, farmers have experienced a reduction in the need for synthetic fertilizers, leading to cost savings and a more sustainable approach to nutrient management. Additionally, the use of this technique has improved the physical properties of the soil, including its structure and moisture retention, which are critical for crop growth.</p> <p><b>Impact:</b> Farmers from Gadania and Bairawas have reported more area convert from cotton to cluster bean, increased yields from subsequent crops due to the enriched soil conditions created by the cluster bean plants. This crop not only supported better crop productivity but also promoted biodiversity and reduced soil erosion. The successful implementation of HG 2-20 in the region serves as a model for sustainable agricultural practices, highlighting the importance of technology adoption in enhancing food security and fostering environmental stewardship. Overall, the positive impacts of this initiative reflect the potential for cluster beans to transform agricultural productivity in similar farming communities.</p> |
| 2. | Micro sprinkler irrigation method in wheat                            | <p><b>Adoption of technology:</b> Water scarcity is the major problem of the district and wheat is the major crop of <i>Rabi</i> season after mustard in Mahendergarh district. Restricting irrigation can enhance water use efficiency by reducing excessive water applications and promoting a more efficient use of available water, especially in areas where water is scarce or expensive. The adoption of restricted irrigation wheat variety WH-1142 with micro sprinkler irrigation method and low requirement of inputs had positive impact on water saving and reducing cost of cultivation and overall increase farmers' income.</p> <p><b>Impact:</b> The positive impact of this technology adoption extends beyond individual farms, contributing to improved food security in the region and promoting sustainable agricultural practices. By transitioning to WH-1142 wheat variety, farmers are better equipped to adapt to climate variability, ensuring more reliable incomes and enhancing the overall resilience of Mahendergarh agricultural sector.</p>                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3. | Improved mustard variety for rainfed/restricted irrigation conditions | <p><b>Adoption of technology:</b> Diversification towards more desirable cropping system can sustain the production and farm income. Cultivation of oilseed crops suited to prevailing farming situation could be very helpful in meeting edible oil requirement and increasing farm income. Mustard is one of <i>rabi</i> season crop that can be successfully grown in conditions of NICRA villages having rainfed/irrigated without animal typology. Demonstration on cultivation of mustard variety RH-725 following improved production practices were conducted at Gadania and Bairawas villages farmers' fields in <i>rabi</i> 2023. Mustard variety RH-725 grown in demonstration plots of NICRA farmers performed better than varieties grown by non- NICRA farmers.</p> <p><b>Impact:</b> Mild frost was experienced which did not affect performance of mustard variety RH-725 adversely in comparison to local varieties raised by non-NICRA farmers. Similarly, moisture stress experienced during crop growing season did not affect performance of mustard variety RH-725 much in comparison to other local varieties.</p>                                                                                                                                                                                                                                                                                                                                                  |

| SN | Name of intervention                      | Description of technology, adoption, impact, economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. | Use of mineral mixture as feed supplement | <p><b>Adoption of technology:</b> Farmers' domesticates unidentified breeds of livestock having low productive potential. Scarcity of green fodder &amp; feeding with low nutritive feed further determines the productivity. Sustaining productivity of livestock in rainfed conditions is a difficult task as there remains scarcity of green fodder. Livestock and milch animals in particular can be provided feed supplements (mineral mixture) for improving milk production and livestock health, Mineral mixture was provided to Gadania and Bairawas villages dairy farmers' domesticating &amp; milch animals to observe the impact of the technology.</p> <p><b>Impact:</b> Feeding of mineral mixture (50 g/animal/day) for a period of 10 months provided additional milk of 240 lit and 232 lit per lactation and earned a net returns of Rs 9735 and 12760 Rs/annum, respectively at village Gadania and Bairawas. Animal health also improved after use of mineral mixture as feed supplement and animal tolerate the adverse climate conditions without any adverse effect.</p> |

## Sirsa

### Natural Resource Management

**Details of technology:** Rice and wheat are the major cereal crops in Haryana, contributing to the approximately 80% to the production of food grains. The water requirement of rice-wheat system varies from 1382 mm to 1838 mm, where more than 80% water is required for paddy cultivation. The excessive groundwater usage and inappropriate management practices have risen as a threat to future food security and natural resources. Natural resource conservation technologies (RCTs) such as; laser land levelling has been known for improving uniform water application, crop stands, yields and stabilizing nutrient-water interactions in irrigated and rainfed environments.



**Demo on laser Land Leveller in Paddy field**



**Demo on Mustard var. RH-725 at Rupana village**

**Performance and impact of technology:** The study was conducted in village Rupana of Sirsa District in Haryana under demonstration component of National Innovation in Climate Resilient Agriculture (NICRA) project from 2021-2024. The laser land levelling technology was demonstrated at the rice-wheat cropping system farm fields and seed of rice variety PB-1509 was provided to farmers. Laser land

levelers were provided through custom hiring centers. To access the performance of laser land levelling technology as an *in-situ* moisture management practice, comparative analysis of data from demonstration and farmer's practice plot was done. The observations indicated that the yield from the laser leveled fields was increased by 9.52%, 9.09% and 8.31% in year 2021, 2022 and 2023, respectively. The findings of the study revealed that laser land levelling technology given to farmers as resource conservation practice, was able to help in water management while giving higher yields and better returns. The response of farmers and yield data indicated that approximately 78% farmers have successfully adopted the laser levelling and practicing it regularly every two or three years. The farmers also reported saving of time and energy in terms of pumping hours, reduced weed population, and cost saving etc.

### Performance of laser land leveler technology in NICRA village from 2020-2023

| Year of trial | Measurable indicators (yield) q/ha |      | % Increase in yield | Economics of demonstration (Rs. /ha) |              |            |      | Economics of FP (Rs. /ha) |              |            |      |
|---------------|------------------------------------|------|---------------------|--------------------------------------|--------------|------------|------|---------------------------|--------------|------------|------|
|               | Demo                               | FP*  |                     | Gross Cost                           | Gross Return | Net Return | BCR* | Gross Cost                | Gross Return | Net Return | BCR* |
| 2021          | 46                                 | 42   | 9.52                | 39500                                | 107640       | 68140      | 2.72 | 38000                     | 98280        | 60280      | 2.59 |
| 2022          | 48                                 | 44   | 9.09                | 40250                                | 153600       | 113350     | 3.82 | 38500                     | 140800       | 102300     | 3.66 |
| 2023          | 48.2                               | 44.5 | 8.31                | 40250                                | 168700       | 128450     | 4.19 | 38500                     | 155750       | 117250     | 4.04 |

\*Benefit : cost ratio

**Upscaling:** The technology can be scaled up with the help of custom hiring centres established at village level under different projects or programs of state and union Government agencies.

### Crop Production:

#### Performance of Frost tolerant variety of Mustard RH-725

**Details of technology:** Month of December-January are usually rough for *rabi* crops especially mustard due to occurrence of sub-zero temperatures and frost in north-western parts of India. It affects crop yield adversely. The extent of damage to plants and flower may rise up to 1/4<sup>th</sup> of the total crop stands under adverse situations. The improved varieties of mustard such as RH-725 showed very good results in terms of tolerating low temperatures and frost. The robust growth of plants of this variety helps in protecting the flowers and pods from direct contact of frost, thereby ensuring a good yield. The variety RH-725 stands better when compared with the private sector hybrids which are sold to farmers at higher market rates. The cheaper prices of seed, good yield and tolerance to adverse climatic conditions makes it a better option for the farmers of Sirsa district in Haryana.

**Performance and impact of technology:** The seed of mustard variety RH-725 produced at the CCSHAU Hisar was distributed for demonstrations in NICRA village, Rupana of Sirsa district. The improved



variety produced 10.6% higher yield in 2021, 6.6% higher yield in 2022 and 13.63% higher yield in 2023 when compared with local variety in the village. Moreover, the impact of frost was less in RH-725 variety. The results enhanced the adoption of this variety in the village at large scale including the nearby village. This year demand of mustard variety RH-725 was very high due to its highest production potential.

### Performance of laser land leveler technology in NICRA village from 2021-2024

| Year of trial | Measurable indicators (yield) q/ha |      | % Increase in yield | Economics of demonstration (Rs. /ha) |              |            |       | Economics of FP (Rs. /ha) |              |            |      |
|---------------|------------------------------------|------|---------------------|--------------------------------------|--------------|------------|-------|---------------------------|--------------|------------|------|
|               | Demo                               | FP*  |                     | Gross Cost                           | Gross Return | Net Return | BCR   | Gross Cost                | Gross Return | Net Return | BCR  |
| 2021          | 28                                 | 25   | 10.6                | 28000                                | 118720       | 90720      | 4.24  | 28000                     | 104160       | 76160      | 3.72 |
| 2022          | 24                                 | 22.5 | 6.6                 | 19500                                | 151200       | 131700     | 7.75  | 19000                     | 141750       | 122750     | 7.46 |
| 2023          | 18.75                              | 16.5 | 13.63               | 10000                                | 103125       | 93125      | 10.31 | 10500                     | 90750        | 80250      | 8.64 |

**Upscaling:** The technology can be spread to the entire districts through convergence with state departmental activities, central programmes and NFSM, CFLD-oilseeds.

### Performance of Yellow Rust Wheat variety HD-3086

**Details of technology:** Majority of the wheat area of NWPZ falls under timely sown irrigated crop conditions, in this area needs to resistance with yellow rust and tolerance to terminal heat stress. Improving grain yield is the ultimate aim of wheat improvement programme in India. Yield increase may be effectively tackled on the basis of performance of yield components and related characters. The variety HD-3086 was developed from the cross DBW 14/HD 2733// HUW 468 following modified bulk method. The HD-3086 wheat variety developed by the Division of Genetics, ICAR-IARI, New Delhi. In the NWPZ, yellow rust is the main yield reducing biotic factor. HD-3086 has higher resistance to yellow rust (ACI 5.3).

**Performance and impact of technology:** The demonstrations of Yellow rust resistance wheat variety HD-3086 were conducted and the farmers of NICRA village, Rupana of Sirsa district were provided seeds along with crop production technology. The improved variety produced significantly higher yield in both the years when compared with local wheat variety. The impact of Yellow rust was less in HD-3086 wheat variety and the technology was proven to be effective to mitigate income sustainability problems. The results enhanced the adoption of this variety in the village at large scale including the nearby villages where the land is affected by Yellow rust. The demonstrations were able to create awareness among farmers.

### Performance of Yellow rust resistance Wheat variety HD-3086 in village from 2021-24

| Year of trial | Measurable indicators (yield) q/ha |     | Economics of demonstration (Rs. /ha) |              |            |      | Economics of FP (Rs. /ha) |              |            |      |
|---------------|------------------------------------|-----|--------------------------------------|--------------|------------|------|---------------------------|--------------|------------|------|
|               | Demo                               | FP* | Gross Cost                           | Gross Return | Net Return | BCR  | Gross Cost                | Gross Return | Net Return | BCR  |
| 2021          | 36                                 | 22  | 35200                                | 60544        | 25344      | 1.72 | 35200                     | 40480        | 5280       | 1.15 |
| 2022          | 30                                 | 17  | 32500                                | 69000        | 36500      | 2.12 | 32000                     | 39100        | 7100       | 1.22 |
| 2023          | 53                                 | 51  | 34000                                | 120575       | 86575      | 3.54 | 35000                     | 116025       | 81025      | 3.31 |

### High yielding chickpea variety GNG-2171 under crop diversification

**Details of technology:** The most common cropping system in Sirsa district is rice-wheat or cotton-wheat or cotton-mustard based. The repeated cultivation of same crops over the years leads to pest emergence and poor soil conditions. Pulse crops not only give good returns but also improves soil health by fixing nitrogen, therefore, these crops are best suitable for crop diversification. They require less fertilizer than other crops and they are a low carbon source of protein. They have a direct positive impact on soil quality because chick pea crop helps in feeding soil microbes which further helps in improving soil health. Keeping in view these facts, a suitable variety of chickpea i.e. GNG-2171 (Ghanghor) was introduced in the village under NICRA demonstration program. The objective was to ensure sustainable income for farmers along with nutritional security.

**Performance and impact of technology:** The seed of gram variety GNG-2171 was procured and distributed for demonstration in NICRA village, Rupana and Nirban of Sirsa district. The improved variety produced 9% higher yield in 2019, 11% higher yield in 2021, 11.11% higher yield in 2022 and 20% higher yield in 2023 in comparison to local variety or other popular varieties in the village. The inclusion of chickpea in the existing cropping system enhanced annual farm income of farmers in the village. As a result of successful demonstrations of the intervention, the variety has become very popular among farmers.

### Performance of Chickpea variety GNG-2171 in NICRA village from 2019-2024

| Year of trial | Measurable indicators (yield) q/ha |       | % Increase in yield | Economics of demonstration (Rs. /ha) |              |            |       | Economics of FP (Rs. /ha) |              |            |       |
|---------------|------------------------------------|-------|---------------------|--------------------------------------|--------------|------------|-------|---------------------------|--------------|------------|-------|
|               | Demo                               | FP*   |                     | Gross Cost                           | Gross Return | Net Return | BCR** | Gross Cost                | Gross Return | Net Return | BCR** |
| 2019          | 21.3                               | 19.5  | 9                   | 24600                                | 96000        | 71400      | 3.90  | 24000                     | 88000        | 64000      | 3.6   |
| 2021          | 20                                 | 18    | 11                  | 19500                                | 90000        | 70500      | 4.61  | 19000                     | 81000        | 62000      | 4.26  |
| 2022          | 20                                 | 18    | 11.11               | 19500                                | 108000       | 88500      | 5.54  | 19000                     | 97200        | 78200      | 5.12  |
| 2023          | 22.5                               | 18.75 | 20                  | 19500                                | 112500       | 93000      | 5.76  | 19000                     | 93750        | 74750      | 4.93  |

## Management of parawilt in cotton by cobalt chloride application

**Details of technology:** Cotton is sown in approximately 1.96 lakh ha area in Sirsa district. The Nathusari Chopta block has the highest area under cotton crop. Sometimes the heavy rainfall results in waterlogging of cotton fields and plants show wilting symptoms within very short duration which is known as parawilt/ sudden wilt. It is a major problem of cotton crop in the district. Plants show sudden drooping of leaves (wilting) but the root system remains intact. As per the recommendations of CCS HAU Hisar, the affected plants can be saved by spraying Cobalt chloride @ 1.0 g per 100 litre of water (10ppm) immediately after the appearance of symptoms. There would be no recovery if permanent wilting has already set in and spraying is delayed. Cobalt chloride is easily available at reasonable prices which don't increase cost of production for farmers. The timely application is important; therefore, the farmers need to be aware of correct concentrations and time for application to prevent yield losses caused by parawilt in cotton crop.

**Performance and impact of technology:** The Spray of Cobalt chloride on cotton as suggested by CCSHAU Hisar was distributed for demonstration in NICRA village, Rupana of Sirsa district in the affected area. The timely spray of cobalt chloride resulted in less disease incidence and the crop produced 20.3% higher yield in 2020-21 (stress year), 3.1% higher yield in 2021-22 (normal year) and 22.72% higher yield in 2023-2024 when compared with the crop fields which were not attended timely. The results of the intervention motivated the farmers to adopt less costly technology to manage parawilt problem without enhancing the cost of cultivation excessively.

### Performance of Cobalt Chloride Spray on Cotton (IDM) in village from 2021-23

| Year of trial | Measurable indicators (yield) q/ha |       | % Increase in yield | Economics of demonstration (Rs. /ha) |              |            |       | Economics of FP (Rs. /ha) |              |            |       |
|---------------|------------------------------------|-------|---------------------|--------------------------------------|--------------|------------|-------|---------------------------|--------------|------------|-------|
|               | Demo                               | FP*   |                     | Gross Cost                           | Gross Return | Net Return | BCR** | Gross Cost                | Gross Return | Net Return | BCR** |
| 2021          | 13                                 | 10.8  | 20.3                | 38300                                | 71500        | 33200      | 1.86  | 38300                     | 59400        | 21100      | 1.55  |
| 2022          | 16.5                               | 16    | 3.1                 | 38000                                | 129500       | 91500      | 3.41  | 38000                     | 126000       | 88000      | 3.31  |
| 2023          | 20                                 | 16.25 | 22.72               | 36000                                | 136000       | 100000     | 3.77  | 38000                     | 110500       | 72500      | 2.90  |

### Performance of short duration summer moong var. MH-421 under crop diversification.

**Details of technology:** Summer pulses play a crucial role in improving soil health, providing additional income to farmers, and promoting crop diversification in Northern India. The development of short-duration, mung bean Yellow Mosaic Virus resistant varieties has enabled the cultivation of mung bean during March-to-June window between wheat and rice crops, fostering diversified cropping systems and enhancing economic benefits for farmers while improving soil quality. Improved summer moong varieties like; MH-421 have demonstrated excellent performance, offering better yields, tolerance to

adverse climatic conditions, and affordability compared to expensive private-sector hybrids. This makes MH-421 an ideal choice for farmers in regions like Sirsa district, Haryana, contributing to sustainable agriculture and higher profitability.

**Performance and impact of technology:** The summer moong variety MH-421 was procured and distributed for demonstration in NICRA villages Rupana and Nirban in Sirsa district. This improved variety showed a yield increase of 15% in 2021-22, 50% in 2022-23, and 28.57% in 2023-24 compared to local or other popular varieties in the villages. The inclusion of mung beans in the existing cropping system enhanced annual farm income of farmers in the village. As a result of successful demonstrations of the intervention, the variety is very popular among farmers.

#### Performance of short duration summer moong var. MH-421 in NICRA village

| Year of trial | Measurable indicators (yield) q/ha |     | % Increase in yield | Economics of demonstration (Rs. /ha) |              |            |      | Economics of FP (Rs. /ha) |              |            |      |
|---------------|------------------------------------|-----|---------------------|--------------------------------------|--------------|------------|------|---------------------------|--------------|------------|------|
|               | Demo                               | FP* |                     | Gross Cost                           | Gross Return | Net Return | BCR  | Gross Cost                | Gross Return | Net Return | BCR  |
| 2021          | 7.5                                | 6.5 | 15                  | 17000                                | 37500        | 20500      | 2.20 | 16000                     | 32500        | 16500      | 2.03 |
| 2022          | 3                                  | 2   | 50                  | 7000                                 | 20400        | 13400      | 2.91 | 6500                      | 13600        | 7100       | 2.09 |
| 2023          | 9                                  | 7   | 28.57               | 17380                                | 49500        | 32120      | 2.84 | 16000                     | 38500        | 22500      | 2.46 |

#### Livestock & Fodder Production: Inclusion of mineral mixture in daily diet of livestock for improvement in health and milk yield.

**Details of technology:** Mineral mixture feeding is very important for dairy animals. The deficiency or overfeeding of minerals are cause of many problems in body. These are important for growth of calves and clean and more milk production by lactating animals. Problem of metabolic disorders and lower milk yield in all categories of dairy animals have been reported due to lower bioavailability of minerals in feed stuffs. There is a strong need for the supplementation of area specific mineral mixture to dairy animals; as it contains all the essential nutrients in right quantities. Supplementing daily feed with mineral mixture will help in improving growth rate and milk production in livestock, reduces heat stress, improves reproductive efficiency and life span. The recommended dose of mineral mixture is 50g/day/animal along with routine the animal feed.

**Performance and Impact of technology:** It was observed from the demonstrations that the use of mineral mixture in daily diet of animal along with suitable health supplements increased the milk yield. The incidences of mastitis in cattle were also reduced as the overall health of animal was improved in Sirsa district of Haryana. In the year 2021, 2022 and 2023, 50 demonstrations each year were allotted to farmers of NICRA villages, Rupana, Ludesar and Nirban. The milk yield was found to be increased by 8.75%, 11% and 11.61%, respectively in the year 2021, 2022 and 2023 as compared to the local

practice. Despite the cost of mineral mixture the B:C ratio was also higher in the economics of demonstration, proving the fact that inclusion of mineral mixture increases per unit income along with milk yield. The intervention is well adopted by the farmers of NICRA villages and the adjacent villages of district Sirsa in Haryana.

### Performance of inclusion of mineral mixt & health supplements in animal feed (2021-2023)

| Year | Measurable indicators of yield* (milk) |       | % increase | Economics of demonstration (Rs./ha) |              |            |      | Economics of Local (Rs./ha) |              |            |      |
|------|----------------------------------------|-------|------------|-------------------------------------|--------------|------------|------|-----------------------------|--------------|------------|------|
|      | Demo                                   | Local |            | Gross Cost                          | Gross Return | Net Return | BCR  | Gross Cost                  | Gross Return | Net Return | BCR  |
| 2021 | 3600                                   | 3150  | 8.75       | 34500                               | 162000       | 127500     | 4.69 | 33500                       | 148000       | 114500     | 4.41 |
| 2022 | 3400                                   | 3050  | 11         | 33600                               | 153000       | 119400     | 4.55 | 31500                       | 137250       | 105750     | 4.35 |
| 2023 | 3460                                   | 3100  | 11.61      | 33600                               | 121100       | 87500      | 3.60 | 31500                       | 108500       | 77000      | 3.44 |

**Upscaling:** The CCS HAU Hisar is producing mineral mixture in large quantities which is being provided at KVKs of the university. However, the availability of the technology can be enhanced widely through the State Animal Husbandry Department, National Livestock Mission and also by supplying subsidised mineral mixture.

### Institutional Interventions:

**Custom Hiring Centre:** The KVK provided different machinery under custom hiring centres to farmers so that the mechanization can be promoted among farmers. Crop specific and weather-related advisories were shared to farmers via mobile messages. A large number of farmers were benefited with this service. Different agricultural implements (seed-cum-fertilizer zero drill, rotavator, tractor mounted sprayer etc) are performing satisfactorily, in which total amount mobilised was Rs 4750 covering 62.0ha area during the year 2023-24.

**Capacity Building activities:** More than 250 farmers including farm women were trained through 23 different vocational training courses in several thematic areas related to crop, integrated farming system, livestock management, child nutrition and kitchen gardening etc. Capacity building activities includes integrated nutrient management, in *Rabi* and *Kharif* crops, weed management in *Kharif* crops, usefulness of mineral mixture, weed management in *Rabi* crops, foliar spray for nutrient deficiencies amelioration, integrated farming system and promotion of fodder crops.

**Extension Activities:** Total 10 different extension activities (field days, method demonstrations, group discussion, awareness, agro-advisory services, and celebration of different special days) were organized by the KVK Sirsa involving 650 farmers. Method demonstrations on soil sampling and seed treatment were organised for the farmers in NICRA adopted villages.





Demo on Mineral mixture at Rupana village



Field Day on Green gram var. MH-421 at Nirban

### Rainfall characteristics for the year 2023-24

| Rainfall                                      |         | Normal RF      | 2023-24 |
|-----------------------------------------------|---------|----------------|---------|
| Annual rainfall (mm)                          |         | 309            | 339.3   |
| June                                          |         | 30             | 50.9    |
| July                                          |         | 150            | 183.7   |
| August                                        |         | 40             | 0       |
| September                                     |         | 41             | 52.6    |
| Total <i>Kharif</i> rainfall                  |         | 261            | 287.2   |
| Total <i>rabi</i> rainfall                    |         | 48             | 52.1    |
| No. of rainy days                             |         | 11             | 17      |
| No. of dry spells during <i>kharif</i> season | >10days | 0              | 0       |
|                                               | >15days | 0              | 1       |
|                                               | >20days | 0              | 2       |
| No. of intensive rain spells (2023            |         | >60 mm per day | 2       |

### Impact of contingency measures taken up in the village (Relate the dry spells/floods/heat wave/cold wave/etc., with crops and their growth stages)

| S. No | Dry spell/ heat wave/cold wave/frost ( no. of days) | Duration(from -- to-----)                             | Crop name | Crop stage affected         | Intervention taken up*                        | Number of farmers involved | Impact on crop yields (q/ha) |      |                                 |
|-------|-----------------------------------------------------|-------------------------------------------------------|-----------|-----------------------------|-----------------------------------------------|----------------------------|------------------------------|------|---------------------------------|
|       |                                                     |                                                       |           |                             |                                               |                            | Farmers' practice            | Demo | Increase over farmers' practice |
| 1     | Cold wave                                           | 1 <sup>st</sup> Jan 2024<br>26 <sup>th</sup> Jan 2024 | Mustard   | Flowering and pod formation | Frost resistant varieties and crop advisories | 30                         | *                            | *    | *                               |

**Adoption of successful intervention in the NICRA village and the adjoining villages:** Several successful interventions under NICRA project have been adopted in Sirsa district.

| Successful interventions including crops and varieties | Extent of adoption in the village (ha) |      |      |      |      |      |      |      |      |      |
|--------------------------------------------------------|----------------------------------------|------|------|------|------|------|------|------|------|------|
|                                                        | 2014                                   | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| Biogas Unit (Nos.)                                     | -                                      | 2    | 3    | 2    | 2    | 1    | 1    | 1    | 1    | 1    |
| Laser land Leveller                                    | 300                                    | 100  | 70   | 100  | 100  | 250  | 350  | 590  | 750  | 750  |

Two successful interventions under NICRA project have been adopted in adjoining areas. One Bio-gas units has been established successfully in the year 2023. Total 6 biogas plants are working in the village. Laser land levelling has been found very useful and the area has increased to 750ha in the year 2023.

### Popularization of Climate Resilient Varieties:

| Crop    | Climate Resilient Varieties incorporated in the <i>Rabi</i> 2023-24 plan of the State Department | Area brought under the variety by the state department during the <i>Rabi</i> 2023-24 (ha) |
|---------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Mustard | RH 725 (Frost Tolerant)                                                                          | 300                                                                                        |
| Wheat   | HD 3086 (Rust Tolerant)                                                                          | 3000                                                                                       |

Under climate resilient varieties, Mustard (RH-725) and Wheat varieties (HD-3086), have been demonstrated in the *Rabi*-2023-24 plan of the Haryana State Agriculture Department and covering 300.0ha and 3000ha area, respectively, in Sirsa district.

### Awards Received during the year for the work related to NICRA:

| Name of the award                                                                                                                   | Given to whom                         | When the award was given |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------|
| Oral presentation of paper entitled "Promotion of climate resilient interventions in Sirsa district of Haryana under NICRA project" | Dr. Vinita Rajput, DES (Horticulture) | 20-09-2023               |

### Distinguished visitors during the year 2023-24

| Name of visitors                                                                       | Date       | Remarks                                                                  |
|----------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------|
| Dr. P.P. Rohilla, Sr. Scientist<br>Nodal Officer, NICRA Project<br>ICAR-ATARI, Jodhpur | 25-04-2024 | To review of the progress of project and verification of success stories |

### Amount (Rs) mobilized through convergence from various departments:

| Activity/ Intervention | No. of farmers involved | Coverage Area (ha) | Convergence established with (Name of the programme or department) | Approx. amount mobilized |
|------------------------|-------------------------|--------------------|--------------------------------------------------------------------|--------------------------|
| Bio Gas                | 1                       | -                  | Department of Agriculture & Farmer Welfare, Sirsa                  | 12000                    |



| Activity/ Intervention     | No. of farmers involved | Coverage Area (ha) | Convergence established with (Name of the programme or department) | Approx. amount mobilized |
|----------------------------|-------------------------|--------------------|--------------------------------------------------------------------|--------------------------|
| Laser Leveller             | 55                      | 750                | Community hiring                                                   | 55000                    |
| Skill development training | 40                      | -                  | CCSHAU Hisar                                                       | 70000                    |

### Publications from the project: Abstract

Rajput, V, Kumar, S, Jakhar, DS, Kumar, S, Kumar, N, Kalkal, H, & Devi, R. 2023. Promotion of climate resilient interventions in Sirsa district of Haryana under NICRA project, International conference on 'Prospects and challenges of environment and biological sciences in food production system for livelihood security of farmers' organised at ICAR-CIARI, Port Blair, Andaman & Nicobar Islands from 18-20 September 2023. Pp: 37.

### Significant observations about the project/the performance of interventions/ adoption of interventions/ livelihood improvement etc:

| SN | Name of Intervention         | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Laser Levelling              | <p><b>Adoption of technology:</b> About 90 per cent of total cultivated area been levelled by laser land levelling technique.</p> <p><b>Impact:</b> This technique has resulted in 10 per cent water saving and 4-6 per cent increases in the crop yield. Three laser levellers have been purchased in the village after popularization of this technique.</p> <p><b>Economics:</b> Increase in yield has resulted due to more area under irrigated farming and thereby increasing farmers' income.</p> <p><b>Up-scaling:</b> Laser Land Levelling has become popular in the nearby village and 750.00ha area is being laser levelled in convergence with State Department of Agriculture and farmer's welfare.</p>                                                                 |
| 2. | Establishment of biogas unit | <p><b>Adoption of technology:</b> In the beginning one biogas unit was established in NICRA village. After seeing its benefits in terms of fuel and quality FYM, more people have adopted and number has been increased to eight.</p> <p><b>Impact:</b> This intervention in addition to meet the household bio-gas also resulted in production of quality FYM for self-use/ domestic purpose.</p> <p><b>Economics:</b> Use of bio-gas has saved an estimated amount of Rs10000 in terms of LPG cost. Carbon status of soil has been improved due to which increase in yield up to 4-5 % was observed.</p> <p><b>Up-scaling:</b> Biogas units in adjoining villages to the NICRA village are under construction while 1 more biogas plant was constructed in the NICRA village.</p> |
| 3. | Climate resilient IFS        | <p><b>Adoption of technology:</b> Dairying along with agriculture provides assured income. 200 farmers have adopted IFS.</p> <p><b>Impact:</b> By adopting IFS farmers easily overcome the loss caused due to crops by adverse climatic conditions, as there is assured income from other enterprises.</p> <p><b>Economics:</b> Farmers earned additional income of 2.75 lakh per annum through IFS, having 10 dairy cattle.</p>                                                                                                                                                                                                                                                                                                                                                    |



| SN | Name of Intervention   | Description of technology, adoption, impact, economics and up-scaling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                        | <b>Up-scaling:</b> Due to success of IFS in the existing climatic situation, 60 more farmers of the adjoining villages have adopted IFS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4. | Use of Mineral Mixture | <p><b>Adoption of technology:</b> Total 300 farmers are using mineral mixture for their dairy animals.</p> <p><b>Impact:</b> Use of mineral mixture results increase in milk yield in addition to meet out mineral nutrient requirement of the animals; thereby increasing the lactation period of the dairy animals and also reduces the calving interval.</p> <p><b>Economics:</b> This intervention has resulted an increase of 8-10 per cent milk yield of lactating dairy animals.</p> <p><b>Up-scaling:</b> This intervention has been up-scaled in four nearby villages having similar agro-climatic situations in convergence with State Animal Husbandry Department in Haryana</p> |



### 3. PUBLICATIONS / AWARDS

#### Research article

Pushkar Dev, S. Khandelwal, S.C. Yadav, H.R. Mali and Poonam. 2023. Climate Based Smart Agriculture: Need for food Security and Sustainability. *International Journal of Environment and Climate Change*. 13 (3) 2023.

Pushkar Dev, Suman Khandelwal, S.C. Yadav, Vikas Arya, Dilip Singh, H.R. Mali, Poonam and K.K. Yadav. 2023. Conservation Agriculture for Sustainable Agriculture. *International Journal of Plant & Soil Science*. 35(5) 2023.

Pushkar Dev, Suman Khandelwal, S.C. Yadav, Vikas Arya, Dilip Singh, H.R. Mali, and Poonam. 2023. Climate Change- Perceived Impacts on Agriculture, Vulnerability and adaptation Strategy to mitigate it by farmers of Alwar district (Rajasthan). *Journal of Plant Development Sciences*. 15(2) 2023.

#### Popular Article

Malik, AK, Shoeran RS, Singh B, Singh K, Rohilla PP and Singh SK. 2023. Bed Planting: Affordable Technique for Resource Conservation in Wheat. *Indian Farming*. August Issue. 72 (8): 20-21.

कुमार प., खान आर., दयानन्द एवं कुमार अ. 2024. शुष्क क्षेत्र में पलवार विधि से तरबूज में मुनाफा पाएँ) कृषक दूत 26 मार्च से 1 अप्रैल 2024.

#### Folder/ Pamphlet

Dr. Hansram Mali, Pushkar Dev, Dr. Subash Chand Yadav, Dr. Vikas Arya, Dr. Suman Khandelwal, Dr. Poonam and Kamlesh kumar Yadav. 2023. Rabi faslo ka paale se bachav. *Krishi Vigyan Kendra Alwar-I*. 07/2023.

Dr. Hansram Mali, Pushkar Dev, Dr. Subash Chand Yadav, Dr. Vikas Arya, Dr. Suman Khandelwal, Dr. Poonam and Kamlesh kumar Yadav. 2023. Jal sanrakshan paddhatiya. *Krishi Vigyan Kendra Alwar-I*. 08/2023.



## 4. Success Stories

Some of success stories emerged out of NICRA Project during the year 2023 is depicted here.

### Alwar-I

|                                                |                                                             |
|------------------------------------------------|-------------------------------------------------------------|
| <b>Name of farmer</b>                          | : <b>Sh. Singhraj</b>                                       |
| <b>Father's Name</b>                           | : Sh. Moolchand                                             |
| <b>Age</b>                                     | : 70 yr                                                     |
| <b>Mobile</b>                                  | : +91-8696150006                                            |
| <b>Address</b>                                 | : Vill- Chandigarh, Teh.-Ramgarh<br>Distt.-Alwar, Rajasthan |
| <b>Land holdings (Rainfed &amp; Irrigated)</b> | : 3 Irrigated & 1 ha Rainfed                                |
| <b>Livestock</b>                               | : 2 Cows & 3 Buffalo                                        |



#### Technology Interventions:

**Green manuring:** Soil deficient in organic matter adopted the Dhaincha DH-1 variety for green manuring, which increases organic matter by adding biomass to the soil. This enhances fertility, improves soil structure, boosts yield, and reduces input costs also.

**Soil Testing and Fertilizer Management:** Sh. Singhraj was encouraged to conduct soil testing, which informed a balanced fertilizer regimen. He used the improved mustard variety DRMR 2017-15, coupled with a precise line sowing technique. The recommended fertilizer application was also included.

**Mini Sprinkler Irrigation and farm pond:** KVK trained Sh. Singhraj about the benefits of mini sprinkler system and farm pond, which he later installed in 1.50 ha area of mini sprinkler and increased irrigated area through farm pond.

**Calcium, Mineral mixture and green fodder:** Sh. Singhraj benefitted from calcium and mineral mixture interventions by enhancing livestock health and productivity. Additionally, incorporating green fodder sorghum improved forage quality, increased biomass yield, and promoted better animal nutrition.

**Impact of Interventions:** The introduction of DRMRIJ-2017-15 variety has brought significant changes to agricultural practices in the village. Known for its resistance to biotic stresses such as; white rust, alternaria blight, and powdery mildew, this variety has been widely adopted and has spread across 32.0ha area within the community. The irrigated area was enhanced through the implementation of mini sprinkler irrigation systems and the construction of farm ponds, thereby improving water efficiency and crop productivity. The use of mini sprinklers and farm pond resulted in water economy and crop productivity.

**Economic and Yield Outcomes:** Following the implementation of these practices, Sh. Singhraj achieved a remarkable increase in mustard yield, rising by 19.35% to 18.0 q/ha. The economic analysis indicated substantial financial gains, Earned Gross Income of Rs100800 per unit area. and Net Return of Rs 68100 per unit area. Net income of Rs 22738 and 52920, respectively from 2 cows and 3 buffaloes.



**Demo on Green manuring at farmer's field**



**Demo on Farm pond at farmer's field**

## Barmer-I

|                                                |                                                                                     |
|------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Name of farmer</b>                          | : <b>Sh. Prakash Chand Poonar</b>                                                   |
| <b>Father's Name</b>                           | : Sh. Hakma Ram Poonar                                                              |
| <b>Age</b>                                     | : 34 yr                                                                             |
| <b>Mobile</b>                                  | : +91-8955509281                                                                    |
| <b>Address</b>                                 | : Village- Poonro Ki Basi, The. – Barmer,<br>Distt.- Barmer (Rajasthan) pin- 324001 |
| <b>Land holdings (Rainfed &amp; Irrigated)</b> | : 9.6 ha (2.83 ha Irrigated & 6.77 ha Rainfed)                                      |
| <b>Farm machinery</b>                          | : Tractor, Harrow, trolley & cultivator etc.                                        |



**Technology Demonstrated:** Model of an Integrated Farming System for Barmer District of Rajasthan.

**Problem Identified:** Sh. Prakash Chand Poonar adopted an Integrated Farming System (IFS) comprising of water mill and agriculture is developed in Poonro Ki Basi village of Barmer District of Western Rajasthan. He grows pearl millet, moth bean, green gram & castor in *Kharif* and isabgol, cumin and vegetables in *Rabi* season. The productivity of all crops was low as the farmer was not following improved cultivation practices, improved varieties and earlier used flood irrigation.

**Description of Technology:** KVK encouraged the farmer to adopt production of vegetable soil testing, for improved seed (certified) variety of both season, line sowing and fertilizer application was done as basal application as recommended. The farmer was also trained about the benefits of mini sprinkler, due to which he has installed mini sprinkler and drip irrigation in his 2.83ha area.

**Impact of Intervention:** This variety has spread in the entire village in an area of 10.0ha. This IFS demonstration motivated the farming community to replace their old pattern of crop varieties and livestock. Sh. Prakash Chand Poonar was very happy with his improved income from adopted model, livelihood and set an example for others farmers of NICRA-TDC village along with adjoining villages of district.

**How the intervention minimized the impact of climate variability:** By the adoption of improved variety and integrated crop management practices under both season (*Kharif* & *Rabi*) Sh. Poonar got higher returns with low cost of production and less water requirement for irrigation. All crop varieties were tolerant to drought/biotic stresses. More than profit, it helped to ensure much needed quality of weight gain & animal protein to supplement dietary needs

**Yield and Economics:** Pearl millet, castor yield increased by 9.02% with productivity of 5.56q/ha. The economic gain in terms of per unit expenditure gross incomes were recorded Rs 15012 during *Kharif*. isabgol, cumin & vegetables yield increased by 31.32%, 10.64% with productivity of 8.47q/ha. The economic gain in terms of per unit expenditure gross income of Rs 271040, 156000 and net return were recorded Rs 221790 and 232440, respectively during *Rabi*. Vegetable yield over and above income received from seedlings of onion, brinjal & ber orchard was Rs 45000, Rs 90000, Rs 200000 & Rs 22000 respectively. Sale from goat were recorded Rs 22000/- during the year. Gross income of Sh. Prakash Chand Poonar (IFS model per annum was Rs 872385/- only.



Demo on improved var. of Brinjal



Demonstration on Animal Production (Sirohi goat)

## Bharatpur

**Name of farmer** : **Harveer Singh**  
**Father's Name** : Bhagwan Singh  
**Age** : 60 yrs  
**Mobile** : 6376349728  
**Address** : Village-Gagarsoli  
 Tehsil & Distt. – Bharatpur.  
**Land holdings (Rainfed & Irrigated)** : 8.0 ha.  
**Livestock** : Buffalo- 2, Cow- 1



**Technology Demonstrated:** Recharge of tube well, Green manuring (Dhaincha), vermi-composting, Improved variety of Mustard (DRMR1165-40).

**Problem Identified:** Sh. Harveer Singh used to grow pearl millet, sorghum in *Kharif* and wheat and mustard in *Rabi*. The productivity of all crops was low as compared to potential yield. The major causes for low productivity identified were not following improved cultivation practices, improved varieties, high salinity of ground water and lack of quality irrigation water.

**Description of Technology:** KVK motivated the farmer for soil sample collection, testing, and application of fertilizers on the basis of soil test. Farmer participated in the training programmes organized by KVK and adopted the demonstrations at his field on integrated crop production technology, organic farming, rain water harvesting, tube well recharge technology. He adopted the improved mustard variety DRMR1165-40. This variety is heat tolerant at seedling stage and moisture stress tolerant, matured in 133-151 days, suitable for rainfed condition, line sowing and fertilizer application was done as basal application including half dose of Nitrogen, full dose of SSP and full dose of MOP as recommended. Rest Nitrogen used after first irrigation.

**Impact of Intervention:** The mustard variety DRMR 1165-40 has spread in more than 100.0ha area of Deeg and Bharatpur districts. Farmers adopted this variety as well as seed treatment and sulphur based fertilizer application in mustard crop. Adoption of tube well recharge technology by the farmers, reducing the salinity of ground water and increasing crop yield. Green manuring of Dhaincha crop adopted by large number of farmers, this practice improved the soil health. These technologies motivated the farming community and now their cost of cultivation has decreased and net profit has increased significantly.

**How the intervention minimized the impact of climate variability:** By the adoption of improved variety DRMR1165-40 and integrated crop management practices farmers get higher returns with low cost of production and less water requirement for irrigation. The variety is heat tolerant at seedling stage and moisture stress tolerant Improved variety of mustard mature in 133-151days & suitable for rainfed conditions.

**Yield and Economics:** During Rabi season mustard variety DRMR 1165-40 was Cultivated in 3.0ha area. Mr. Harveer Singh earned a net return of Rs 67104/ha with 2.52 B:C ratio.



**Demo on Mustard DRMR1165-40 at farmer's field**



**Demo on Mustard DRMR1165-40 at farmer's field**



## Bhilwara-I

|                                                |                                                      |
|------------------------------------------------|------------------------------------------------------|
| <b>Name of farmer</b>                          | : <b>Smt Bhanwar Kanwar</b>                          |
| <b>Father's Name</b>                           | : Sh Jodha Singh                                     |
| <b>Age</b>                                     | : 50 yr                                              |
| <b>Mobile</b>                                  | : +91-7878580078                                     |
| <b>Address</b>                                 | : Village- Dholikheda, Distt.- Bhilwara<br>Rajasthan |
| <b>Land holdings (Rainfed &amp; Irrigated)</b> | : 1.50 ha                                            |
| <b>Livestock</b>                               | : 2 Cow, 3 Buffalo and 13 goat (Sirohi)              |



**Technology Demonstrated:** Improved variety of Maize (DHM-121), improved Sirohi goat breed, mineral mixture and vaccination, green fodder- Napier grass.

**Problem Identified:** High mortality due to infectious disease of goats, problem during farming situation such as uneven rainfall, traditionally cultivation of maize, cost of production was high at farm and low productivity etc.

**Description of Technology:** Initially Smt Bhanwar Kanwar adopted traditional farming approach and received lower yield of maize crop and less net return as well. KVK Bhilwara organised off-campus training programmes on control of infectious disease and vaccination, deworming, balanced concentration feeding and area specific mineral mixture. The concentrate required for one-year-old male goat is 200gm/animal/day and for female goats it is 350-400gm/animal/day.

**Impact of Intervention:** Smt Bhanwar kanwar started goat farming with five improved Sirohi goat breed under NICRA project KVK Bhilwara. She has 13 goats in her flock now. After adoption of balanced feeding, vaccinations to infectious disease helped in more weight gain and reduced kid's mortality. Deworming also helped in preventing the stress from parasites, which can lead to symptoms like; diarrhoea, anaemia etc. Smt. Bhanwar Kanwar has become a role model among small farmers in Dholikheda village. She is very happy with this improved production and goat management technology and has set an example for other women farmers of the village.

**How the intervention minimized the impact of climate variability:** The intervention has helped the farmer to mitigate the impact of climate variability as his sole dependency on crop production minimized due to inclusion of improved breed of goat (Sirohi).

**Yield and Economics:** Presently Smt. Bhanwar Kanwar is earning a net income of Rs 45000/- every year after the intervention of KVK from goat farming.



Training programme at KVK Bhilwara



Demo on Sirohi goat breed at farmer's house

## Bhiwani

**Name of farmer** : **Sh. Bhawarjeet**  
**Father's Name** : Sh. Amrit Singh  
**Age** : 30 yr  
**Mobile** : +91-8395948138  
**Address** : Village- Lohani, Block – Kairu,  
 Distt.- Bhiwani  
**Land holding size** : 2.0 ha Irrigated  
**Livestock** : 2 Buffalo



**Technology Demonstrated:** Improved variety of wheat DBW-303, mustard RH-725 and green fodder Jowar.

**Problem Identified:** Sh. Bhawarjeet used to grow cotton in *Kharif* and wheat and mustard in *Rabi* with more than 10yrs old varieties. The productivity of all varieties was very low. The major causes for low productivity identified were not following improved cultivation practices, improved varieties and earlier used irrigation methods.

**Description of Technology:** KVK encouraged the farmer for soil testing, on the basis of that farmer was advised for balanced dose of chemical fertilizers with improved variety of wheat DBW-303 and mustard RH-725 in which fertilizer application was done as basal application including half dose of Nitrogen, full dose of DAP and full dose of MOP as recommended. Rest Nitrogen used after first irrigation. Further, KVK Bhiwani trained the farmer about the benefits of micro-irrigation, due to which Bhawarjeet sown all crops under micro irrigation system in his field resulting in increased yield and good water saving.

**Impact of Intervention:** Both varieties have spread in the entire village in an area of 30.0ha. This demonstration motivated the farming community to replace their old varieties as well as non- recommended varieties. Sh. Bhawarjeet is very happy with his improved income, livelihood and set an example for others too. Adoption of minimum eliminated water conveyance channels by reducing conveyance loss and water saving up to 40 to 50% with optimum seed rate, seed treatment, balanced application of fertilizers, timely weed, insect-pest & disease management leads to crop higher yields.

**How the intervention minimized the impact of climate variability:** By adoption of improved varieties of DBW-303, RH-725 and integrated crop management practices farmers got higher returns with low cost of production and less water requirement for irrigation. RH-725 variety is tolerant to biotic (white rust, Alternaria blight, powdery mildew) stresses and bold seeded, less shattering losses during harvesting time. Also by adopting multi cut variety of Sorghum made round the year green fodder availability.

**Yield and Economics:** Mustard yield increased by 30.4% with productivity of 20.5q/ha. The economic gain in terms of per unit expenditure gross income and net return were recorded Rs 101700 and 39200, respectively. Similarly, Wheat yield increased by 12.5% with productivity of 54.0q/ha. The economic gain in terms of per unit expenditure gross income and NR were recorded Rs 132850 and 53350, respectively.



**Demo on Mustard var. RH-725 at farmer's field**



**Demo on Wheat var. DBW-303 at farmer's field**



## Bikaner-I

|                                                |                                                        |
|------------------------------------------------|--------------------------------------------------------|
| <b>Name of farmer</b>                          | : <b>Sh Pappu Singh</b>                                |
| <b>Father's Name</b>                           | : Sh Ummed Singh                                       |
| <b>Age</b>                                     | : 45 yrs                                               |
| <b>Mobile</b>                                  | : 9784380319                                           |
| <b>Address</b>                                 | : Village- Kanasar, Teh. & Distt.-Bikaner<br>Rajasthan |
| <b>Land holdings (Rainfed &amp; Irrigated)</b> | : 2.0 ha Irrigated & 4.0ha Rainfed                     |
| <b>Livestock</b>                               | : 2 cows                                               |



**Technology Demonstrated:** Improved variety Radhika with spray of  $H_2SO_4$  at the time of pod formation.

**Problem Identified:** Sh. Pappu Singh faced significant challenges in his agricultural practices, particularly due to the use of early sowing varieties that were susceptible to frost damage. Early sowing varieties, while intended to maximize the growing season, were vulnerable to unexpected frost conditions. This led to substantial crop losses, severely affecting overall productivity.

**Description of Technology:** The technology demonstrated by the Krishi Vigyan Kendra, Bikaner aimed to enhance mustard cultivation through a systematic approach focused on soil health, improved varieties, and optimized fertilization techniques. KVK encouraged Sh. Pappu Singh to conduct comprehensive soil testing. This assessment helped in understanding the nutrient status and pH of the soil, enabling the formulation of a targeted fertilization plan. The use of the late-sown mustard variety Radhika was recommended. This variety is better adapted to withstand frost conditions and has the potential for higher yields compared to earlier varieties. The farmer was advised to adopt line sowing practices, which improved plant spacing, allowed better air circulation, and facilitated more efficient weed management. A spray of sulfuric acid ( $H_2SO_4$ ) at the time of pod formation helped to enhance nutrient uptake and strengthened plant resilience against environmental stresses.

**Impact of Intervention:** The intervention had a significant impact on the farming community in the village, covering an area of 17.0ha. The demonstration of this improved variety has effectively encouraged farmers to replace their old and non-recommended varieties. Sh. Pappu Singh's success story highlights the positive outcomes of this initiative, showcasing increased income and improved livelihoods. His experience served as an inspiring example for others in the community, motivating farmers to adopt better agricultural practices and potentially transforming local farming standards. Overall, this initiative not only benefitted individual farmers but also fostered a culture of innovation within the farming community.

**How the intervention minimized the impact of climate variability:** By the adoption of improved variety Radhika and application of sulphuric acid ( $H_2SO_4$ ) on the improved mustard variety Radhika during pod formation served as a strategy for frost management. The treatment enhanced the plant's cellular structure, making it more resilient to frost damage during critical growth stages.

**Yield and Economics:** Mustard yield increased by 16.82% with productivity of 12.5q/ha. The economic gain in terms of per unit expenditure gross income and net return were recorded Rs 24500 and Rs 43625, respectively.



Demo on Mustard var. Radhika at field



Field day on Mustard var. Radhika at field

## Churu-I

**Name of Farmer** : **Sh Ram Lal Meghwal**  
**Father's Name** : Sh Sharwan Ram  
**Age** : 40 year  
**Mobile** : +91-7073729303  
**Address** : Village- Mitasar, Tehsil -Sardarshahar  
 Distt.–Churu (Rajasthan)  
**Land holdings (Rainfed & Irrigated)** : 4 ha Irrigated & 1 ha Rainfed  
**Livestock** : 3 Buffalo, 2 Cow



**Technology Demonstrated:** Production technology of salt tolerant mustard variety CS-60.

**Problem Identified:** Sh. Ram Lal Meghwal faced significant challenges in his agricultural practices; the production of crop was low as compared to potential yield. The major causes of low yield were poor fertility status of soil, saline irrigation water and lack of technical knowledge.

**Description of Technology:** The technology demonstrated by the Krishi Vigyan Kendra, Churu-I aimed to enhance mustard cultivation through a systematic approach focused on soil health, improved salt tolerant variety and optimized fertilization techniques. KVK encouraged Sh. Ram Lal Meghwal to for soil and water testing of his field. This assessment helped in understanding the nutrient status and pH of the soil, enabling the formulation of a targeted fertilization plan. The use of the (salt tolerant) variety CS-60 was recommended for sowing. This variety is better adapted to withstand under saline conditions and has the potential for higher yields as compared to other varieties of mustard. KVK scientist advised the farmers to adopt line sowing, spacing, weed management and use of sulphur. A precautionary spray of sulphuric acid ( $H_2SO_4$ ) at the time of pod formation was suggested to manage frost situation this treatment aims to strengthen plant resilience against frost injury.

**Impact of Intervention:** The intervention has a significant impact on the farming community in the village, covering an area of 14.0ha. The demonstration of this improved variety has effectively encouraged farmers to replace their old varieties. Sh. Ram Lal Meghwal's success story highlights the positive outcomes of this initiative, showcasing increased income and improved livelihoods. His experience serves as an inspiring example for others in the community, motivating them to adopt better agricultural practices and potentially transforming local farming community. Overall, this initiative not only benefitted individual farmers but also fostered a culture of innovation and progress within the farming community of Churu district.

**How the intervention minimized the impact of climate vulnerability:** Adoption of salt tolerant variety CS-60 and integrated crop management practices farmers got higher returns with low cost of production under saline water ( $EC\ 1.5$  to  $3.5\ dsm^{-1}$ ) irrigation. Further, spray of sulphuric acid to manage frost proved highly effective and beneficial.

**Yield and Economics:** Mustard var. CS-60 resulted 16.06% higher yield 14.38 vs 12.39q/ha) with higher B:C ratio of 2.46 was recorded under demonstration than local check. The economic gain in terms of per unit expenditure gross income and net return were recorded Rs 83764 and Rs 49766, respectively.



**Demo on Mustard (Var.CS-60) at farmer's field**



**Crop cutting for yield estimation of mustard**



## Fatehabad

**Name of farmer** : **Sh. Navinder Singh**  
**Father's Name** : Sh. Amar Singh  
**Age** : 36 years  
**Mobile** : +91-9992014576  
**Address** : Village- Banmandori, Tehsil & Dist Fatehabad  
**Land holdings (Rainfed & Irrigated)** : 2.0ac (Irrigated)  
**Livestock** : 2 Buffalos & 1 Cow



**Technology Demonstrated:** Spray of Cobalt Chloride in Cotton in *Kharif*-2023 and salt-tolerant wheat (KRL-210) in *Rabi*-2023.

**Problem Identified:** Sh. Navinder Singh earlier cultivated cotton in *Kharif* and wheat in *Rabi*. The productivity of both crops was low as compared to the potential yield. The main cause of low productivity was traditional cultivation practices, physiological disorders and problematic soils.

**Description of Technology:** KVK Fatehabad encouraged the farmer for the testing of soil and water; on the basis of that, the farmer was advised to cultivate a salt-tolerant wheat variety in *Rabi* and spray cobalt chloride in case of the occurrence of parawilt in cotton in *Kharif*. The spray of cobalt chloride was performed on cotton for the prevention of parawilt disease. The salt-tolerant wheat variety (KRL-210) was sown in salt-affected soil.

**Impact of Intervention:** The salt-tolerant wheat variety has spread in the village in an area of 36.0ac. This demonstration had motivated the farmers to adopt the improved variety and counter salinity with salt-tolerant variety. Both of the interventions have economically benefited the farmers.

**How the intervention minimized the impact of climate variability:** Wilting is observed in all the different agro-climatic zones of cotton cultivation. Parawilt is a physiological disorder of cotton and can only be managed with earlier preparation and alertness. Compared with the traditional management of parawilt in cotton, the cobalt chloride spray has effectively prevented the farmers from huge economic losses. The salt-tolerant wheat variety was resistant to higher salt content of soil and yielded far better than earlier cultivated wheat varieties.

**Yield and Economics:** Cotton yield increased by 27.7% with productivity of 1050kg/ha. The economic gain in terms of net return was recorded at Rs 21700 with the B:C ratio of 1.41, respectively. The higher yield (15.38%) was recorded in wheat. The economic gain in terms of net return was recorded at Rs 39250 with the B:C ratio of 2.50, respectively.



Demonstration on parawilt in Cotton



Demonstration on salt tolerant wheat variety

## Hanumangarh-I

|                                                |                                                              |
|------------------------------------------------|--------------------------------------------------------------|
| <b>Name of farmer</b>                          | : <b>Sh Harcharan Singh</b>                                  |
| <b>Father's Name</b>                           | : Sh. Baldev Singh                                           |
| <b>Age</b>                                     | : 42 Yrs                                                     |
| <b>Mobile</b>                                  | : 9636229052                                                 |
| <b>Address</b>                                 | : V&PO- Hirnawali, Tehsil-Sangaria,<br>District- Hanumangarh |
| <b>Land holdings (Rainfed &amp; Irrigated)</b> | : 1.5 ha (Irrigated)                                         |
| <b>Livestock</b>                               | : 6 ( 2 Buffalos and 4 Cows)                                 |



**Technology demonstrated:** Cotton sowing with multi crop bed planter under TDC-NICRA.

**Problem identified:** Cotton is a major *kharif* crop of Hanumangarh district. It covers about 2.20 lac ha area under cotton cultivation but irrigation water scarcity and erratic rainfall are the major constraints. To meet out this problems farmer's started to adopt advanced sowing techniques that can improve water-use efficiency and enhance crop productivity.

**Description of technology:** The development and introduction of the multi-crop bed planter in Hanumangarh is a significant step towards improving agricultural practices, especially in regions with water scarcity. By optimizing sowing and irrigation, this technology can greatly benefit farmers by enhancing water-use efficiency and ensuring better crop establishment. The planter's ability to sow two rows on each bed while irrigating through furrows ensures that water reaches the roots more efficiently, reducing wastage. This is particularly beneficial for crops like cotton, which require precise water management to maintain yields, especially in the face of erratic rainfall and diminishing water resources.

The successful demonstration by Sh. Harcharan Singh through the Custom Hiring Center in Hirnawali showed practical application and effectiveness of this tool in real farming conditions. This could inspire other farmers in the region to adopt technology, potentially improving productivity and conserving water.

**Impact of intervention:** Water requirement for raised bed cotton fields is just 72% as compared to the traditional irrigation practice. Soil covers both sides of the plants due to which the risk of cotton plants lodging or getting damaged on account of strong winds is minimized. It controls weeds in the field as compared to the conventional method of sowing cotton. The growth of the crop and cotton bolls quality is better through the raised bed method.

**How the interventions minimized the impact of climate variability:** Bed planting is an effective technology that enhanced crop yields and conserved irrigation water, thereby improved water productivity. The key feature of irrigating through furrows around the beds not only ensured efficient water usage but also provided a safeguard against water-logging by allowing quick drainage of excess water during heavy rainfall. This minimized the risk of crop damage, particularly for sensitive crops like cotton.

**Yield and Economics:** Sowing the cotton crop by multi crop bed planter, demonstrated field obtained higher yield (17.14q/ha) as compared to farmer's practice yield (14.68q/ha). Similarly, higher net return of Rs 34714/ha with B: C ratio of 1.62 in comparison to local practice (Rs 15628/ha & B: C ratio 1.25). An additional return of Rs19086/ha was obtained under demonstrated technologies for cultivation cost saving of Rs 9308/ha.



**Field operation of Multi-Crop Bed Planter for Cotton**



**Demonstration on cotton crop at farmers' field**

## Jhunjhunu

|                |                                                                           |
|----------------|---------------------------------------------------------------------------|
| Name of farmer | : <b>Sh Indra Raj S/o Gopal Ram</b>                                       |
| Address        | : V/P-Bharu, Tehsil-Mandawa, Jhunjhunu, District- Jhunjhunu (Raj.)-333035 |
| Age            | : 50 Yrs                                                                  |
| Mobile Number  | : 9462042308                                                              |
| Education      | : 10th                                                                    |
| Land holding   | : 2 ha (1.2 Irrigated & 0.8 Rain-fed)                                     |
| Livestock      | : 3 Cow & 15 Goat                                                         |



**Technology Demonstrated:** Bio-fortified variety of mustard PM-30 with Gypsum application, wheat variety- DBW-187 & green fodder

**Problem Identified:** Mr Indraj is growing moongbean, cowpea, pearl millet in *Kharif* & wheat, mustard and gram in *Rabi* season and green fodder round the year. He was facing problem of soil salinity and poor quality of ground water. Because of that the potential productivities of crops were less and also not proper utilization of natural resources.

**Description of Technology:** KVK Jhunjhunu encouraged him for soil testing and advised after soil test report. For neutralizing the salinity of soil suggested him for application of gypsum before soil preparation and after that apply half dose N by urea and full dose of P by SSP and full dose of K by MoP as basal application. He has sown mustard variety PM-30 which was demonstrated by KVK Jhunjhunu and for water management, encouraged him to use sprinkler system.

**Impact of Intervention:** This variety has spread in the entire village covering an area of 20.0ha. This demonstration resulted in motivating the farming community to replace their old varieties, non- recommended varieties. Mr Indraj is very happy with his improved income, livelihood and has set an example for others.

**How the intervention minimized the impact of climate variability:** By the adoption of improved variety PM-30 and integrated crop management practices farmers get higher returns with low cost of production and less water requirement for irrigation. Gypsum application reduced the salinity effect of soil on mustard crop and also increased the oil content and productivity.

**Yield and Economics:** Mustard yield increased by 20.66% with productivity of 18.4q/ha. The economic gain in terms of per unit expenditure gross income and net return were recorded Rs 103960 and 69400, respectively.



Mustard variety PM-30 demonstrated at Mr Indraj Singh's field



## Jodhpur-I

|                                                |                                                                     |
|------------------------------------------------|---------------------------------------------------------------------|
| <b>Name of farmer</b>                          | : <b>Sh Shravan Ram Dewara</b>                                      |
| <b>Father's Name</b>                           | : Sh. Nimba Ram Dewara                                              |
| <b>Age</b>                                     | : 36 yrs                                                            |
| <b>Mobile</b>                                  | : +91-7742711609                                                    |
| <b>Address</b>                                 | : Village- Lawari Teh. – Bhopalgargh,<br>Distt.- Jodhpur, Rajasthan |
| <b>Land holdings (Rainfed &amp; Irrigated)</b> | : 1.5 ha Rainfed & Irrigated 2.5ha                                  |
| <b>Livestock</b>                               | : 2 Buffalo and 1 cow                                               |



**Technology Demonstrated:** Improved variety, green gram MH-421.

**Problem Identified:** Rainfed, uneven rainfall and soil salinity in study area.

**Description of Technology:** The farmers harvest rain water *in-situ* by deep ploughing during summers and collected and harvested the excess rain water during rainy season in field by contour formation for future use. In view as limited availability of irrigation water farmer adopted lesser water requirement crops, short duration and drought tolerance varieties.

**Impact of Intervention:** This variety has spread in the entire village in covering an area of 160.0ha. This demonstration's encouraging results motivated the farming community to replace their old varieties, non- recommended varieties. Sh. Shravan Ram, farmer said before he took only single crop in entire year but after adoption of rain water conservation and harvesting practices have contributed to increased land area under cultivation and also increased cropping intensity. Due to *in-situ* and *ex-situ* rain water harvesting had boosted farm productivity by growing diverse crops, vegetable, fruits and their livelihood security.

**How the intervention minimized the impact of climate variability:** Rainfall is the Basic source of irrigation water being the acute input for dryland agriculture; the farmer enforces effective rainwater management is key for successful rainfed agriculture. Under adverse weather conditions like; early withdrawal of monsoon, long dry spells conditions farmer may get good returns from conserved moisture.

**Yield and Economics:** Greengram yield increased by 33% with productivity of 6.0q/ha. Gross cost of Greengram variety MH-421 was Rs 16660/ha and gross return is Rs 33550/ha, respectively.



**Demo on green gram var. MH-421**



**Green gram var. MH-421 at Farmer's field**

## Jaisalmer-I

|                                     |                                                                              |
|-------------------------------------|------------------------------------------------------------------------------|
| Name of farmer                      | : Sh Girdhar Singh                                                           |
| Father's Name                       | : Sh Chandan Singh                                                           |
| Age                                 | : 46 yrs                                                                     |
| Mobile                              | : +91-9828484770                                                             |
| Address                             | : Village- Jogidas Ka Gaon, Teh. – Fatehgarh<br>Distt.- Jaisalmer, Rajasthan |
| Land holdings (Rainfed & Irrigated) | : 32 ha Irrigated & 18 ha Rainfed                                            |
| Livestock                           | : 5 Cows 10 Goats                                                            |



**Technology Demonstrated:** Improved variety of Cumin GC-4.

**Problem Identified:** Sh. Girdhar Singh used to grow the mustard, cumin and isabgol crop under irrigated conditions. The productivity of cumin crop was low due to incidence of blight disease. The occurrence of blight disease in cumin mainly due to untreated local seed of cumin crop.

**Description of Technology:** KVK Jaisalmer-I encouraged the farmer for adopting improved variety of Cumin GC-4 because it is the blight resistant variety. KVK also recommended line sowing and application of balance manure & fertilizer for better crop growth and high yield. Further, Krishi Vigyan Kendra trained the farmer about the benefits of cumin GC-4 variety.

**Impact of Intervention:** The results revealed that the productivity of the GC-4 improved 39.32% as compared to their own cumin seed grown locally. This demonstration results motivated the farming community to replace their old varieties, non-recommended varieties. Adoption of cumin GC-4 variety might be enhanced due to better response in degradable land and other farmers have also decided for sowing in next *rabi* season.

**How the intervention minimized the impact of climate variability:** Due to climate change scenario, the rainfall occurs during *rabi* season and this is suitable for incidence blight and wilt disease in cumin crop. But adoption of improved variety GC-4, the blight and wilt disease occurrence were negligible. Therefore, the farmers got higher net returns from improved cumin variety GC-4 with low input cost.

**Yield and Economics:** Cumin yield increased by 39.32% with productivity of 7.75q/ha. The economic gain in terms of Gross return (Rs/ha and net return(Rs/ha) were recorded Rs 201500 and Rs 148600, respectively.



Demonstration on Cumin GC-4 variety at field



Farmer's field visit to cumin GC-4 variety

## Hisar

**Name of farmer** : **Sh. Omparkash Sheoran**  
**Father's Name** : Sh. Hari Singh  
**Age** : 51 yrs  
**Mobile** : 9896503565  
**Address** : Village- Kohli, Teh. – Adampur,  
 Distt.- Hisar, Haryana  
**Land holdings (Rainfed & Irrigated)** : 5.6 ha Irrigated  
**Livestock** : 10 Buffalo



**Technology Demonstrated:** Salinity tolerant variety of wheat KRL 210.

**Problem Identified:** Sh. Omparkash Sheoran manages 5.60ha of land, practicing a cotton-wheat cropping rotation, along-with Kinnow (1.80ha) and Guava (0.40ha) orchard. However, the production and productivity of his wheat crop were lower than the potential yields. The primary factors contributing to this low productivity were identified as soil salinity issues and the use of local crop varieties.

**Description of Technology:** KVK Hisar encouraged the farmer to adopt salinity tolerant variety of wheat (KRL 210) and apply recommended dose of chemical fertilizer based on soil testing report.

**Impact of Intervention:** This salinity tolerant wheat variety KRL-210 has spread throughout the village, covering an area of 10.0ha and outperforming than conventional wheat varieties such as; WH1105, HD -3086, and HD-2967 grown locally by farmers. This demonstration has gained popularity in neighbouring salt-affected areas, motivating the farming community to replace their local varieties with KRL 210.

**How the intervention minimized the impact of climate variability:** Salt-tolerant crop varieties can significantly enhance agricultural productivity in salt-affected fields. By thriving in saline conditions, these varieties allow farmers to cultivate previously unproductive lands, leading to higher yields and better returns in comparison to locally grown wheat varieties.

**Yield and Economics:** Wheat yield increased by 7.3% with productivity of 55.2q/ha. The economic gain in terms of per unit expenditure gross income and net return were recorded Rs 136440/ha and Rs 89725/ha, respectively.



**Demo on Wheat KRL 210 at farmer's field**



**Wheat KRL 210 field ready for harvest**



## Mahendergarh

|                                                |                                                                    |
|------------------------------------------------|--------------------------------------------------------------------|
| <b>Name of farmer</b>                          | : <b>Sh Ajeet Singh</b>                                            |
| <b>Father's Name</b>                           | : Sh Ramavtar Singh                                                |
| <b>Age</b>                                     | : 49 yrs                                                           |
| <b>Mobile</b>                                  | : +91-9467726988                                                   |
| <b>Address</b>                                 | : Village- Bairawas, Block- Mahendergarh<br>District- Mahendergarh |
| <b>Land holdings (Rainfed &amp; Irrigated)</b> | : 1.2 ha Irrigated                                                 |
| <b>Livestock</b>                               | : 02 Buffalo                                                       |



**Technology Demonstrated:** Improved Mustard variety RH-725, Green fodder bajra & mineral mixture supplementation.

**Problem Identified:** Sh. Ajeet Singh used to grow pearl millet, cotton in *Kharif* and wheat and mustard in *Rabi* season. The productivity of all crops was low as compared to potential yield. The major causes for low productivity identified were water scarcity for irrigation, non adoption of improved cultivation practices, lack of knowledge of improved varieties of various crops and low milk yield of livestock.

**Description of Technology:** KVK Mahendergarh scientists visited farmers' fields and encouraged them to get soil test report of fields. On the basis of that farmers were advised for balanced use of chemical fertilizers in different crops. Improved mustard variety RH-725 for limited availability of water was introduced in farmers' fields. Along with this LUVAS University mineral mixture was also provided to the farmers for improvement of livestock health and green fodder for higher milk yield. Further, Krishi Vigyan Kendra involved several farmers in training programs for enhancing their capacity in improved agronomic practices and livestock management.

**Impact of Intervention:** Improved mustard variety RH-725 has attracted a large number of farmers and spread in more than 30.0ha area of the village. his demonstration resulted in motivating the farming community to replace their old varieties, non- recommended varieties. Sh Ajeet Singh is very happy with his improved income, livelihood and set an example for others farmers of the village.

**How the intervention minimized the impact of climate variability:** By the adoption of improved variety RH-725 and integrated crop management practices farmers got higher returns with low cost of production and less water requirement for irrigation. RH-725 Variety is tolerant to a biotic stress (water and frost) and bold seeded, less shattering losses during harvesting time. Green fodder and mineral mixture supplementation has resulted significant improvement in livestock health. Farmers of adopted village are also taking benefits of weather advisory and incorporate necessary strategies to protect crops and livestock from cold waves and heat waves.

**Yield and Economics:** Mustard yield increased by 17.9% with productivity of 22.5q/ha. The economic gain in terms of gross income and net returns were recorded as Rs 87325/ha and Rs 52925/ha, respectively.



**Demonstrations on Mustard var. RH-725 at field**



**Field Day on Mustard var. RH-725**



## Nagaur-I

**Name of farmer** : **Sh Jay Ram Kashaniya**  
**Father's Name** : Sh Hanuwant Ram  
**Age** : 42 Yrs  
**Mobile** : +91-9983283279  
**Address** : Village- Deshwal Block-Merta City,  
 Dist.- Nagaur, Rajasthan-341514  
**Land holdings (Rainfed & Irrigated)** : 4.2 ha Irrigated  
**Livestock** : 1 Cow & 1 Buffalo



**Technology demonstrated:** Improved & wilt resistant variety of Cumin (GC-4)

**Problem identified:** The cumin crop's productivity fell below its projected output. The main reasons for the poor production were found to be the failure to use improved farming techniques and the adoption of improved cumin varieties by the farming community.

**Description of technology:** Use of improved seed variety of Cumin GC-4 @ 15 kg/ha and seed treatment with Carbendazim 3.0g/kg seed; soil treatment with *Trichoderma viride* @ 2.5 kg/ha with 100 kg FYM (well decomposed); Recommended N:P:K (15:20:20 kg/ha) and use of waste decomposer @ 50.0g/ha, use of sulphur @ 2.5 kg/ha; use of Zinc sulphate @12.5 kg/ha and use of micronutrient.

Shri Jay Ram Kashaniya took part in trainings on the cultivation of various *Kharif* and *Rabi* crops, which included all aspects of farm operations from methods of land preparation to crop harvesting, conducted by Krishi Vigyan Kendra, Nagaur-I under the NICRA Project. The KVK experts advised that farmers must assess their soil, add organic manures, apply a balanced fertilizer dose using the improved variety GC-4.

**Impact of intervention:** The cumin yield increased as a result of managing diseases and pests. The farmer's socio-economic status has improved and he is making more money. His field's soil health has also improved significantly.

**How the interventions minimized the impact of climate variability:** GC-4 is wilt tolerant improved variety of cumin which gives better yield in adverse climatic condition than locally grown cumin crop.

**Yield and Economics:** Cumin yield increased by 18.20% with productivity of 9.70q/ha. The gross income and net return were recorded Rs 237650/ha and Rs 194900/ha respectively.



**Training Prog on Cumin (GC-4) cultivation**



**Demo on Cumin (GC-4) at farmers' field**

## Pali-I

|                                     |                                                                |
|-------------------------------------|----------------------------------------------------------------|
| Name of farmer                      | : Sh Ranchod Singh Patel                                       |
| Father's Name                       | : Sh Phoolaramji                                               |
| Age                                 | : 65 yrs                                                       |
| Mobile                              | : +91-9799447829                                               |
| Address                             | : Village- Gajangarh, Teh. – Rohat,<br>Distt.- Pali, Rajasthan |
| Land holdings (Rainfed & Irrigated) | : Rainfed (3.0ha) & Irrigated (0.35ha)                         |
| Livestock                           | : Buffalo-2 & 2 Cows-2                                         |



**Technology Demonstrated:** Improved variety, Green gram GM-6.

**Problem Identified:** Rainfed, uneven rainfall and soil salinity.

**Description of Technology:** The farmer harvest rain water *in-situ* by deep ploughing during summers and collected and harvested the excess rain water during rainy season in field by contour formation for future use. In view as limited availability of irrigation water farmer adopted lesser water requirement crops, short duration and drought tolerance varieties.

**Impact of Intervention:** This variety has spread in the entire village covering an area of 15.0ha. This demonstration resulted in motivating the farming community to replace their old varieties, non- recommended varieties. Sh. Ranchod Patel, farmer said before he took only single crop in entire year but after adoption of rain water conservation and harvesting practices have contributed to increased land area under cultivation and also increased cropping intensity. Due to *in-situ* and *ex-situ* rain water harvesting had boosted farm productivity by growing diverse crops, vegetable, fruits and their livelihood security.

**How the intervention minimized the impact of climate variability:** Rainfall is the basic source of irrigation water being the acute input for dryland agriculture; the farmer enforces effective rainwater management is key for successful rainfed agriculture. Under adverse weather conditions like; early withdrawal of monsoon, long dry spells conditions farmer may get good returns from conserved moisture.

**Yield and Economics:** Greengram yield increased by 20% with productivity of 5.8q/ha. Gross cost of Green gram variety GM-6 was Rs 16570/ha and gross return is Rs 33450/ha, respectively.



Demo on Green Gram Variety-GM-6



Demo on Green Gram Variety-GM-6 at field



## Sirsa

**Name of farmer** : **Sh Rajender Singh**  
**Father's Name** : Sh Ram Datt  
**Age** : 50 yrs  
**Mobile** : 9416403312  
**Address** : VPO- Nirban, Block- Nathusari Chopta, Sirsa  
**Land holdings (Rainfed & Irrigated)** : 25 ha  
**Livestock** : 10 (4 Cows & 6 Buffaloes)



**Technology Demonstrated:** Improved variety Green gram MH-421, chickpea GNG-2171 and groundnut as intercrop in kinnow orchard with drip irrigation.

**Problem Identified:** Sh. Rajender from village- Nirban used to cultivate only agricultural crops i.e. cotton, guar, wheat and mustard. The annual farm income was less and was only sufficient for his routine family expenses. Three years back he shifted from conventional agricultural crops to horticultural crops and planted kinnow in 4.0ac area. The major problems in the area were poor soil fertility and low quality of ground water. He needed to improve soil fertility status and a regular source of irrigation for orchard. Additionally, he focused to increase his farm income by adoption of improved practices.

**Description of Technology:** Under the project, KVK Sirsa encouraged him to build a water storage tank and install drip irrigation system at his farm for kinnow orchard. He was also advised to adopt leguminous intercrops i.e. groundnut, green gram (*Kharif* season) and chick pea (*Rabi* season) to improve soil conditions and to earn additional income during the years of no fruiting from the fruit trees. KVK Sirsa provided seeds of green gram var. MH-421 and chick pea var. GNG- 2171 and all the technical information required for intercropping.

**Impact of Intervention:** The construction of water storage tank helped him to irrigate the crops at critical stages which enhanced the growth and yield of crops. He harvested 3.0qt of green gram and 11.0qt of chick pea from his farm as additional yield. These leguminous crops improved the soil condition of the field and supported the growth of the fruit trees resulting in good flowering and fruiting in the present year. The success of the intervention encouraged him to follow the practices in the later years also. His model field became an example to other farmers of the village.

**How the intervention minimized the impact of climate variability:** The green gram var. MH-421 is not only high yielding but is tolerant to yellow vein mosaic virus also. The leguminous intercrops in both *kharif* and *rabi* seasons helped in conservation of soil moisture, improvement of soil nutrient status and enhancing annual farm income. The intercropping also helped him to bear the risk of crop failure and supported him financially by earning additional income. The water tank and drip irrigation system reduced the risk of yield loss due to absence of irrigation.

**Yield and Economics:** He earned Rs 75260/ha from intercropping in 4.0ac of orchard as an additional income. The farmer also reported reduction in fertilizer cost in the succeeding cropping year.



**Intercropping in kinnow orchard with groundnut**



**Demo on MH-421 var. green gram at field**

## Sirohi

|                                                |                                                               |
|------------------------------------------------|---------------------------------------------------------------|
| <b>Name of farmer</b>                          | : <b>Sh Shekhar Pal Singh</b>                                 |
| <b>Father's Name</b>                           | : Sh Moti Singh                                               |
| <b>Age</b>                                     | : 32 yrs                                                      |
| <b>Mobile</b>                                  | : 9982015518                                                  |
| <b>Address</b>                                 | : Village- Dhanta, Teh.- Sirohi,<br>Distt.- Sirohi, Rajasthan |
| <b>Land holdings (Rainfed &amp; Irrigated)</b> | : 2.25 ha Irrigated & 0.75 ha Rainfed                         |
| <b>Livestock</b>                               | : 2 Buffalo, 1 Cow, 5 Goats                                   |



**Technology Demonstrated:** Improved short duration variety IPM-410-3, Breed improvement, area specific mineral mixture.

**Problem Identified:** Sh. Shekhar Pal Singh used the local green gram variety which was very low in productivity and crop failed due to long dry spell during the crop growing season. Productivity of green gram crops was low as compared to potential yield. The major causes for low productivity identified were long dry spell during the crop growing season and use of local varieties in cultivation and not following improved cultivation practices.

**Description of Technology:** KVK Sirohi encouraged the farmer for soil testing, on the basis of that farmer was advised for balanced dose of chemical fertilizer with improved short duration and draught tolerant green gram variety IPM-410-3., line sowing and fertilizer application was done as basal application including half dose of Nitrogen, and full dose of  $P_2O_5$  as recommended. Rest Nitrogen used after first irrigation. Further, Krishi Vigyan Kendra trained the farmer about benefits of mineral mixture & local goat breed improvement through demonstration of Sirohi goat breed.

**Impact of Intervention:** This variety has spread in the entire village covering an area of 10.0 ha. This demonstration resulted in motivating the farming community to replace their old varieties, non- recommended varieties. Sh Shekhar Pal is very happy with his improved income, livelihood and set an example for others. Area specific mineral mixture & Improvement of local goat breed helped farmers to get pure breed of goats which helped him got more meat and milk production and got additional income up to 25 to 30% from the local farmer.

**How the intervention minimized the impact of climate variability:** By the adoption of improved variety IPM-410-3 and integrated crop management practices farmers got higher returns with low cost of production and less water requirement for irrigation. IPM-410-3 variety is short duration & drought tolerant (Mature in 60-65 days and resistant to Moong Yellow vein mosaic virus) good market value and bold seeded, less shattering losses during harvesting time.

**Yield and Economics:** Mustard yield increased by 24.48% with productivity of 6.1q/ha. The economic gain in terms of per unit expenditure gross income and net return were recorded Rs 52203/ha and Rs 34053/ha, respectively.



**Demo on Green gram var. IPM-410-3**



**Demo on Improved Sirohi Goat Breed**



## 5. NICRA Annual-Review Meeting



### NICRA Review meeting was held at ATARI Jodhpur on 19.07.2024

The Zonal Review Workshop of National Innovations in Climate Resilient Agriculture for the Krishi Vigyan Kendra's of Haryana and Rajasthan was organized at ICAR- Agricultural Technology Application Research Institute, Zone-II, Jodhpur on 19-20 July 2024. The list of participants is Annexed.

The progress of TDC components of NICRA for the year 2023-24 and action plans for 2024-25 of 18 KVKs implementing NICRA in Haryana and Rajasthan were discussed and reviewed. Dr. JP Mishra, Director, ICAR-ATARI, Zone-II, Jodhpur chaired the meeting. ICAR-CRIDA Hyderabad was represented by Dr G. Pratibha, National Coordinator, NICRA-TDC and Dr AK Indoria, Co-PI, NICRA Project. The Chairman emphasized upon initiating new interventions models which have direct bearing effect with the climate vulnerability of the district. He highlighted that soil testing is crucial for climate-friendly agriculture, setting targets, educating farmers, and providing training to farmers, farm women, and youth can help to promote awareness and encourage sustainable agriculture practices. The livestock based farming system and resource conservation technologies must be focused in arid region under NICRA-TDC.

**Dr (Mrs) G. Pratibha, National Coordinator, NICRA-TDC** elaborated the steps for implementation of different modules and ways for developing district adaptation plan and procurement of those equipments which are more in demand by the farming community under CHC for adopted villages.

**Dr. Sudesh Kumar, Director Extension, SKNAU, Jobner**, highlighted the aims of NICRA project and stressed to promote climate-resilient agricultural technologies. He appraised that deterioration of natural resources due to changing climate is to be taken care, especially land and water. These interventions under NICRA should be aligned with existing cropping practices of the region based on vulnerability.



The progress of work done during 2023 were discussed subsequently. The following overarching recommendations and KVK specific recommendations were made during the presentations/discussions.

### Common Recommendations for All KVKs

- The reporting of progress of 100 days Action Plan related to NICRA should be done every week. Sr. Scientist & Head need to responsive this Action Plan very critically and carefully to accomplish the given targets well in time.
- The new initiative for technology demonstrations should be started as per farming system typology in selected village under TDC module.
- Demonstrations on "Natural Resource Management must be encouraged in adopted villages under NICRA-TDC to provide nutritional security to farming community.
- The selected village has to be divided as per the Farming System typology and climate resilient technologies address to identified climate stress to be incorporated in TDC.
- The activities under NICRA should be focused on climatic vulnerability of that district and it should be different than other normal demos/trainings/extension activities of KVKs.
- The upscaling of proven technologies of NICRA should be attempted by all KVKs through convergence with line department of the district.
- APR 2022-23 is due to KVKs as indicted by the National Coordinator NICRA-TDC and Carbon Balance Report is to be submitted by all 18 NICRA KVKs of Rajasthan and Haryana states.
- The duly filled data sheet related to impact assessment studies as per Integrated Farming System Typology should be submitted at the earliest to CRIDA, Hyderabad
- Success stories are lacking in the APR-2023 and this should be given much emphasis to show worth of technology as well as existence of KVK.
- The budget must be utilized fully under each head and refund the excess amount, if any.
- NICRA logo must be put on each and every banner of the demonstration and trainings conducted under NICRA project.
- Prior consent of ICAR-ATARI Jodhpur should be taken for any type of publication related to NICRA and acknowledge the financial help provide by ICAR-CRIDA Hyderabad.
- Develop 2 to 3 min video about successful interventions of NICRA-TDC as per reference video.
- The Sr. Scientist & Head KVK need to ensure to present the APR and Action Plan in Zonal Review Workshop by themselves only.
- The Action Plan-2024 has to be reworked as per identified vulnerability of the concerned district, suggestions given by expert members and; it has to be submitted to ATARI office by 24 July 2024.



**Dr Sudesh Kumar, DEE, SKNAU, Jobner** who also Co-chaired the technical session on 20th July 2024, in his remarks stated that: -

- All the KVKs should initiate more NRM interventions, agro-forestry plantation and fodder component for livestock feeding during scarcity periods.
- Under Livestock module maximum activities should be taken up like; breed improvement, shelter management, feeding management, deworming and vaccination etc.
- Impact assessment studies must be taken up to know the real effect of NICRA interventions.

**Dr PP Rohilla, Principal Scientist (LPM), ICAR-ATARI, Jodhpur & Nodal Officer, NICRA, Zone-II** stated: -

- The APR 2023-24 need to be submitted immediately by the KVKs who have not submitted yet.
- Detailed expenditure of the item-wise of the budget should be provided by all the KVKs.
- The data of all components should be properly documented and analyzed.
- While publishing any report of NICRA, the due consent of ICAR-ATARI to be taken and ICAR-CRIDA to be acknowledged adequately. The logos of ICAR, NICRA, CRIDA and ATARI should be depicted in all such publications.
- The SRF of NICRA at KVK should be utilized purely for the activities of NICRA with adequate capacity development.
- The periodical reporting of NICRA should be maintained adequately and appropriately.

**Dr AK Indoria, Co-PI, NICRA-TDC** briefed about the future programme modalities of NICRA-TDC to be followed for implementation of different modules and ways for developing district adaptation plan. Certain action points were suggested for improving the NICRA project implementation:

- Integration of all components i.e. NRM, Crop, livestock for predominant farming typology of the village.
- Soil and water conservation through different techniques should be taken up and district vulnerability should be focused in all the NICRA-TDC interventions.
- Geo tagging is must for all the activities taken up as component of NICRA-TDC in action.

**Dr Pratibha, NICRA-TDC National Coordinator** in her concluding remarks suggested following for the improvment of NICRA and its output/outcome: -

- Focus on *in-situ* and *ex-situ* conservation techniques under NRM module.
- Summer ploughing intervention must be applied only in the suitable specific regions.
- Crop diversification should be adopted and agro-forestry may also be initiated as per vulnerability.



- For hot and cold wave only the suitable and recommended crop varieties should be used.
- Impact assessment studies should be taken up by all KVKs and presented in house.
- Some interventions on renewable energy may also be initiated wherever suitable.
- Crop contingency measures must be given by all the KVKs to save the crop failures.

**Dr JP Mishra, Director ICAR-ATARI, Jodhpur** in his plenary remarks observed the following for strengthening of NICRA in Zone-II: -

- The old 5 NICRA KVKs (Barmer, Bharatpur, Jhunjhunu, Jodhpur, Sirsa) need to prepare document on "Eleven years of NICRA Achievements" during the Golden Jubilee Celebration of KVKs.
- Identify the suitable typology in selected village and implement the interventions which are highly suitable to vulnerability.
- The impact assessment studies are required using 2 to 3 most important performance indicators viz; soil organic carbon status and water foot print before and after NICRA interventions,
- We have to develop more suitable CHC models based on the NICRA experience.
- The funds must be utilized judiciously and efficiently for each component/ TDC module.
- In Haryana and Rajasthan there are several ICAR institutes and SAUs; hence, we have to adopt recommended technologies of these institutes addressed to weather aberrations and climatic change management.
- All the PIs must be responsibly responsive to deadline given for any report asked for submission.
- After every three years the villages should be changed to up-scale the successful interventions.
- Focus on documentation of successful interventions and scale up them in convergence mode.
- Our efforts should be to move from success stories to case studies for more fruitful and effective output.
- The reallocation of NICRA to other KVK in the same district, an adjoining district with representative village to delineated vulnerability may be worked out by ICAR-CRIDA Hyderabad in consultation of ICAR-ATARI concerned.
- The inter-KVK allocation of budgetary support may be given to ICAR-ATARI for more effective and purposeful utilization of the NICRA funds.

The meeting ended with vote of thanks to the Chair, Co-Chair, Chief Guest and all the participants by Dr BL Jangid, Pr. Scientist (AE), ICAR-ATARI, Jodhpur.



## 6. Budget Allocation in 2023 under NICRA, Zone-II

| Name of ATARI per KVK | Grants-in –Aid-General (REVENUE)<br>(₹ in lakh) |                |               | Grants for creation of Assets<br>(CAPITAL) |               | Total (Rs in lakh) |
|-----------------------|-------------------------------------------------|----------------|---------------|--------------------------------------------|---------------|--------------------|
|                       | Operational                                     | TA             | Total General | Equipment                                  | Total Capital |                    |
| ATARI, Jodhpur        | 7.940                                           | 1.06           | 9.00          | 000                                        | 000           | 9.00               |
| 1. Alwar-I            | 7.82                                            | 0.67           | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 2. Barmer-I           | 12.95                                           | 0.54           | 13.49         | 0.79                                       | 0.79          | 14.28              |
| 3. Bharatpur          | 7.70                                            | 0.790          | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 4. Bhilwara-I         | 7.70                                            | 0.790          | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 5. Bikaner-I          | 8.00                                            | 0.900          | 8.90          | 0.79                                       | 0.79          | 9.28               |
| 6 Churu-I             | 8.23                                            | 0.2644         | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 7 Hanumangarh-I       | 8.42                                            | 0.070          | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 8 Jaisalmer-I         | 7.70                                            | 0.790          | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 9 Jhunjhunu           | 8.89                                            | 0.7276         | 9.62          | 0.79                                       | 0.79          | 10.41              |
| 10 Jodhpur-I          | 6.94                                            | 0.3196         | 7.26          | 0.79                                       | 0.79          | 8.05               |
| 11 Nagaur-I           | 8.34                                            | 0.150          | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 12 Pali-I             | 8.49                                            | 0.00           | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 13 Sirohi             | 7.70                                            | 0.79           | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 14 Bhiwani            | 8.40                                            | 0.09           | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 15 Fatehabad          | 7.70                                            | 0.79           | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 16 Hisar              | 8.49                                            | 0.00           | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 17 Mahendergarh       | 7.70                                            | 0.79           | 8.49          | 0.79                                       | 0.79          | 9.28               |
| 18 Sirsa              | 7.70                                            | 0.790          | 8.49          | 0.79                                       | 0.79          | 9.28               |
| <b>Total</b>          | <b>156.80823</b>                                | <b>9.91177</b> | <b>166.72</b> | <b>14.22</b>                               | <b>14.22</b>  | <b>180.94</b>      |



## Annexure-I

**Table-1: Module-I: Interventions undertaken under Natural Resource Management**

| SN                 | Resilient practice                                                                            | No. of Demonstrations | Farmers covered | Area covered (ha) |
|--------------------|-----------------------------------------------------------------------------------------------|-----------------------|-----------------|-------------------|
| <b>Rajasthan</b>   |                                                                                               |                       |                 |                   |
| 1.                 | Summer deep ploughing                                                                         | 126                   | 126             | 230.5             |
| 2.                 | Green Manuring                                                                                | 95                    | 95              | 36.5              |
| 3.                 | <i>In-situ</i> moisture conservation                                                          | 115                   | 115             | 83                |
| 4.                 | Vermi compost Unit                                                                            | 43                    | 43              | 156.3             |
| 5.                 | <i>Ex-situ</i> moisture conservation                                                          | 2                     | 11              | 20                |
| 6.                 | Soil health card issue                                                                        | 90                    | 90              | 200               |
| 7.                 | Heat stress management                                                                        | 10                    | 10              | 5.6               |
| 8.                 | Low Cost Rain water harvesting structure                                                      | 33                    | 33              | 120               |
| 9.                 | Foliar spray of 1% KNO <sub>3</sub> in maize                                                  | 5                     | 5               | 1                 |
| 10.                | Plantation for wind breaker                                                                   | 10                    | 10              | 0.5               |
| 11.                | Soil moisture conservation (Hydrogel)                                                         | 10                    | 10              | 0.5               |
| 12.                | Sowing with Multi crop bed planter of cotton and mustard crop for saving the irrigation water | 10                    | 10              | 4                 |
| 13.                | Use of Soil Tensiometer in cotton, Wheat and mustard crops for management of irrigation water | 30                    | 30              | 12                |
| <b>Total</b>       |                                                                                               | <b>579</b>            | <b>588</b>      | <b>869.9</b>      |
| <b>Haryana</b>     |                                                                                               |                       |                 |                   |
| 1.                 | Micro Irrigation                                                                              | 26                    | 26              | 10.4              |
| 2.                 | Summer Moong (MH-421) Resistant to yellow vein mosaic virus                                   | 50                    | 50              | 20                |
| 3.                 | Evaluating the effect of planting methods in cotton                                           | 7                     | 7               | 2.8               |
| 4.                 | Demonstration on cultivation of cluster bean for restoring soil fertility                     | 20                    | 20              | 8                 |
| 5.                 | Use of laser land leveller                                                                    | 80                    | 80              | 52                |
| <b>Total</b>       |                                                                                               | <b>183</b>            | <b>183</b>      | <b>93.2</b>       |
| <b>Grand Total</b> |                                                                                               | <b>762</b>            | <b>771</b>      | <b>963.1</b>      |



**Table-2: Module-II: Interventions undertaken under Crop Production**

| Resilient practice                                                   | No. of Demonstrations | Farmers covered | Area covered (ha) |
|----------------------------------------------------------------------|-----------------------|-----------------|-------------------|
| Mini sprinkler irrigation                                            | 10                    | 10              | 4                 |
| Short duration variety of different crop                             | 255                   | 255             | 92.4              |
| Site specific nutrient management)                                   | 14                    | 17              | 7                 |
| Drought tolerance and high yielding varieties                        | 225                   | 225             | 90                |
| ICM & Drought Tolerant varieties                                     | 50                    | 50              | 20                |
| Income generation activities Vegetables (Nutri Garden)*              | 25                    | 25              | 2.5               |
| Improved Variety different crop                                      | 528                   | 461             | 224.9             |
| Drought tolerant variety                                             | 265                   | 265             | 106               |
| Vegetable seedling and Kitchen gardening kit                         | 50                    | 50              | 5                 |
| Recharge Tube well + Wheat                                           | 20                    | 20              | 8                 |
| Suitable intercropping systems under real rainfall situations        | 5                     | 5               | 1                 |
| Mitigation of terminal heat stress in heat tolerant variety          | 51                    | 51              | 14.4              |
| Crop diversification                                                 | 44                    | 44              | 17.6              |
| Climate resilient practices                                          | 60                    | 60              | 24                |
| Salinity tolerant crop of barley                                     | 30                    | 30              | 12                |
| Bio-fortified variety in Pearl millet                                | 21                    | 21              | 8.4               |
| Use of Sulphuric acid to mitigate the effect of cold wave in mustard | 10                    | 10              | 4                 |
| Suitable for rainfed condition                                       | 25                    | 25              | 10                |
| Wilt resistance variety of cumin                                     | 25                    | 25              | 10                |
| Weed Management in wheat through metsulfuron methyl                  | 20                    | 20              | 5                 |
| Micro-nutrient in mustard crop (BioVita)                             | 20                    | 20              | 5                 |
| Sucking pest management in fenugreek through Yellow Sticky Trap      | 10                    | 10              | 4                 |
| Multi cut Bajra (Green fodder) production in zaid season             | 25                    | 25              | 10                |
| House hold nutritional security through Nutri-garden                 | 100                   | 100             | 2                 |
| Salinity tolerant variety (CS -60) of Mustard                        | 20                    | 20              | 8                 |
| <b>Total</b>                                                         | <b>1908</b>           | <b>1844</b>     | <b>695.2</b>      |
| <b>Haryana</b>                                                       |                       |                 |                   |
| Crop Diversification                                                 | 75                    | 75              | 30                |
| High yielding and improved variety                                   | 190                   | 190             | 76                |
| Wheat (KRL-210) Salt Tolerant Variety                                | 20                    | 20              | 8                 |
| Bajra (HHB-299) Bio Fortified Variety                                | 10                    | 10              | 4                 |



| Resilient practice                                                                      | No. of Demonstrations | Farmers covered | Area covered (ha) |
|-----------------------------------------------------------------------------------------|-----------------------|-----------------|-------------------|
| Heat stress management in Guar                                                          | 44                    | 44              | 18                |
| Salinity and water management in Wheat                                                  | 41                    | 41              | 16                |
| Frost and cold wave Management in Mustard                                               | 72                    | 72              | 27                |
| Short duration drought tolerant variety                                                 | 30                    | 30              | 12                |
| Demonstration on Groundnut var. GJG-19 under limited irrigation conditions              | 10                    | 10              | 4                 |
| Demonstrations on improved mustard variety for rainfed/restricted irrigation conditions | 60                    | 60              | 24                |
| Demonstrations on wheat variety suitable for limited irrigation water availability      | 20                    | 20              | 8                 |
| YVMV tolerant variety of Moong                                                          | 20                    | 20              | 20                |
| Integrated pest management in cotton                                                    | 120                   | 120             | 48                |
| Integrated nutrient management in cotton                                                | 72                    | 72              | 28.8              |
| Yellow rust tolerant wheat varieties                                                    | 10                    | 10              | 4                 |
| <b>Total</b>                                                                            | <b>794</b>            | <b>794</b>      | <b>327.8</b>      |
| <b>Grand Total</b>                                                                      | <b>2702</b>           | <b>2638</b>     | <b>1023</b>       |

**Table-3: Module-III: Livestock Production Interventions implanted in village**

| SN  | Resilient practice                                        | No. of Demonstrations | Farmers covered | No. of animals covered | Area covered (ha) |
|-----|-----------------------------------------------------------|-----------------------|-----------------|------------------------|-------------------|
| 1.  | Green fodder production                                   | 177                   | 177             | 373                    | 23.3              |
| 2.  | Feeding of Area Specific Mineral mixture                  | 232                   | 232             | 318                    | 0                 |
| 3.  | Breed Up-gradation in Goats                               | 50                    | 121             | 465                    | 10                |
| 4.  | Feeding of mineral Mixture to mitigate mineral deficiency | 69                    | 69              | 258                    | 0                 |
| 5.  | Back yard Poultry/Poultry unit                            | 96                    | 95              | 1470                   | 0                 |
| 6.  | Multi-nutrient feed block                                 | 25                    | 25              | 25                     | -                 |
| 7.  | E-W housing                                               | 5                     | 5               | 5                      | -                 |
| 8.  | Cow mat                                                   | 13                    | 13              | 13                     | -                 |
| 9.  | Vermicompost                                              | 20                    | 20              | 65                     | -                 |
| 10. | Parasite management in small ruminants                    | 2                     | 50              | 1912                   | -                 |
| 11. | Fodder beet cultivation                                   | 10                    | 10              | 20                     | 1                 |
| 12. | PMR                                                       | 20                    | 20              | 20                     | -                 |
| 13. | Composite Fish Culture                                    | 10                    | 10              | -                      | 0.92              |



| SN                 | Resilient practice                                                                                               | No. of Demonstrations | Farmers covered | No. of animals covered | Area covered (ha) |
|--------------------|------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------|------------------------|-------------------|
| 14.                | Introduce new multi cut variety of Sorghum fodder                                                                | 20                    | 20              | 65                     | 2.5               |
| <b>Total</b>       |                                                                                                                  | <b>749</b>            | <b>867</b>      | <b>5009</b>            | <b>37.72</b>      |
| <b>Haryana</b>     |                                                                                                                  |                       |                 |                        |                   |
| 1.                 | New multi cut fodder variety                                                                                     | 64                    | 64              | 64                     | 7                 |
| 2.                 | Mineral supplementation                                                                                          | 48                    | 48              | 48                     | -                 |
| 3.                 | Animal health improvement using Feed Supplement                                                                  | 90                    | 90              | 190                    | -                 |
| 4.                 | Improved nutrition of livestock by including Mineral mixtures in Feed, green fodder, vaccination , deworming etc | 125                   | 125             | 125                    | -                 |
| <b>Total</b>       |                                                                                                                  | <b>327</b>            | <b>327</b>      | <b>427</b>             | <b>7</b>          |
| <b>Grand Total</b> |                                                                                                                  | <b>1076</b>           | <b>1194</b>     | <b>5436</b>            | <b>44.72</b>      |

**Table-4: Module-IV: Institutional Interventions carried out under NICRA Project**

| Seed/fodder systems | Seed/fodder produced (tons) | Farmers covered | Area covered (ha) | Quantity of Seed/fodder retained for next season | Amount mobilized (Rs) |
|---------------------|-----------------------------|-----------------|-------------------|--------------------------------------------------|-----------------------|
| Seed Bank           | 1104.86                     | 381             | 744               | 961.1                                            | 2054180               |
| Fodder Bank         | 4705                        | 88              | 16                | 4630                                             | 0                     |
| CHC                 | -                           | 3085            | 3440.5            | -                                                | 183506                |

**Seed bank**

| SN | Seed systems | Seed produced (tons) | Farmers covered | Area covered (ha) | Quantity of seed retained for next season | Amount mobilized (Rs) |
|----|--------------|----------------------|-----------------|-------------------|-------------------------------------------|-----------------------|
| 1. | Wheat Seed   | 56.06                | 53              | 31                | 59.5                                      | 856250                |
| 2. | Barley       | 6.88                 | 18              | 6                 | 11.1                                      | 266050                |
| 3. | Mustard      | 162.56               | 90              | 169               | 100.5                                     | 862760                |
| 4. | Gram         | 228.96               | 30              | 12                | 50                                        | 0                     |
| 5. | Green gram   | 132.4                | 20              | 8                 | 4                                         | 0                     |
| 6. | Cluster bean | 145                  | 100             | 145               | 160                                       | 14400                 |
| 7. | Groundnut    | 281                  | 50              | 281               | 480                                       | 48000                 |
| 8. | Fenugreek    | 92                   | 20              | 92                | 96                                        | 6720                  |
|    | <b>Total</b> | <b>1104.86</b>       | <b>381</b>      | <b>744</b>        | <b>961.10</b>                             | <b>2054180</b>        |

### Fodder bank

| SN | Fodder systems       | Fodder produced (tons) | Farmers covered | Area covered (ha) | Quantity of fodder retained for next year | Amount mobilized (Rs) |
|----|----------------------|------------------------|-----------------|-------------------|-------------------------------------------|-----------------------|
| 1. | Oat (Kent)           | 35                     | 18              | 3                 | 0                                         | 0                     |
| 2. | Napier grass CO-4    | 3220                   | 40              | 4                 | 3180                                      | 0                     |
| 3. | Fodder beet Geronimo | 1450                   | 10              | 1                 | 1450                                      | 0                     |
| 4. | Berseem              | 0                      | 20              | 8                 | 0                                         | 0                     |

**Table-5: Module-V: Different courses taught under Capacity Building Program**

| Theme                                                                    | No. of training programmes | Number of beneficiaries |        |       |
|--------------------------------------------------------------------------|----------------------------|-------------------------|--------|-------|
|                                                                          |                            | Male                    | Female | Total |
| Rain Water harvesting                                                    | 6                          | 190                     | 71     | 261   |
| Scientific cultivation of <i>Kharif</i> & <i>rabi</i> Crops              | 3                          | 58                      | 12     | 70    |
| Custom hiring centre                                                     | 3                          | 69                      | 2      | 71    |
| Importance of Nutri-garden for healthy food                              | 7                          | 85                      | 244    | 212   |
| Mobile application use for agriculture information                       | 1                          | 18                      | 0      | 18    |
| Mustard cultivation techniques, yield optimization and market strategies | 1                          | 10                      | 0      | 10    |
| Protection of <i>rabi</i> crops from frost                               | 2                          | 36                      | 0      | 46    |
| Importance of feeding mineral mixture to dairy cattle                    | 7                          | 133                     | 25     | 190   |
| ICM in crops                                                             | 9                          | 236                     | 73     | 310   |
| Skill Development & capacity building of Agricultural Labour programme   | 1                          | 3                       | 34     | 37    |
| Production Management of Green Manuring                                  | 1                          | 48                      | 12     | 60    |
| Production Technology of crops                                           | 8                          | 233                     | 39     | 272   |
| Off Campus Training                                                      | 8                          | 175                     | 74     | 249   |
| On Campus Training                                                       | 4                          | 96                      | 24     | 120   |
| Pre-seasonal training on <i>Kharif</i> & <i>rabi</i> crop                | 2                          | 30                      | 62     | 92    |
| Poultry rearing technology                                               | 1                          | 20                      | 30     | 50    |
| Seed and fodder production                                               | 1                          | 15                      | 30     | 45    |
| Natural farming components                                               | 2                          | 35                      | 35     | 70    |
| Integrated Pest & disease management in crops                            | 7                          | 143                     | 24     | 167   |
| Scientific poultry farming                                               | 1                          | 20                      | 0      | 20    |
| Scientific Goat Farming                                                  | 1                          | 18                      | 9      | 27    |



| Theme                                                                       | No. of training programmes | Number of beneficiaries |            |             |
|-----------------------------------------------------------------------------|----------------------------|-------------------------|------------|-------------|
|                                                                             |                            | Male                    | Female     | Total       |
| Soil and water conservation methods                                         | 4                          | 98                      | 21         | 119         |
| Importance of horticultural crops in traditional farming                    | 1                          | 19                      | 1          | 20          |
| Cleaning, grading, safe storage of food grain & seed                        | 1                          | 18                      | 1          | 19          |
| Use of plastic in agriculture                                               | 1                          | 13                      | 7          | 20          |
| Weed management in wheat                                                    | 1                          | 16                      | 5          | 21          |
| Production and use of organic inputs at field level                         | 1                          | 19                      | 0          | 19          |
| Integrated Nutrient management in crops                                     | 3                          | 75                      | 6          | 81          |
| Management of sucking pest through yellow sticky traps                      | 1                          | 17                      | 1          | 18          |
| Cultivation of multi cut bajra for green fodder                             | 1                          | 25                      | 0          | 25          |
| integrated farming system                                                   | 2                          | 32                      | 17         | 49          |
| Precision irrigation                                                        | 1                          | 19                      | 4          | 23          |
| Fodder management technique by silage making                                | 1                          | 29                      | 0          | 29          |
| Climate resilient agriculture Training programme                            | 2                          | 60                      | 20         | 80          |
| Improved practice of cumin cultivation                                      | 1                          | 25                      | 0          | 25          |
| Drudgery reduction farm implement                                           | 1                          | 0                       | 49         | 49          |
| Nursery Management                                                          | 1                          | 10                      | 22         | 32          |
| One day workshop to promote climate friendly agriculture under Life Mission | 1                          | 24                      | 2          | 26          |
| Institutional training                                                      | 2                          | 42                      | 0          | 42          |
| Conservation agriculture under rainfed condition                            | 1                          | 24                      | 5          | 29          |
| Climate smart agriculture practices                                         | 1                          | 16                      | 8          | 24          |
| Improved method of cultivation under rainfed and saline condition           | 1                          | 18                      | 9          | 27          |
| Management and care of milch animal                                         | 1                          | 40                      | 0          | 40          |
| Fruits production technology                                                | 1                          | 25                      | 0          | 25          |
| <b>Total</b>                                                                | <b>107</b>                 | <b>2335</b>             | <b>978</b> | <b>3239</b> |

**Table-6: Module-VI: Different Extension Activities carried out under NICRA Project**

| SN | Name of Activities             | Number of Participants |         | Total |
|----|--------------------------------|------------------------|---------|-------|
|    |                                | Rajasthan              | Haryana |       |
| 1. | Field Day                      | 1190                   | 827     | 2017  |
| 2. | Method Demonstrations          | 92                     | 0       | 92    |
| 3. | Integrated Nutrient Management | 206                    | 516     | 722   |
| 4. | Exposure visit                 | 239                    | 0       | 239   |

| SN           | Name of Activities          | Number of Participants |             | Total        |
|--------------|-----------------------------|------------------------|-------------|--------------|
|              |                             | Rajasthan              | Haryana     |              |
| 5.           | VCRMCM meeting              | 457                    | 0           | 457          |
| 6.           | Kisan Gosthi                | 572                    | 1068        | 1640         |
| 7.           | Field visit                 | 380                    | 297         | 677          |
| 8.           | Farmers awareness Program   | 748                    | 371         | 1119         |
| 9.           | Natural farming             | 176                    | 374         | 550          |
| 10.          | Breed Up gradation          | 54                     | 0           | 54           |
| 11.          | Animal Health Camp          | 337                    | 0           | 337          |
| 12.          | Special Day celebration     | 793                    | 664         | 1457         |
| 13.          | Mission Life Programme      | 144                    | 106         | 250          |
| 14.          | Kisan Mela                  | 335                    | 163         | 498          |
| 15.          | Advisory Services           | 534                    | 450         | 984          |
| 16.          | Soil and Water Conservation | 87                     | 338         | 425          |
| 17.          | Balanced use of fertilizers | 0                      | 72          | 72           |
| 18.          | Drone Demonstration         | 82                     | 0           | 82           |
| 19.          | Crop residue management     | 250                    | 0           | 250          |
| <b>Total</b> |                             | <b>6676</b>            | <b>5246</b> | <b>11922</b> |

**Table-7: Module-wise Summary of NICRA APR 2024-25**

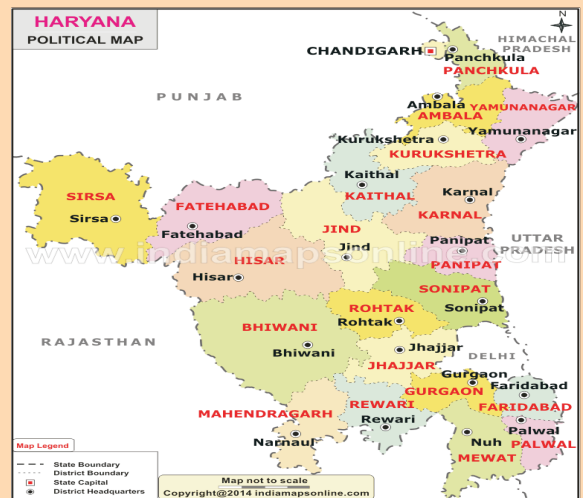
| SN           | Module                     | No of Demos (area)                      | No. of Partner Farmers |             |              |
|--------------|----------------------------|-----------------------------------------|------------------------|-------------|--------------|
|              |                            |                                         | Male                   | Female      | Total        |
| 1            | NRM                        | 762 (963.1 ha)                          | --                     | --          | 771          |
| 2            | Crop Production            | 2702 (1023 ha)                          | --                     | --          | 2638         |
| 3            | Livestock and Fisheries    | 1076 (5436 animals)                     | --                     | --          | 1194         |
| 4            | Institutional Intervention | CHC- 3085 (3440.5)<br>Amount Rs183506/- | --                     | --          | 3085         |
|              | Seed/Fodder Bank           | 469 (760.0)<br>Amount Rs 2054180        | --                     | --          | 469          |
| 5            | Capacity Building          | 107                                     | 2335                   | 978         | 3239         |
| 6            | Extension Activities       | 345                                     | 6676                   | 5246        | 11922        |
| <b>Total</b> |                            | <b>8201</b>                             | <b>9011</b>            | <b>6224</b> | <b>23318</b> |



[illegible]

[illegible]





## ICAR-Agricultural Technology Application Research Institute, Zone-II

### भाकृअनुप-कृषि प्रौद्योगिकी अनुप्रयोगअनुसंधान संस्थान, क्षेत्र-II

CAZRI Campus, Jodhpur -342 005. Rajasthan

काजरी परिसर, जोधपुर - 342 005. राजस्थान

