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Annual Report 2017-18

भाकृअनुप
ICAR

ICAR-Agricultural Technology Application Research Institute

भाकृअनुप–कृषि तकनीकी अनुप्रयोग संस्थान

(ISO 9001-2015)

(CAZRI Campus), Jodhpur-342 005, Rajasthan, India

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हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch

Annual Report : 2017-18

ICAR-Agricultural Technology Application Research Institute

CAZRI Campus, Jodhpur - 342 005 Rajasthan, INDIA

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

E-mail : zpd6jodhpur@gmail.com

Website : www.atarijodhpur.res.in

Guidance

Dr. A.K. Singh

Deputy Director General (Agril. Extn.)

ICAR, New Delhi

Published by

Dr. S.K. Singh

Director

Editorial Board

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Dr. S.K. Singh
Director

ICAR-Agricultural Technology Application Research Institute
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(CAZRI Campus), Jodhpur-342 005, Rajasthan, India

PREFACE

Transforming Agriculture is transferring India as agriculture continue to be backbone of Indian economy today, even in the face of tremendous progress made in the secondary and tertiary sectors. In a country where over 56 percent population lives in villages, where agriculture and allied sectors is estimated to contribute nearly 13.9 percent of the GDP and provides employment to over half of the country's work force, the progress of the nation is directly linked with advancement in agriculture and education.

The role of science and technology in agriculture is crucial in not only ensuring food security of the country and affordability of the food items for the public at large, but also in providing farmers competitive edge in the present day global commodity market. It is in this context that the Government of India, through ICAR, established the large network (nearly 700) of Krishi Vigyan Kendras across the country for conducting technology assessment and demonstration, knowledge dissemination and providing critical input support for the farmers with a multi-disciplinary approach.

As a first line extension system, KVKs have brought in visible changes in agricultural production system, in terms of raising productivity, increasing capacity building of farmers and extension personnel, promoting improved varieties/breeds and technologies in agriculture and allied enterprises under different agro-eco system. KVK is a key player in this system, providing precious feedback to the agriculture department/research institute/SAUs on the performance of recommended technologies at the grass root level. This unique institution has also shown tremendous ingenuity in developing solutions to location specific problems the process of technology assessment and demonstration, value addition

and post-harvest processing in agriculture, promoting self help groups, empowering farm women and rural youth.

Haryana has 44.2 lakh hectares of land which is 1.34 percent of total geographical area of the country. Agriculture contributes 16.7 percent to state GDP and is the mainstay of more than 51% population. The major cropping system are rice-wheat, bajra-wheat, cotton-wheat and sugarcane-wheat and the cropping intensity is over 184%. The average productivity of food grains has reached 35.27 q/ha in the state as against 19.2 q/ha at National level. The state has attained quantum jump in food grains production which is mainly due to contribution of principal crops viz., rice, wheat and bajra. The state enjoys first position in the production of Basmati Rice and also in productivity of wheat (51.8 q/ha), pearl millet (20.4 q/ha) and rapeseeds mustard (18.8 q/ha). This could be possible due to development and adoption of improved technologies, expansion of infrastructure and farmer friendly policy of government. The rice-wheat cropping system in the state, which has cereal 58% cultivated area is now seen as major cause of soil health deterioration. Emphasis is given on promotion of different oilseeds and pulse crops through diversification particularly on agronomy, feasibility, profitability, total factor productivity and market demand as it will help in motivating the farmers for diversification.

Rajasthan is the largest state covering 10.5% of geographical area and 5.5 percent population of the country. 2/3rd population depends on agricultural and 10% animal population of the country. 83% of available water used for irrigation and 35% cropped area is irrigated. 70% area irrigated through well-tube wells. 27% irrigated through canal and only 1% water resources of the country is available in Rajasthan. 10.6 lakh has area is saline and sodic soils. The major challenges are large area under light textured soil low water retention, poor soil health, depleting ground water table, deteriorating quality, extreme temperature, high evapotranspiration, uncertain erratic and scanty rainfall, small and fragmented holding, low investment capacity. Even contribution of Rajasthan in food production and other allied sectors is well recognized with share of 40% in mustard, 40% per millet, 80% cluster bean, 95% isabgol, 95% in Henna, 65% in coriander. Rajasthan is rated as first rank in the country. Besides, this Rajasthan is considered IInd rank in pulse and cumin, third rank is soybean, fourth rank in maize and firth rank in wheat.

Livestock sector plays important role in achieving food, nutritional, economical, social and environmental security is Rajasthan, Haryana and even in Delhi states. Reducing instability in agricultural production ahs been major policy concern over the year since the stability and growth in agricultural are vital for providing food, nutritional security to burgeoning population of Rajasthan, Haryana & Delhi. In view of this, KVKs under ICAR-ATARI, Jodhpur have developed need based resource affordable, situation specific and farmers' acceptable workplan and are in regular contact with different stakeholders to address different issues for acceleration of growth, inclusiveness, gainful employment, sustainable income generation and reduction of poverty.

Coordination and monitoring of technology application and management of Extension Education programmes and strengthening agricultural extension research are the major mandates of ICAR-ATARI, therefore different on-going projects/schemes executed by KVKs of Rajasthan, Haryana and Delhi are Attracting and Retaining Youth in Agriculture, Cluster Frontline Demonstration on Pulses under National Food Security Mission, Cluster Frontline Demonstrations on Oilseeds under Nation Mission on Oilseeds and Oil Palm, Farmer FIRST programme, Mera Gaon Mera Gaurav, IARI Post Office Linkage Extension Model, Tribal Sub-Plan, Demonstration of Climate Resilient Integrated Farming System, Sustainable Livelihood through Skill Development in Rajasthan, Haryana and Delhi, Creation of Seed Hubs for Increasing Indigenous Production of Pulses & Oilseed in India and National Innovation in Climate Resilient Agriculture. Similarly, the new initiatives in KVK scheme viz., Knowledge System Homestead Agriculture Management in Tribal Areas (KSHAMTA), Value addition Technology Incubation Centre in Agriculture (VATICA), Nutri Sensitive Agricultural Resources and Innovation (NARI), e-Extension/Digitalization, Hydroponics, Green Agriculture, Doubling Farmers Income, Soil Health Cards, Farm Innovation and Resource Management, Farmer Producer Organisation and Creation of Custom Hiring Centre have been approved in the EFC 2017-20.

I express sincere thanks and gratitude to Dr. Trilochan Mohapatra, Secretary DARE and Director General, ICAR; Dr. A. K. Singh, Deputy Director General (Agril. Extn.); Dr. V. P. Chahal and Dr. Randhir Singh ADGs (Agril. Extn.) and Scientific Staff/Administrative Staff of Division of agricultural Extension, ICAR, New Delhi for their full and utmost

supports in achieving the targets. I also express thanks to Directors of Extension Educations and their staff for providing technological backstopping to KVKs and for ably coordinating and monitoring the KVKs activities. I complement Senior Scientist & Heads, Subject Matter Specialists and staff of KVKs & ATICs for systematically planning and implementing action plan and achieving targets for 2017-18. I express my deep sense of gratitude to all may colleagues of ICAR-ATARI, Jodhpur for providing excellent support, unstinted cooperation, achieving targets and putting in a lot of efforts for bringing out the annual report timely.

It is hoped that data and information provided in this report will be of immense use to researchers, administrators, policy makers, extension personnel, farmers and other stakeholders for devising policy, research and development projects.

Place : Jodhpur
Date : July 15, 2018



(S.K. Singh)

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कार्यकारी सारांश

कृषि तकनीकी अनुप्रयोगों के समन्वय एवं मूल्यांकन, अग्रणी प्रसार शिक्षण कार्यक्रम, कृषि प्रसार शोध को मजबूत करना एवं कृषि ज्ञान प्रबंधन, भाकृअनुप–कृषि तकनीकी अनुप्रयोग संस्थान, जोधपुर के प्रमुख उद्देश्य है। कृषि प्रसार अनुसंधान को मजबूत बनाने के लिए राजस्थान, हरियाणा एवं दिल्ली में कृषि विज्ञान केन्द्रों के माध्यम से कई कदम उठाए गए है।

तिलहन के उत्पादन और उत्पादकता में वृद्धि के लिए कृषि विज्ञान केन्द्रों द्वारा नेशनल मिशन ऑन ऑयल सीड्स एण्ड ऑयल पॉम के अंतर्गत तिलहनी फसलों पर क्लस्टर प्रथम पंक्ति प्रदर्शनों का आयोजन किया गया। दलहन उत्पादन को बढ़ाने के लिए राष्ट्रीय खाद्य सुरक्षा मिशन के अतंर्गत दलहनी फसलों में क्लस्टर प्रथम पंक्ति प्रदर्शनों का आयोजन किया गया। युवाओं को कृषि की ओर आकर्षित करना एवं उसमें बनाएं रखना (आर्या) भाकृअनुप की एक अभिनव पहल है जो ग्रामीण क्षेत्र के युवाओं को विभिन्न कृषि एवं उससे संबंधित गतिविधियों में आकर्षित करती है और सशक्त बनाती है। किसानों में कृषि तकनीकी की जागरूकता के लिए मेरा गाँव मेरा गौरव कार्यक्रम को प्रारंभ किया गया, जिसे राजस्थान, हरियाणा एवं दिल्ली के भाकृअनुप के संस्थानों एवं राज्य कृषि विश्वविद्यालयों द्वारा क्रियान्वित किया जा रहा है। किसानों तक ज्ञान को बढ़ाने एवं एकीकृत तकनीकी पहुँचाने के लिए भाकृअनुप द्वारा 'फार्मर फस्ट परियोजना' को राष्ट्रीय कृषि शोध प्रणाली के द्वारा क्रियान्वित किया जा रहा है। राजस्थान एवं हरियाणा के 7 कृषि विज्ञान केन्द्रों द्वारा कृषि पर जलवायु परिवर्तन की राष्ट्रीय पहल (निकरा) को क्रियान्वित किया जा रहा है।

जनजातीय उप–योजना और अन्य कई परियोजनाओं का संचालन भाकृअनुप–कृषि तकनीकी अनुप्रयोग संस्थान, जोधपुर के समन्वय व वित्तीय सहयोग से राजस्थान के 22 कृषि विज्ञान केन्द्रों द्वारा प्रभावी ढंग से किया जा रहा है। राजस्थान व हरियाणा के 12 कृषि विज्ञान केन्द्र एकीकृत कृषि प्रणाली मॉडल के सक्रिय क्रियान्वयन में लगे हुए हैं। भारत सरकार के कृषि एवम् किसान कल्याण मंत्रालय, नई दिल्ली के वित्तीय सहयोग से स्वीकृत सीड हब्ब परियोजना राजस्थान के 8 व हरियाणा के 2 कृषि विज्ञान केन्द्रों द्वारा संचालित की जा रही है। वर्ष 2017–18 के दौरान इन सीड हब्ब केन्द्रों के द्वारा 7600 क्विंटल से अधिक चना, मूंग, उड़द और अरहर की किसानों द्वारा पसंद की जाने वाली किस्मों का बीज का उत्पादन किया गया। राजस्थान व हरियाणा के कुल 9 कृषि विज्ञान केन्द्रों द्वारा विभिन्न कौशल आधारित स्वरोजगार उत्पन्न करने वाले प्रशिक्षण कार्यक्रमों का आयोजन किया गया।

भाकृअनुप– कृषि तकनीकी अनुप्रयोग संस्थान, जोधपुर ने राष्ट्रीय एवं अंतर्राष्ट्रीय संस्थानों से कार्यकारी संबंध स्थापित किये है इनमें राष्ट्रीय मत्स्य विकास बोर्ड, राष्ट्रीय कृषि एवं ग्रामीण विकास बैंक, अंतर्राष्ट्रीय अर्द्ध–शुष्क उष्णकटिबंधीय फसल अनुसंधान संस्थान, विज्ञान एवं प्रौद्योगिकी संस्थान, भारतीय किसान खाद निगम लिमिटेड, भारतीय खाद्य निगम, केन्द्रीय मीठा जल जीवन पालन अनुसंधान संस्थान, आकाशवाणी आदि प्रमुख है। संस्थान ने कृषि विज्ञान केन्द्रों की उपलब्धियों के मूल्यांकन के लिए वार्षिक क्षेत्रीय कार्यशाला का आयोजन 10–12 जून 2017 को जूनागढ़ कृषि विश्वविद्यालय, जूनागढ़ (गुजरात) में किया। संस्थान द्वारा कृषि विज्ञान केन्द्रों की वार्षिक कार्य योजना को अंतिम रूप देने के लिए राज्य स्तरीय कार्यशालाओं का आयोजन किया गया जिसमें राजस्थान राज्य के कृषि

विज्ञान केन्द्रों के लिए दिनांक 27–28 दिसंबर, 2017 को महाराणा प्रताप कृषि एवं तकनीकी विश्वविद्यालय, उदयपुर (राजस्थान) में तथा हरियाणा एवं दिल्ली राज्य के कृषि विज्ञान केन्द्रों के लिए 04 जनवरी, 2018 चौधरी चरणसिंह हरियाणा कृषि विश्वविद्यालय (हरियाणा) में किया गया। राजस्थान व गुजरात के 62 कृषि विज्ञान केन्द्रों की गतिविधियों के मूल्यांकन के लिए, 7वीं संस्थान प्रबंधन समिति की बैठक 12 मार्च, 2018 को निदेशक डॉ. एस.के. सिंह के निर्देशन में आयोजित की गई।

कृषि विज्ञान केन्द्र, अनुसंधान संस्थानों तथा किसानों के तकनीकी अपनाने के मध्य की दूरी को कम करने हेतु, फसल उत्पादन, उत्पादकता एवं कृषि और इसकी सहायक गतिविधियों से आय बढ़ाने के लिए जिला स्तर पर विज्ञान एवं नवाचार केन्द्र के रूप में कार्य करता है। कृषि विज्ञान केन्द्रों द्वारा 230 तकनीकों का आंकलन 1834 प्रक्षेत्र परीक्षणों के माध्यम से किया गया। उत्पादन के आंकड़ों और किसानों की प्रतिक्रिया प्राप्त करने के लिए कृषि एवं इससे संबंधित क्षेत्रों में स्थान विशिष्ट की नवीनतम तकनीकों को प्रदर्शित करने के लिए प्रमुख फसलों तिलहन, दलहन, मसालों, सब्जियों, नकदी फसलों और बाजरा पर 25369 प्रथम पंक्ति प्रदर्शनों का आयोजन 10056.82 हैक्टेयर क्षेत्र में किया गया। इसके साथ ही मुर्गी पालन (20), पशुपालन (108), कृषि यन्त्रों पर (136) और अन्य गतिविधियों (1263) पर प्रदर्शनों का सफल आयोजन किया गया। कृषि यन्त्रों पर किए प्रदर्शनों से यह ज्ञात हुआ कि ये कार्य करने में प्रभावी एवं इससे आय, समय और श्रम में बचत होती है।

भाकृअनुप–कृषि तकनीकी अनुप्रयोग संस्थान, जोधपुर के कृषि विज्ञान केन्द्रों द्वारा 4611 प्रशिक्षण कार्यक्रमों का आयोजन किया गया जिसमें 130904 किसानों, ग्रामीण युवाओं और विस्तार कार्यकर्त्ताओं ने भाग लिया। 3947 प्रशिक्षण कार्यक्रमों के आयोजन से 112618 कृषक/महिलाओं की दक्षता में वृद्धि हुई। इन कार्यक्रमों में 29.62 प्रतिशत पिछड़ी जाति/आदिवासी एवं 22.92 प्रतिशत महिला किसानों की भागीदारी रही। ग्रामीण युवाओं के लिए 434 एवं विस्तार कार्यकर्त्ताओं के लिए 230 आयोजित कार्यक्रमों में क्रमशः 12981 ग्रामीण युवा एवं 5305 विस्तार कार्यकर्त्ताओं ने भाग लिया। कृषि ज्ञान प्रबन्धन, जल प्रबंधन, जैविक खेती और मोबाइल सलाह सेवा पर विषय वस्तु विशेषज्ञों के ज्ञान एवं कौशल को बढ़ाने के लिए कृषि तकनीकी अनुप्रयोग संस्थान, जोधपुर एवं प्रसार शिक्षा निदेशकों द्वारा 24 मानव संसाधन गतिविधियों का आयोजन किया गया।

विस्तार गतिविधियों में प्रमुखतः किसान मेला (75), प्रक्षेत्र दिवस (450), किसान गोष्ठी (499), प्रदर्शनी (230), किसान कार्यशाला (98), समूह बैठकें (623), पूर्व–प्रशिक्षक बैठकें (29), शैक्षणिक भ्रमण (278), सलाहकार समिति, पशु चिकित्सा शिविर, नैदानिक भ्रमण, किसान–वैज्ञानिक वार्त्ता एवं विस्तार साहित्य, समाचार पत्रों, आकाशवाणी कार्यक्रम आदि के माध्यम से कुल 1108243 किसानों एवं 23012 विस्तार कार्यकर्त्ता लाभान्वित हुए। कृषि विज्ञान केन्द्रों द्वारा 11326 मोबाइल संदेशों द्वारा 2349614 किसानो को कृषि सलाह दी गई।

राजस्थान, हरियाणा एवं दिल्ली के कृषि विज्ञान केन्द्रों द्वारा कुल 39036 मृदा/जल/पौधों के नमूनों की जांच की गई, इसमें 27913 मृदा, 9197 जल एवं 1926 पौधों के नमूने जो कि 3495 गाँवों के 32870 किसानों के लिए गए। विभिन्न फसलों के 19824.37 क्विंटल बीज, 838858 पौध सामग्री क्रमशः 34330 एवं 17821 किसानों को उपलब्ध कराया गया। इसके साथ ही 149555.95 कि.ग्रा. जैविक उत्पादों और 30684 सन्तति पशुओं का विक्रय किसानों को किया गया। किसानों ने शैक्षणिक भ्रमण के दौरान कृषि प्रौद्योगिकी सूचना केन्द्रों से एकल खिड़की से तकनीकी, बीज, पौध सामग्री आदि मूल्य सवंर्धित उत्पादों की जानकारी व उपलब्धता प्राप्त की गयी।

कुल 62 वैज्ञानिक सलाहकार समिति की बैठकों का आयोजन मेजबानी संस्थानों द्वारा किया गया, जिसमें भाकृअनुप के संस्थानों, जिला स्तरीय विभागों, प्रगतिशील किसानों और महिला किसानें द्वारा कृषि विज्ञान केन्द्रों के कार्यक्रमों व गतिविधियों को क्षेत्र की परिस्थिति, उपलब्ध संसाधन व कृषकों की आवश्यकता के अनुरूप प्रशिक्षणों का आयोजन किये गये एवं इनके प्रभावी संचालन के बारे में सलाह दी गई।

सहभागीदारी से जगरूकता पैदा करने में कृषि विज्ञान केन्द्रों को अग्रणी माना जाता है। कृषि विज्ञान केन्द्रों द्वारा 18 अगस्त से 15 सितम्बर 2017 के दौरान संकल्प से सिद्धि कार्यक्रम को आयोजन किया। 17 सितम्बर से 2 अक्टूबर, 2017 के दौरान स्वच्छता ही सेवा कार्यक्रम का आयोजन किया गया। 15 अक्टूबर, 2017 को महिला प्रक्षेत्र दिवस का आयोजन किया गया। 16–18 मार्च, 2018 को 4500 से अधिक किसानों ने भारतीय कृषि अनुसंधान संस्थान, नई दिल्ली में आयोजित कृषि उन्नति मेले में भाग लिया। वर्ष 2017–18 के दौरान दो अतिरिक्त केवीके उदयपुर व भीलवाड़ा जिले में स्थापित किये गये।

कृषि विज्ञान केन्द्र, कोटा एवं कुरूक्षेत्र को पण्डित दीनदयाल अन्तोदंय राष्ट्रीय कृषि विज्ञान पुरस्कार–2017 प्रदान किया गया। श्री करण सीकरी, कुरूक्षेत्र (हरियाणा) को जगजीवन राम अभिनव कृषक पुरस्कार/जगजीवन राम नवाचार कृषक पुरस्कार (राष्ट्रीय) प्रदान किया गया। श्री पूनमचंद पाटीदार, झालावाड़ एवं श्री महावीर सिंह राठौड़, भीलवाड़ा (राजस्थान) को जगजीवन राम अभिनव कृषक पुरस्कार/जगजीवन राम नवाचार कृषक पुरस्कार (क्षेत्रीय) प्रदान किया गया। श्री सतपाल सिंह, कैथल, (हरियाणा) को पण्डित दीनदयाल उपाध्याय अंतोदय कृषि पुरस्कार (क्षेत्रीय) प्रदान किया गया। इसी प्रकार श्री हरबीर सिंह, कुरूक्षेत्र (हरियाणा) को विविध कृषि के लिए एन.जी. रंगा कृषक पुरस्कार प्रदान किया गया।

वर्ष 2017–18 के दौरान कृषि विज्ञान केन्द्रों को कुल 7853.07 लाख रूपये आवर्ती एवं अनावर्ती मद में स्वीकृत किये गये जिसमें से 7847.06 लाख रूपये खर्च कर दिये गये।

EXECUTIVE SUMMARY

ICAR-ATARI is mandated with ccoordination & monitoring of technology application and front line extension education programmes and strengthening agricultural extension research and knowledge management. For strengthening agricultural extension research, institute has taken a number of initiatives in networking mode with KVKs in Rajasthan, Haryana and Delhi. For increasing production & productivity of oilseeds, Cluster Frontline Demonstrations on Oilseeds under National Mission on Oilseeds & Oil Palm (NMOOP) are conducted by KVKs. Promotional efforts in form of cluster demonstrations on pulses have been initiated under National Food Security Mission (NFSM). Attracting and Retaining Youth in Agriculture (ARYA) is a major initiative of ICAR to attract and empower youth in rural areas to take up various agriculture and allied activities. Mera Gaon Mera Gaurav, an innovative initiative for creating awareness among farmers on agricultural technologies is being implemented through ICAR institutes and SAUs of Rajasthan, Haryana and Delhi. For enriching knowledge and integrating technology, ICAR commenced the Farmer FIRST project within National Agricultural Research System. For measuring the effectiveness of Farmer to Farmer (F2F) extension model, a project entitled "Effectiveness of Farmer-to-Farmer (F2F) Extension Model to Enhance Technology Uptake in Rajasthan State" has been initiated in networking mode with KVKs under extra mural funding. National Innovation in Climate Resilient Agriculture (NICRA) is also being implemented through 7 KVKs of Rajasthan and Haryana.

Tribal Sub-Plan scheme is being implemented by 22 KVKs of Rajasthan. Eleven KVKs of Rajasthan and Haryana are actively involved in execution of situation specific integrated farming system models. Ten KVKs are implementing DAC sponsored Creation of Seed Hub Project in Rajasthan and Haryana. Total 7600 quintal seeds of greengram, blackgram, cowpea and chickpea have been produced during 2017-18 in a participatory mode. Total 9 KVKs of Rajasthan, Haryana and Delhi organised Skill Development programmes in different job roles for 200 hours under ASCI sponsored programme.

ICAR-ATARI established linkages with national as well as international institutes viz., National Fisheries Development Board, National Institute of Agricultural Extension Management, International Crop Research Institute for Semi-Arid Tropics, Department of Science and Technology, Indian Farmers Fertilizers Cooperative Limited, Food Corporation of India, Central Institute Freshwater Aquaculture, All India Radio and other organizations. Annual Zonal Workshop

was organized at JAU, Junagadh during 10-12 June, 2017 to review the achievements of KVKs for the year 2016-17. Finalization of Annual Work Plan Workshop for the year 2018-19 was held on 27-28 December, 2017 at MPUA&T, Udaipur and 4th January, 2018 at CCSHAU, Hisar, Haryana. Institute also organized 7th Institute Management Committee meeting at ICAR-ATARI, Jodhpur on 12th March, 2018 under the Chairmanship of Dr. S. K. Singh, Director. ICAR-ATARI coordinates & evaluates the activities of 62 KVKs functioning in Rajasthan, Haryana and Delhi.

As an innovative and district level farm science center, KVKs reduced time lag between generation of technology at research institutions and its transfer to farmers' field for increasing production, productivity and income from agriculture and allied sectors. Under ATARI, KVKs conducted on-farm testing on 230 technologies through 1834 trials. To demonstrate the proven production potentials of latest location specific technologies in agriculture and allied areas for generating production data and obtaining feedback, 25369 FLDs covering 10056.82 ha area on major crops of oilseeds, pulses, cereals, vegetables, cash crops and millet were carried out. In addition to FLDs on crops, demonstrations on dairy (108), poultry (20), farm implements (136) and others (1263) were successfully conducted. Farm implements were also found to be effective in drudgery reduction, and saving in cost, time and labour.

KVKs of Zone-II organized 4611 training, in which 130904 farmers, rural youths and extension functionaries participated. From organization of 3947 trainings, 112618 practicing farmer's/farm women enhanced the skills. The participation of scheduled castes/tribes and farm women was noted as 29.62 per cent and 22.92 per cent, respectively. Training conducted for rural youths and extension functionaries were 434 and 230 through which 12981 rural youth, 5305 extension functionaries, respectively, got benefited. ICAR-ATARI, Jodhpur and Directorates of Extension Education (SAUs) had conducted 24 human resource development activities for subject matter specialists from different KVKs to enrich their knowledge and skills on agricultural knowledge management, watershed management, organic farming and mobile advisory services, etc.

The major extension activities namely, kisan mela (75), field days (450), kisan gosthies (499), exhibitions (230), farmers seminar/ workshop (98), method demonstration (791), group meetings (623), ex-trainee samellan (29), exposure visits (278), advisory services (21858), animal camps (29), diagnostic visits (1509), interactions, extension literature, print media coverage, broadcasting in electronic media were conducted in which a total of 1108243 farmers and 23012 extension personnel participated. KVKs have provided agro-advisory services through 11326 SMS to 2349614 farmers.

A total of 39036 samples comprising 27913 soils, 9197 water and 1926 plant samples

of 32870 farmers inhabiting 3495 villages were tested by KVKs of Rajasthan and Gujarat. A total of 19824.37 q seeds of different crops and 838858 planting materials were sold to 34330 and 17821 farmers, respectively. In addition to that 149555.95 kg bio-products and 30684 progeny animals and poultry were also produced and sold to farmers. Agricultural Technology Information Centres have provided single window delivery on technologies, information, seeds, planting material and value added products to visiting farmers.

In sixty-two scientific advisory committee meetings comprising representatives from host institutes, ICAR institutes, district line departments, progressive farmers and farm women had provided advisory for proper functioning of the KVKs in the zone.

KVKs are considered as forefront for creating awareness in a participatory approach. All the KVKs of Zone organised Sankalp se Siddhi programme during 18 August, 2017 to 15 September, 2017. Swatchta hi Sewa was organised during 17 September to 2 October, 2017. Farm Women Day was organised on 15 October, 2018. More than 4500 farmers participated in Krishi Unnati Mela during 16-18 March, 2018 at ICAR-IARI, New Delhi. Two additional KVKs in Udaipur and Bhilwara districts have been established.

KVK, Kota and KVK, Kurukshetra have been recognised for Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar 2017. Jagjivan Ram Abhinav Kisan Puruskar/Jagjivan Ram Innovative Farmer Award (National) was conferred to Sh. Karan Sikri, Kurukshetra, Haryana and Jagjival Ram Abhinav Kisan Puruskar/Jagjivan Ram Innovative Farmer Award (Zonal) was conferred to Sh. Poonar Chand Patidar, Jhalawar, Rajasthan and Sh. Mahaveen Singh Rathore, Bhilwara, Rajasthan. Pandit Deendayal Upadhyaya Antyodaya Krishi Puruskar (Zonal) was conferred to Sh. Satpal Singh, Kaithal, Haryana. Similarly, N. G. Ranga Farmer Award for Diversified Agriculture was conferred to Sh. Harbir Singh, Kurukshetra, Haryana.

A total of Rs. 7853.07 lakhs fund was sanctioned in recurring and non-recurring heads for the zone out of which Rs. 7847.06 lakhs was utilized.

CHAPTER 1

BUDGET AND STAFF

The details on funds allocation and utilization with respect to ATARI, KVKs, and Directorates of Extension Education under different sub-heads for the period 2017-18 are shown in table 5.1. A total of 7853.07 lakh was allocated during the period under report out of which 7847.06 was spent.

5.1 Budget position at ATARI, DEEs and KVKs (2017-18)

5.2 Staff strength at ICAR-ATARI, Jodhpur

Total sanctioned staff strength of ATARI, Zone-II, Jodhpur is 18, out of which 11 have been filled up (Table 5.2).

5.3 Staff position existing

Existing staff position of the ICAR-ATARI, Jodhpur as on March 31, 2017 is presented in table 5.3.

Table 1.1: Fund allocation & utilization at ATARI, DEEs and KVKs for 2017-18 (Rs. In lakhs)

Head	ATARI, Jodhpur		KVKs		DEEs		Total KVKs+DEEs		Grand Total	
	RE	Exp.	RE	Exp.	RE	Exp.	RE	Exp.	RE	Exp.
Capital	0.15	0.00	413.87	413.87	0.00	0.00	413.87	413.87	414.02	413.87
Salary	116.00	116.00	6444.00	6444.00	0.00	0.00	6444.00	6444.00	6560.00	6560.00
General	58.00	52.14	789.05	704.55	32.00	32.00	821.05	736.55	879.05	873.19
Total	**174.15**	**168.14**	**7646.92**	**7562.42**	**32.00**	**32.00**	**7678.92**	**7594.42**	**7853.07**	**7847.06**

Table 1.2 Staff strength at ICAR-ATARI, Jodhpur

S.No	Posts/Designation	Sanctioned	Filled	Vacant
1.	Director	01	01	-
2.	Principal Scientist (Agricultural Extension)	01	01	-
3.	Senior Scientist (Livestock Production & Management)	01	01	-
4.	Senior Scientist (Agricultural Extension)	01	-	01
5.	Senior Scientist Agricultural Economics)	01	-	01
6.	Scientist (Agricultural Extension)	01	01#	-
7.	Scientist (Agronomy)	01	-	01

S.No	Posts/Designation	Sanctioned	Filled	Vacant
8.	T-6 (Computer)	01	01	-
9.	Assistant Finance & Account Officer	01	01	-
10.	Assistant Administrative Officer	01	01	-
11.	Junior Accounts Officer	01	01*	-
12.	Assistant	01	-	01
13.	Private Secretary	01	-	01
14.	Senior Clerk	01	01	-
15.	Junior Clerk	02	01	01
16.	Driver	01	01	-
17.	Supporting Staff	01	-	01
	Total	18	11	07

Transferred on 07.07.2017 to DOGR, Pune. * Promoted and transferred to IIMR, Ludhiana on 22.11.2017.

Table 1.3 Staff Position existing (on 31st March 2017)

Category	Name of Staff	Designation
Director	Dr. S.K. Singh	Director
Scientific	Dr. P.P. Rohilla	Principal Scientist (LPM)
	Dr. M.S. Meena	Principal Scientist (Agricultural Extension)
	Dr. R.B. Kale	Scientist (Agril. Extension) #
Technical	Sh. P.K. Satapathy	Assistant Chief Technical Officer (Computer)
	Sh. Ram Nivas	Driver
Administrative	Sh. N.S. Gehlot	Assistant Administrative Officer
	Md. Irfan	Assistant Finance & Accounts Officer
	Sh. Permod Sharma	Junior Accounts Officer*
	Sh Rajender Benda	Upper Divisional Clerk
	Sh. MukeshTripathi	Lower Divisional Clerk
Supporting staff	---	---

Transferred on 07.07.2017 to DOGR, Pune. * Promoted and transferred to IIMR, Ludhiana on 22.11.2017.

5.4 Joining / Transfers / Superannuation / Promotion

- Md. Irfan, JAO, IISWC, Dehradun joined this Institute on promotion as AF&AO w.e.f. 27th January, 2018
- Sh. Ram Niwas (Driver) has been promoted to Senior Technical Assistant (Driver) w.e.f. 17th March, 2018.

5.5 Staff position of KVKs

The data base on number of staff sanctioned, in position and posts vacant in KVKs of Zone-II during the period under report shown in table 5.5 indicated that 43% posts are vacant. Vacant posts were mostly belonged to SAUs which are going to be filled up during 2018-19 as universities have initiated the process.

Table 1.5 Summary of KVK staff position

Category	Rajasthan			Haryana			Delhi			Zone Total		
	S	F	V	S	F	V	S	F	V			
Senior Scientist & Head	43	26	17	18	13	5	1	1	0	62	40	22
Subject Matter Specialists	258	166	92	108	67	41	6	3	3	372	236	136
Programme Assistant	129	42	87	54	30	24	3	2	1	186	74	112
Administration	86	28	58	36	25	11	2	2	0	124	55	69
Auxiliary	86	39	47	36	28	8	2	2	0	124	69	55
Supporting	86	66	20	36	19	17	2	1	1	124	86	38
Total	688	367	321	288	182	106	16	11	5	992	560	432

S: sanctioned, F: filled, V: vacant

CHAPTER 2

ICAR-ATARI - An Introduction

ICAR-ATARI, Jodhpur is functioning under Division of Agricultural Extension which is one of the 8 divisions of Indian Council of Agricultural Research (ICAR), New Delhi. The major activities of Agricultural Extension Division are assessment and demonstration of technology I products through a network of 700 Krishi Vigyan Kendras (KVKs). Agricultural Extension division is headed by Deputy Director General (Agricultural Extension) supported by two Assistant Director Generals. Extension Division has established the network of 700 Krishi Vigyan Kendras all over the country under administrative control of various ICAR Institutes, State Agricultural Universities, State Department of Agriculture and NGOs with the aim to asses and demonstrate technologies in agriculture and allied sectors. The Agricultural Extension Division at ICAR level monitors the progress of KVKs through its eleven ATARIs located across the country. The thrust areas of Agricultural Extension division are:

- Assessment and demonstration of technology/products
- Training of practising farmers and vocational training for rural youth
- Training of extension personnel
- Single window delivery system for technology products, diagnostic services and information through Agricultural Technology Information Centres
- Development of gender-specific technologies, and
- Creating awareness of improved agricultural technologies among the farmers

1.1 Genesis of ICAR-ATARI

The ICAR established Eight Zonal Coordinating Units in September 1979 to monitor and coordinate Lab to Land Programme (LLP) which was launched in 1979 on the occasion of ICAR's Golden Jubilee celebration. To begin with Zonal Coordinating Units, Zone-VI had its office at Ahmadabad but was subsequently shifted to CAZRI Campus Jodhpur in September 1991. The jurisdiction of Zone-VI included Rajasthan, Gujarat and Daman & Diu and Dadra & agar Haveli. Rajasthan and Gujarat occupies 60% and 20% of hot arid region, respectively in the country (75% of arid and semi arid region). Various Research Institutions of ICAR and SAUs are catering the needs of the arid and semi-arid parts of both the states. Zone-VI, therefore, regularly established for these two states to address the problems in hot arid and semi-arid regions. The unit was

converted as a plan scheme with additional staff in 1986 and additional objective of monitoring other Transfer of Technology (ToT) Project of ICAR viz, KVK, Trainers Training Centre (TTC), National Demonstration Scheme (NSD), Operational Research Project (ORP), Scheduled Caste and Scheduled Tribe Project and Special Project on Oilseed. During 1990-91 another objective for implementing and monitoring the National Pulse Project was added. At this juncture, during XI Five Year Plan (2009), Zonal Coordinating Units were upgraded to Zonal Project Directorates and Zonal Coordinators were re-designated as Zonal Project Directors with financial and administrative powers akin to other ICAR institutes. ICAR has upgraded all the eight Zonal Coordination Units to the status of Directorates and thus Zonal Project Directorate (ZPD), Zone-VI came into existence during the year 2009. During the XII plan Zonal Project Directorate has been renamed as ICAR-ATARI (Agricultural Technology Application Research Institute) with research as one of the major components.

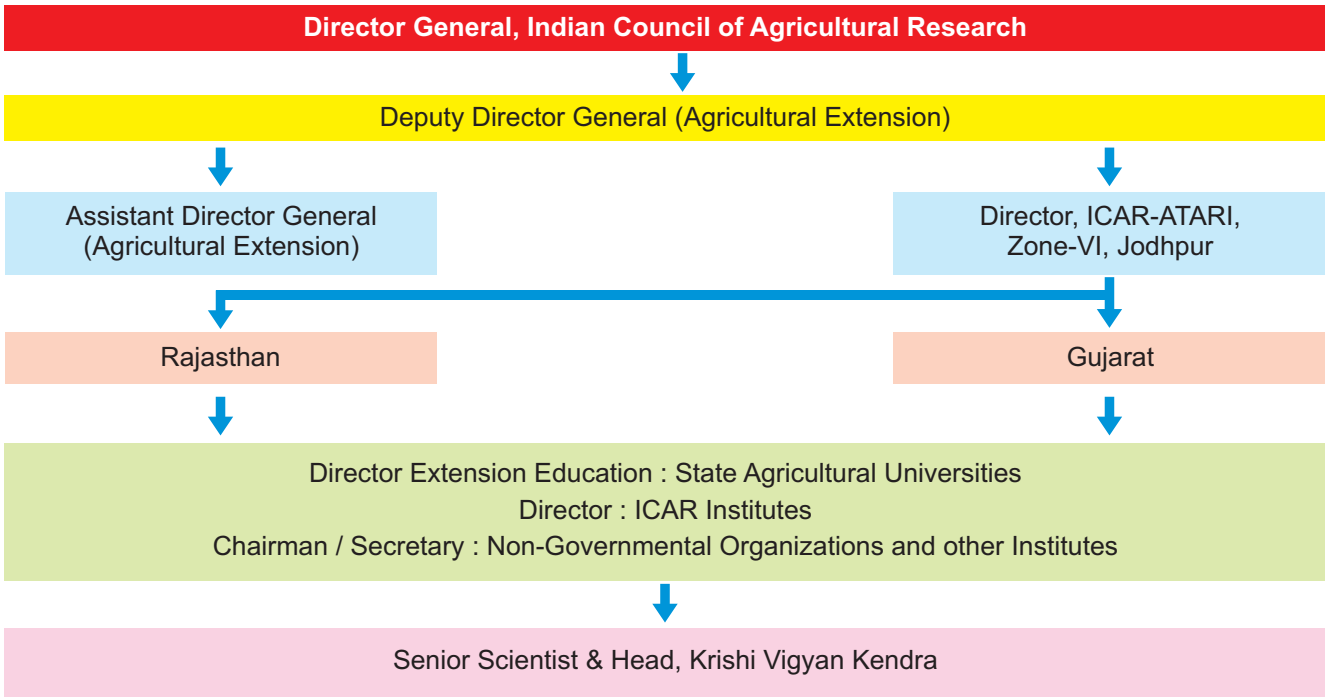
Mandate of ATARI

- Coordination and monitoring of technology application and front line extension education programs.
- Strengthening agricultural extension research and knowledge management

1.2 Organizational Structure of ICAR-ATARI

The organizational structure of ICAR-ATARI, Zone-II, Jodhpur and KVK functioning in Zone is depicted in Fig 2.1.

Fig 2.1 Organizational structure of ICAR-ATARI, Zone-VI, Jodhpur



1.3 KVKs functioning under ICAR-ATARI, Jodhpur

A total of 62 KVKs are functioning in ICAR-ATARI, Jodhpur. In Rajasthan, 43 KVKs are working while 18 KVKs are functioning in Haryana state and 1 KVK is in Delhi for the betterment of the farming community (Table 2.2)

Table 2.2 KVKs under ICAR-ATAIR, Jodhpur

State	Number of KVKs	KVKs				Total
		SAUs	NGOs	ICAR	Others	
Rajasthan	43	34	4	3	2	43
Haryana	18	14	2	2	0	18
Delhi	1	0	0	0	1	1
Total	62	48	6	5	3	62

1.4 Workshop/Meeting/Conference/ Trainings Organized

Review & Planning Meeting of Tribal Sub-Plan Schme was held on 03.05.2017 at ICAR-ATARI, Jodhpur. A total 26 Senior Scientists & Heads of Rajasthan & Gujarat took part. Technical programmes based on needs, resource availability and marketability have been finalized for each Tribal dominated districts of both the states.



Annual Zonal Workshop for KVKs of Rajasthan & Gujarat Organized at JAU, Junagarh

Junagadh 13th June, 2017, A three days Annual Zonal Workshop for 72 KVKs of Rajasthan and Gujarat has been inaugurated on 10th June at Junagadh Agricultural University, Junagadh.

Dr. S.K. Singh, Director, ICAR-Agricultural Technology Application Research Institute (ATARI), Jodhpur in his introductory remarks briefed about initiatives and achievements of various flagship programmes implemented through Krishi Vigyan Kendras of Rajasthan and Gujarat such as National food security Mission, National Mission on Oilseed and Oil Palm, Skill Development in Agriculture, Soil Health Cards, Pradhan Mantri Fasal Bima Yojana, Attracting and Retaining youth in Agriculture, Farmer FIRST, Mera Gaon Mera Gaurav. He advised the KVKs to promote swachchta programme, cashless transaction and Direct Benefit Transfer, etc. in an efficient manner. He thanked Dr. A. R. Pathak, Vice Chancellor, Junagadh Agricultural University, Junagadh & Dr. A. K. Singh, DDG (Agril. Extn.), ICAR, New Delhi for sparing their valuable time to grace the occasion despite their busy schedules.

The Chief Guest of the occasion, Dr. A. K. Singh, DDG (Agril. Extn.), ICAR, New Delhi mentioned about the huge network of 673 KVKs all over the country contributing in science-led technology application, cluster front line demonstrations and dissemination in the field of

agriculture. He stressed the KVKs to generate 30% fund of their expenditure through own efforts. He also advised the KVKs to promote swachchta programme, cashless transaction and Direct Benefit Transfer, etc. in an efficient manner. Genetic and bio-diversity conservation should be promoted in tribal areas by registering local varieties under PPV & FRA. Farmers' innovations must be up-scaled through farm innovation research he opined. KVKs are not only for extension but also to undertake local farmers' participatory research. ICT-based initiatives such as KVK portal, mobile apps, small videos must be effectively used for the betterment of the farming community.

During the function various publications were released and website of ICAR-ATARI, Jodhpur and mobile apps have been launched.



Dr. A.R. Pathak, Vice Chancellor, JAU, Junagadh in his presidential address stressed the technologies developed at SAUs/ICAR should be transferred in an efficient manner by overcoming challenges faced by the KVKs and the expectations by farmers should be fulfilled. Climate change is a major challenge and impact analysis of the KVKs should be done on priority.



Dr. Lakhan Singh, Director, ICAR-ATARI, Pune expressed his views on science led move of the KVKs under climate change scenario to enhance the visibility and efficiency of the KVKs.

During the 3 days' workshop, Directors of Extension Education from 9 State Agricultural Universities of Rajasthan and Gujarat presented the progress and monitoring of KVKs in their jurisdiction. All the senior scientists and head from 72 KVKs were presented the progress of work done during 2016-17.

On 12th June 2017, in the concluding remarks Vice-Chancellor of JAU, Junagadh stated that the KVKs are working in the real rural social setting for the betterment of the farming community. The expectations from KVKs are very high hence there is need to priorities the activities for doubling the farmers' income. He stressed on organization of more number of front line demonstrations to show the production potentialities of the proven technologies. KVKs should work hard to fulfill the expectations of the nation with the visible impact of the agricultural technologies at farmers' fields.

Training Programme on "Proper Handling of Mini Soil Testing Machine" during 19-20 May, 2017 inaugurated for KVKs of Rajasthan and Gujarat

19th May, 2017, Jodhpur, A two days collaborative training programme on "Proper Handling of Mini Soil Testing Machine" has been inaugurated at ICAR-Agricultural Technology Application Research Institute (ATARI), Jodhpur (Rajasthan).

Dr. M.S. Meena, Principal Scientist (Agril. Extn.) welcomed the participants.

Dr S. K. Singh, Director, ICAR-ATARI, Jodhpur in his introductory remarks emphasised the challenges in agriculture particularly the soil health status in present scenario of Indian agriculture and KVKs have a major role to play in overcoming the challenges in an evolutionary approach. He urged that to ensure food security by 2050 for 1.66 billion estimated population with limited land sustainable soil health is having paramount importance. He opined that indiscriminate use of chemical fertilizers will have impact on soil health, human health and ecology. He appealed to Scientists of KVKs to make farmers aware about soil test based recommended use of fertilizers and issue of Soil Health Cards to farmers. Based on soil test the cropping pattern should be decided so that farmers can have more profit, he opined. He stressed the importance of soil test in the present mission of Hon'ble Prime Minister of India for Doubling Farmers Income by 2022. He expressed that proper procedure should be followed for taking soil samples and same should be taught to farmers while collecting soil samples. He opined that soil testing should be a



prerequisite before implementation of FLDs, OFTs, etc.

The Service Engineers from M/s. Nagarjuna Agrochimicals Pvt. Ltd. demonstrated the proper handling of Mini Soil Testing Machine manufactured in collaboration with ICAR-IISS, Bhopal to the Nodal Officers of KVKs of Rajasthan. A total of 42 Nodal Officers from KVKs of Rajasthan took part in the training programme. On 20th May, 2017 the Nodal Officers from 30 KVKs of Gujarat will take part in the said training programme.



Exhibition at National Workshop on Empowering Tribal Farmers

KVKs of Rajasthan and Gujarat having representing districts of significant population of Tribes were participated in National Workshop

on Empowering Tribal Farmers held at NASC Complex, New Delhi during 07-08th June 2017. KVK Navasari and KVK Valsad shared the expericnces of tribal development through the presentation in the event. Two innovative tribal farmers from Navsari and Valsad also shared their success stories. Dr. R. B. Kale, Scientist (AE) coordinated the KVKs of zone for exhibition and participation of KVKs from ATARI, Jodhpur. KVK Udaipur, Banswara, Pratapgarh and Dungarpur from Rajasthan and KVK Navsari, Dahod and Valsad displayed different traditional tribal products and specimens in the exhibition and these were appreciated by Hon'ble Director General ICAR Dr. Trilochan Mohapatra.



One day orientation-cum-sensitization meeting for KVKs of Haryana and Delhi

In view of reshuffling of Zones of KVKs (from 8 Zones to 11 Zones), first orientation-cum-sensitization meeting was organised on 30.06.2017 for KVKs of Harayana and Delhi at ICAR-ATARI, Jodhpur to review the status of KVKs and their work plans for 19 KVKs (18 from Haryana and 1 from Delhi). The Senior Scientist & Heads of KVKs along with DEE, CCSHAU, Hisar attended the meeting. Dr. R. S. Hudda, DEE, CCSHAU, Hisar introduced the KVKs of Haryana and Delhi and reported the status of KVKs.

Dr. S. K. Singh, Director, ICAR-ATARI, Jodhpur explained the reshuffling of Zones of KVKs from 8 to 11 Zones which was announced at National Conference of KVKs at Patna. He urged the participants by narrating development process which is endless in view of evolution of KVKs. He appealed the KVKs to focus on Science & Technology led growth for sustainability in Agriculture and Allied Sectors in the respect of 85% small and marginal farmers of India with promotion of location specific situation to incorporate packages and reduce the technological gap in participatory mode. Farm mechanisation, soil health card, National Mission on Oilseed & Oil Palm, National Food Security Mission, Agricultural Skill Trainings, Attracting & Retaining Youth in Agriculture, Integrated Farming System, Doubling Farmers Income by 2022, etc. are the prime focus of Government of India which are to be implemented by KVKs he opined. These must be implemented through convergence mode and with science and technology led demand driven approach he appealed.

Senior Scientists & Head of KVKs of Haryana and Delhi presented the status of KVKs and their work plan for the year 2017-18. The detailed discussion on future thrust and road map has been done.

International Yoga Day

International yoga day was observed on 21st June, 2017 by ICAR-ATARI, Jodhpur as

well as KVKs of Zone-II. In this programme outside experts were invited to teach Yoga for healthy life.



Dr. Trilochan Mohapatra, Secretary, DARE & DG, ICAR visited ICAR-ATARI, Jodhpur

Dr. Trilochan Mohapatra, Secretary, DARE & DG, ICAR visited ICAR-Agricultural Technology Application Research Institute, Jodhpur on 13th August, 2017. He was accompanied by Dr. O. P. Yadav, Director, ICAR-CAZRI, Jodhpur.

Dr. Mohapatra visited the exhibition stall of KVK, Udaipur and interacted with the Subject Matter Specialists of KVK Udaipur and Scientists of ICAR-ATARI, Jodhpur. He urged that, the KVKs should take initiatives for meeting the requirements of their districts in respect of livestocks, planting materials, seeds, bio-products, etc. He also opined that the success stories of innovative farmers should be documented and farmers should visit the farms of innovative farmers so that the same can be replicated within the district as well as to other adjacent districts.



World Honey Bee Day

World Honey Bee Day was observed by all KVKs of Zone-II by inviting farmers for training and method demonstration for apiculture activities on 19-08-2017.



Review & Planning Meeting on Seed Hubs

A Review and Planning Meeting of DAC funded project "Creation of Seed Hubs for Production of quality Seed of Indigenous Pulse Crops" has been organised on 26.08.2017 at ICAR-Agricultural Technology Application Research Institute, Jodhpur. Dr M.S. Meena welcomed the participants.

Dr. S. K. Singh, Director, ICAR-ATARI, Jodhpur informed that this is the 3rd such meeting organised at Jodhpur apart from Kanpur and Kolkata. He briefly presented the status, target and achievements of 16 Seed Hubs created in KVKs of Rajasthan, Gujarat and Haryana. In his introductory remarks highlighted the issue and prospects of seed hub

in formal and informal approaches. He emphasised the genesis of seed hub project in respect to Kharif, Rabi and Summer pulse crops. He urged the KVKs to complete the seed certification process so that the quality and certified seed can be provided to farmers which is the first and foremost requirement and the procurement and sale of seeds from partner farmers could be possible in an effective manner.

Dr. O. P. Yadav, Director, ICAR-CAZRI, Jodhpur described the importance of the project and the final result will provide improved genetics to farmers. He mentioned that last year was the International Year of Pulses and the availability of quality pulse seeds to farmers is a challenge at present scenario. The policy makers should be convinced in respect of Minimum Support Price, purchase issues and subsidy related to pulses. At present the crop duration of pulse crops has reduced from 90 days to 60 days without affecting production. Now-a-days pulse crops are of early maturity and suitable for farm mechanisation for harvesting which reduces the cost of cultivation and thereby increasing the farmers income.

The pulses seed production is easier in comparison to other crops he added. The pulses seed production in Seed Hub Project should be treated at par with National Seed Corporation and State Seed Corporation in respect to subsidy he added.



Dr. N. P. Singh, Director, ICAR-IIPR, Kanpur briefed that the situation of pulse production in the country was alarming few years back and with upscaling of technology the country could achieve a record production of pulses. He emphasized the importance of pulse in respect to nutritional security for vegetarians and sustainability for agriculture in respect to biological nitrogen fixation. The seed production system should be undertaken from breeder seed to foundation seed and should be taken in farmers participatory mode. The registration process with National Seed Corporation and State Seed Corporation should be completed so that foundation and certified seeds can be provided to farmers. With decentralisation of pulse processing sustainability of Seed Hubs can be achieved in a phased manner he opined. He assured that with the efforts of KVKs, India can be self-sufficient in respect to production of pulses and India can transform itself from importer of pulses to the exporter.

The session followed with the presentation of Director of Extension Educations and KVKs in respect to target and achievements of seeds of different pulse crops cultivated during Kharif, Rabi and Summer Seasons.

Hindi week

Hindi week was celebrated at ICAR-ATARI, Jodhpur during 14-21 September, 2017 and on this occasion various competitions were

organized to encourage staff members. Outside experts were invited to deliver speeches on implementation of Hindi as official language.

Swachh Bharat Abhiyan

Swachh Bharat Abhiyan was taken up at ICAR-ATARI, Jodhpur as well as KVKs of Zone-II. The activities include Basic Maintainance, sanitation and SWM, cleaning and beatification of surrounding areas, activities on vermi composting, used water for agriculture, railly, etc.



Re-orientation Programme for Subject Matter Specialists (Agril. Extn.) of KVKs

One day Re-orientation Programme for Subject Matter Specialists (Agril. Extn.) of KVKs of Rajasthan and Haryana was organised at ICAR-Agricultural Technology Application Research Institute (ATARI), Jodhpur on 21 September, 2017.

Dr. S.K. Singh, Director, ICAR-ATARI, Jodhpur in his inaugural address briefed about the roles and responsibility of SMSs (Agril. Extn.) of KVKs in the present scenario of agricultural development in the country. He highlighted the evolution process of KVKs starting from Vocational Training Centre from 1974 to present state. He stressed the importance and involvement of SMS (Agril. Extn.) to provide technological backstopping in their respective districts. Technology generation and transfer has to be performed properly by the Subject Matter Specialists of Agricultural Extension he opined. He stressed that the technological gaps are to be assessed by the SMSs of Agricultural Extension in conductance of On Farm Trials, Front Line Demonstrations, Trainings, Extension Activities, etc. Directors of Extension Education of SAUs presented briefly about the extension systems prevailing in their respective jurisdictions.

The Chief Guest of the occasion Dr. Prabhu Kumar, Former Director of ICAR-ATARI, Bengaluru and Ludhiana shared his vast experience with Subject Matter Specialists of KVKs and guided about the future strategies to be taken up for implementation of mandatory activities of ICAR. He also emphasized on conductance of need based on farm trials for benefit of farming community by Subject Matter Specialists of Agricultural extension. He presented all the aspects to be covered by SMS (AE) of Krishi Vigyan Kendras.

A total of 30 Subject Matter Specialists of Agricultural Extension discipline from Rajasthan and Haryana presented their views and future roadmaps for agricultural developments of their respective districts.



Sensitization Training on Public Finance Management System for KVKs

One day sensitization training programme on PFMS for KVKs/SAUs and NGOs of Rajasthan and Haryana has been organised on 09th November, 2017 at ICAR- Agricultural Technology Application Research Institute, Jodhpur. Dr.M.S. Meena, Principal Scientist welcomed the participants and briefed about the programme.

Dr. S.K. Singh, Director, Agricultural Technology Application Research Institute, Jodhpur in his inaugural address highlighted concept, vision, mission, mandates of Krishi Vigyan Kendras. He also briefed on emphasis and methodology of KVKs in the changing scenario of development in general and agriculture in particular. Dr. Singh narrated about different schemes/programmes being executed and monitored by ICAR-ATARI, Jodhpur. He emphasized upon importance of PFMS at present scenario and briefed the development of KVKs since inception.

In training programme, Resource Persons from ICICI Bank provided hands on training on Expenditure, Advance and Transfer (EAT) modules including Direct Benefit Transfer (DBT), Creation of Vendors, Agency Wise Release, Sanction Status & State-Wise Reports, Sanction Template, Scheme Wise Expenditure, User and Agency Module, Forgot Password, User Manual, Plan Scheme Budgetary Details, etc. to nominated staff of KVKs/SAUs/NGOs and clarified doubts on spot.



A total of 48 participants from KVKs, SAUs, NGOs and ICAR-ATARI, Jodhpur attended training programme.

Workshop-cum-Training programme on Pulses Production Technology under NSFM

A two days workshop-cum-training programme on Pulses Production Technology for Nodal Officers of KVKs of Rajasthan and Haryana states under National Food Security Mission (NFSM) has been organised during 30-31 October 2017 at ICAR-CAZRI, Jodhpur.

Dr. S. K. Singh, Director, ICAR-ATARI, Jodhpur in his inaugural address briefly mentioned about the status of pulses production of the country in which there are 6 major states including Madhya Pradesh, Rajasthan, Maharashtra, Karnataka, Uttar Pradesh and Odisha contributing to 80% of total production of pulses in India. Pulses production of country is ranging from 16-22 million tonnes during last five years. India imports 3-4 million tonnes of pulses every year to meet the demand of pulses. Total pulses production is 22.9 million tonnes during 2016-17 and it is highest in the history. The variation of production in pulses is due to improper weather conditions prevailing in the country. In view of the Doubling Farmers Income by 2022 pulses production technology has a key role to play, he opined. Dr. Singh emphasized on proper application of the critical inputs and critical practices for higher productivity.



Dr. O. P. Yadav, Director, ICAR-CAZRI, Jodhpur and the Chief Guest of the occasion emphasized that the technologies under different agro-climatic conditions are to be implemented by the KVKs so that the micro farming situation/technological option/assessment of gap to maximize production can be done properly and the role of KVK will be the technology provider in partnership mode. KVKs being the prime ambassador at grass root level can boost research in integrated manner.

During this workshop, Dr.S.J. Singh, Director, RARI, Durgapura; Dr.D. Kumar, Ex. PC Arid Legumes and Dr.S.K. Chaturvedi, PS, IIPR, Kanpur also acted as resource person for updating different technology options to the nodal officers.

A total of 49 KVKs from Rajasthan and Haryana participated in the event and the workshop will be continued to 31st October 2017 with presentation progress of KVKs and future strategies to be followed for implementation of NFSM project.

State Level Mid Term Planning Workshop for KVKs of Rajasthan

Two days State Level Mid Term Planning Workshop (2018-19) for KVKs of Rajasthan has been organised by ICAR-ATARI, Jodhpur on 27th December, 2017 at MPUA&T, Udaipur.

Dr. U.S. Sharma, Hon'ble Vice Chancellor, MPUA&T, Udaipur being the Chief Guest of the occasion mentioned that KVKs work at grass root level to disseminate technologies to bridge the gap in the potentiality of technology and farmers practice and the KVK should act as a game changer and Integrated Farming System will play a key role in Doubling Farmers Income by 2022.

Dr. S.K. Singh, Director, ICAR-ATARI, Jodhpur in his introductory remarks mentioned that KVKs have a key role to play in front line extension programmes by showcasing various technologies. He also highlighted the development process of KVKs starting from First KVK of Country established in 1974 with changing role and emphasis of KVKs from technology assessment, refinement to demonstration & technology assessment and capacity development and further to knowledge resource centre and then to technology assessment and capacity development. He opined that vision of KVK should be reflected properly by harmonizing science and technology led growth to enhance productivity, sustainability and profitability with a mission for farmer centric growth under different agro-ecological situations and to minimize the gap in potentiality of technology and result in farmers' fields. He also emphasized that the rural youth migration is a major concern and is to be combated by vocational trainings to rural youth in an efficient manner. He also highlighted the programmes being implemented by KVKs e.g., CFLDs under NFSM & NMOOP, Creation of Seed Hubs for indigenous quality seed production of pulses, NICRA, ARYA, Cashless

& digital transactions, DBT, KVK portal, PPV&FRA, pre-Kharif/Rabi Sammelans, Sanklap se Siddhi programmes, Soil Health Day, women empowerment programmes, etc. The major concern of Rajasthan being less availability of water and problematic soils and the strength of Rajasthan state having major share in spices, oilseeds, pulses, livestock, etc. of the country he opined. The new programmes to be implemented are NARI, KSHSAMTA, VATICA, Hydroponics agriculture, e-extension green agriculture, climate resilient Integrated Farming Systems, doubling farm income, etc. he mentioned.

On the occasion two publications were released namely Highlights of Sanklap Se Siddhi by ICAR-ATARI, Jodhpur and Smart Village Initiatives by MPUA&T, Udaipur.

All the Directors of Extension Education from Agricultural Universities located in Rajasthan have presented the roadmap for 2017-18 for the KVKs under the jurisdiction.



Trainings on Production Technology for Kharif and Rabi Oilseeds Crops under NMOOP for Nodal Officers of KVKs

A two-days Training on Production Technology of Kharif Oilseeds (8-9th August 2017) for Nodal Officers of Krishi Vigyan Kendras (KVKs) of Rajasthan and Haryana under National Mission on Oilseed and Oil palm (NMOOP) has been organised at ICAR-Agricultural Technology Application Research Institute (ATARI), Jodhpur (Rajasthan) during 8-9th August 2017.

The Chief Guest of programme, Dr.Randhir Singh, Assistant Director General (Agri. Extension) in his introductory remarks narrated that India is self-sufficient in cereals while a large gap is still existing in oilseeds production. He emphasised on the latest varieties, balanced fertilisers, AADHAR cards of farmers and reliable data to be taken from farmers. He also emphasised to identify the gaps to address the field problems for enhancing the productivity.

Dr S. K. Singh, Director, ICAR-ATARI, Jodhpur has emphasised upon involvement of major oilseeds research Institutes of ICAR and State Agricultural Universities in collaboration with KVKs improving oilseeds productivity through cluster frontline demonstrations (CFLDs) on oilseeds.He narrated that 48 KVKs of Rajasthan and Haryana are actively engaged in laying out CFLDs on oilseeds under different agro-climatic situations. Oilseeds crops are important for food, social, nutritional,



environmental and agro-ecological sustainability. The technology options need to be decided based on the identified gaps between recommended and existing practices.

Nodal officers of 20 KVKs from Rajasthan and Haryana states were invited to participate in this training programme. Experts from ICAR institutes and SAUs will deliver interactive lectures on improved technologies and production practices in oilseeds crops.

A two-days Training on Production Technology of Rabi Oilseeds (7-8th December, 2017) for Nodal Officers of Krishi Vigyan Kendras (KVKs) of Rajasthan, Haryana and Delhi under National Mission on Oilseed and Oil palm (NMOOP) has been inaugurated at ICAR-Agricultural Technology Application Research Institute (ATARI), Jodhpur (Rajasthan) today.

Dr S. K. Singh, Director, ICAR-ATARI, Jodhpur in his inaugural address briefed about the status of oilseed production and productivity in the country. He mentioned that, there are nine major oilseed crops grown in India and total share of major oilseed crops is 88% including soybean 39%, groundnut 25%, and rapeseed & mustard 24%. He emphasized upon maximisation of production and productivity of oilseed crops in per unit area, per unit time and per unit inputs under prevailing farming situation. He also urged for gap analysis for maximisation of critical inputs and critical practices under CFLDs on oilseed crops. He pointed out about uploading of direct benefit transfer related information under CFLDs, on farm testing and trainings by each KVK.



Dr Arun Kumar, Senior Scientist, ICAR-DRMR, Bharatpur presented technologies for increasing the production of Mustard.

Nodal officers of 29 KVKs from Rajasthan, Haryana and Delhi have been invited to participate in this training programme. Experts from ICAR institutes and SAUs will deliver interactive lectures on improved technologies and production practices in oilseeds crops.

Zonal Meeting of NICRA

One-day Zonal Meeting of National Innovations on Climate Resilient Agriculture (Technology Demonstration Component) of ICAR- Agricultural Technology Application Research Institute, Jodhpur was held at ICAR-ATARI, Jodhpur on 5th July, 2017.

Dr SK Singh, Director,ICAR-ATARI Jodhpur in his inaugural address, said that interventions under NICRA should be aligned with existing cropping practices of the region based on vulnerability. Deploying proven resilient practices for various production systems in the village by identifying the constraints for achieving resilience and by facilitating adoption of suitable technologies



based on resource endowments. In addition, the scientific approaches for ensuring the resilience would be driven through capacity building and awareness in a participatory manner.

Dr J V N S Prasad, Coordinator-NICRA TDC, ICAR-CRIDA, Hyderabad advised participants to up-scale the most successful and scalable technologies in nearby villages. He further emphasized to take up new interventions model which have direct bearing with the climate changes. He also stressed upon for improving the soil organic carbon status and efficient recycling of biomass and efficient use of the soil health cards.

Earlier, Dr PP Rohilla NICRA Nodal Officer presented the highlights of the salient achievements carried out by the NICRA- KVKs under ICAR-ATARI, Jodhpur.

In the technical sessions all the Sr Scientists & Heads/ PIs of the NICRA-KVKs of Rajasthan and Haryana presented the salient achievements of out scaled technologies during the last six years and action plan for 2017-2020.

The workshop was attended by Officials from ATARI Jodhpur, Sr Scientists & Heads/ PIs of the NICRA-KVKs and other technical staff. Dr Rajiv Kale, Scientist (Ag. Extn.) proposed vote of thanks to the Chief Guest and all the participants.

Zonal Review Meeting under Farmer FIRST

Zonal Review Meeting of Farmer FIRST Programme was organized at ICAR-ATARI, Jodhpur on 18th December, 2017 on major theme of integrating technologies and enhancing knowledge. Principal Investigators from different ICAR Institutes and state Agricultural Universities viz; CAZRI, CSWRI, CIRB, CSSRI, NDRI, IARI, AU Jodhpur and CCSHAU HIsar actively took part. Consortium leaders from NAARM Hyderabad, IASRI and NICAP, New Delhi also participated in this meeting.

The major objective of meeting was to review the progress of the sanctioned projects about process, methodology and indicators, physical and financial progress and also to discuss the operationalization mechanism of the implementation of FFP to achieve the major goal and objectives.

Dr S.K. Singh, Director, ATARI, Jodhpur in his introductory remarks emphasised upon the involvement of research Institutes of ICAR and SAUs selected under Farmer FIRST programme



as part of KVK Scheme. He also stressed that farm families selected under this programme must be involved as active partners in research mode i.e technologies selection, assessment and application for improving the livelihood security in a sustainable way. He also briefed about the FFP being implemented in the country and major initiatives by the Government of India to double the income of farming community during next five years. He urged for implementation of demand driven and need based technological modules. Dr PP Rohilla, Member Secretary briefed about the project modalities and evaluation through different committees constituted as per FFP guidelines. He explained that how FFP is unique programme holistic in nature consisting of several activities based on Integrated Farming System which covers interventions related to crop, livestock, natural resources and capacity building etc. in participatory mode with the farm families. The benefit given to farm families either in cash or kind has to be uploaded under DBT (Direct Benefit Transfer) portal under this project. A total of 20 PIs and Co-PIs from Delhi, Haryana and Rajasthan states have participated in this Zonal Review Meeting. Dr M.S. Meena, Pr. Scientist proposed vote of thanks to all the participants.

ZMC visit to NICRA KVKs of Haryana

Zonal Monitoring Team under NICRA Project visited two KVKs of Haryana State (Sirsa and Yamunanagar) during 21 to 23rd December, 2017.The ZMC consistedProf. MC Varshenya (Former VC of Kamdhanu University, Gandhinagar), Dr S K Yadav, Pr. Scientist (Director, CRIDA Hyderabad nominee), Dr RK Godara (Director Extension CCSHAU Hisar nominee), Dr PP Rohilla, Pr Scientist and Nodal Officer. Nodal Officer presented the progress of NICRA project before ZMC and had detailed discussion. Different emerging points and issues were thoroughly discussed to cope-up challenges of climate change on food and agriculture. The Chairman and other members suggested some valuable suggestions for further improvement and to scale-up the climate resilient technologies for the benefit of farming community is the foremost requirement.

Sh Suresh Kumar a progressive farmer even purchased his own Happy Seeder and successfully implemented and has encouraged other 4 to 5 fellow famers to purchase this useful implement. The team had interaction with other farmers, farm women and VCRMC members and also verified the implements and log book maintained in the village. ZMC appreciated the efforts of KVK team and active involvement of the partner farmers and suggested to scale-up the useable interventions in the adjoining villages.

Sankalp Se Siddhi programmes

A total of 51 KVKs of Rajasthan, Haryana and Delhi organised Sankalp Se Siddhi programmes where more than 30,000 farmers participated and in these programmes. In these programmes there was active participation of public representatives in collaboration with other supportive agencies like Department of Agriculture, Horticulture, Animal Husbandry, Banks etc. In these events, 7 Union Ministers, 5 State Government Ministers, 21 Members of Parliament (MP), 27 Members of Legislative Assembly (MLA) along with other important

dignitaries had shown their valuable presence and appreciated the contribution of KVKs.



Address by Hon'ble Union Minister for Agriculture & Farmer Welfare Sh. Radhanmohan Singh ji at KVK, Udaipur

World Soil Day

World Soil Day was celebrated by the 52 KVKs of Rajasthan, Haryana and Delhi Special on 05.12.2017 and the focus was placed on increasing awareness among the farmers and understanding of the importance of soil for food as well as ecological security. In these events more than 18000 farmers participated and more than 16000 soil health cards were issued to farmers with soil advisories. Sh. Radhamohan Singh ji, Hon'ble Minister for Agriculture and Farmers Welfare, Government of India being the Chief Guest on the occasion of World Soil Day at KVK, Jhajhar, Haryana addressed the farmers mentioning importance of soil health card scheme of Government of India.



Mahila Kisan Diwas

has been organised by KVKs of Rajasthan, Haryana & Delhi on 15th October, 2017

On 15th October, 2017, a total of 61 KVKs of Rajasthan, Haryana and Delhi organised Mahila Kisan Diwas in which a total of 4523 women farmers actively participated in the event.

Besides above, ICAR-ATARI, Jodhpur has taken keen interest for arranging Farm Women Day to participate in Rashtriya Mahilla Diwas on 15.10.2017 at NASC Complex, New Delhi and 216 women farmers of Sonipat, Rohtak, Jhajhar, Gurgaon, Faridabad, Rewari, Mahendragarh, Panipath, Karnal, Bhiwani and Delhi attended the programme.



Visits of Dignitaries

Hon'ble Minister for State of Agriculture & Farmer Welfare, Sri Sudarshan Bhagat, Government of India, New Delhi visited, KVK, Chomu, Jaipur-I on 01.09.2017. He addressed a gathering of farmers including farm women and emphasized upon income augmentation of farmers through value addition and adaption of



secondary agriculture. He also urged to the farmers for their action participation in different programmes and activities of KVK, Jaipur-I. He visited at demonstration sites of Farm Machinary, Vermi-compost, goatary, dairy, orchards, sapling (nursery), etc. He appreciated efforts of KVK in upliftment of socio-economic status of farmers. This programme was coordinated by Dr. S. K. Singh, Director, ICAR-ATARI, Jodhpur.



IInd Zonal Committee Meeting for Attracting & Retaining Youth in Agriculture (ARYA) for Rajasthan & Haryana organised at ICAR-ATARI, Jodhpur on 21.12.2017

21st December, 2017, IInd Zonal Committee Meeting for ARYA Project for Rajasthan & Haryana organised at ICAR-ATARI, Jodhpur on 21.12.2017.

Dr. S. K. Singh, Director, ICAR-ATARI, Jodhpur in his inaugural address informed that ARYA is one of the important projects out of four ambitious projects which were announced in National KVK Conference at Patna in 2015 in which a total of 25 KVKs has been sanctioned under ARYA in the country and Zone-II is having two KVKs i.e., Banswara in Rajasthan and Gurgaon in Haryana. He opined that Youth are between age group of 15-35 years and consists of 35 per cent of population and 75 per cent of Youth are from Rural areas. There is a need to attract Rural Youth for taking up agriculture as profession and there is a recent trend to opt out agriculture as a profession by 40% of Rural Youth as per the survey. For establishment of enterprises by Rural Youth local specific skill and market linkages are to be established by linking the Rural Youth with Banks. KVKs have a major role to play by opting consumer preference approach, proper economic models, convergence of opportunities, etc. so that Rural Youth will be attracted for taking up agriculture as a profession. The ARYA project should be monitored in an efficient manner by convening monthly review meeting by Vice Chancellors/Directors of Extension Education and the impact should be visible and reason for non-acceptance of technology by Rural Youth should carefully be analysed. Experience and outcome of ARYA project should be replicated to other stakeholders in a phased manner in opined so that Doubling Farmer Income by 2022 will be possible he urged.

Dr. M. S. Meena, Principal Scientist (AE) & PI of ARYA project presented the progress of ARYA project and emphasized the system of



implemention and basic purpose of the project along with expected outcome and impact. He also stressed that the target of establishing entrepreneurs of 200 Rural Youth in each implementing districts should be achieved at any cost.

In the meeting Dr. O. P. Yadav, Director, ICAR-CAZRI, Jodhpur; Dr. Ishwar Singh, DEE, AU, Jodhpur; Dr. V. K. Pandey, Joint Director, Agricultural Extension, Jodhpur were also present and reviewed the progress of KVK, Banswara and KVK, Gurgaon and provided their valuable comments for better implementation of the project.

State Level Mid Term Planning Workshop for KVKs of Haryana and Delhi held at CCSHAU, Hisar on 04.01.2018

State Level Mid Term Planning Workshop (2018-19) for KVKs of Haryana and Delhi has been organised by ICAR-ATARI, Jodhpur at CCSHAU, Hisar on 04.01.2018. Prof. K P Singh, Hon'ble Vice Chancellor, CCSHAU, Hisar in the inaugural session mentioned that agriculture being very risk prone in nature, it requires to be planned in proper manner so that at the time of calamities the minimization of loses and maximization of profit can be achieved. Long term policies are required to be formulated by Government for development of need based technology for benefit of farming community he emphasized. Dr. S. K. Singh, Director, ICAR-ATARI, Zone-II, Jodhpur mentioned that an early planning is very much needed in an efficient manner for concrete plan of work. Dr. Rajbir Singh, Director, ICAR-ATARI, Zone-I, Ludhiana mentioned that the KVKs are having many schemes to implement and successes are to be documented. The residue management is a major problem in Haryana State and KVKs have a major role to play for addressing the issue. In the workshop 19 KVKs of Haryana and Delhi presented their work plan for the year 2018-19 which were discussed and finalized.



Team of ICAR-ATARI, Jodhpur participated in ICAR West Zone Sports Tournament held during 16-20 January, 2018 at ICAR-CAZRI, Jodhpur



Group Meeting on Cluster Front Line Demonstration on Pulses and Seed Hub Projects under National Food Security Mission during 22-23 March, 2018.

A two-days Group Meeting on Cluster Front Line Demonstrations on Pulses and Creation of Seed Hub Projects (22nd-23rd March, 2018) for Nodal Officers of Krishi Vigyan Kendras (KVKs) of Rajasthan and Haryana under National Food Security Mission (NFSM) was organised at ICAR-Agricultural Technology Application Research Institute (ATARI), Jodhpur (Rajasthan) today.

Dr S.K. Singh, Director, ICAR-ATARI, Jodhpur in his inaugural address briefed about the implementation of Cluster Frontline Demonstration laid out by the KVKs at farmers' field. India is the largest producer, consumer and up to last year importer of the pulses in the world. But in year 2016-17 pulses production of 22.95 million tonnes recorded and now India is self-sufficient on pulses. He also mentioned the importance of the Seed hub project and highlighted about genesis of Pulses Seed Hub Project. Out of 100 seed hubs across India, 10 seed hubs are being implemented by 10 KVKs under ICAR-ATARI, Jodhpur for seed procurement (8 in Rajasthan and 2 in Haryana) and with a target of 1000 quintals allotted to each KVK.



Dr J S Chauhan, Ex-ADG (Seeds) presented the technologies for increasing the production of Pulses. He presented the norms, rules and procedure for quality seed production in pulses. He also briefed upon different technological options relevant to various Farming System(s) of Rajasthan & Haryana States.

Dr. M. S. Meena, Principal Investigator of the NFSM, ICAR-ATARI, Jodhpur presented the methodology of impact assessment of different technologies by implementing KVKs so that the recommendations for research, policy makers and development departments could be considered for future implementations.

Nodal officers of 36 KVKs from Rajasthan and Haryana states participated in this Group Meeting. Experts from ICAR institutes delivered interactive lectures on improved technologies and production practices in pulses.

Participation of Farmers of Haryana, Rajasthan & Delhi in Krishi Unnati Mela held during 16-18 March, 2018 at ICAR-IARI, New Delhi.

Krishi Unnati Mela was organized at ICAR-IARI, New Delhi during 16-18 March, 2018 in which 2090 farmers and farm women attended the Mela at ICAR-IARI, New Delhi and 23031 farmers, rural youth and farm women viewed the live webcast at Krishi Vigyan Kendras. The Chief Guest on the occasion Sh. Narendra Modi ji, Hon'ble Prime Minister of India addressed the farmers and highlighted the efforts on “Doubling Farmers Income by 2022”.



On the occasion the Pandit Deen Dayal Upadhyay Krishi Puruskar Zonal Award was conferred to KVK-Kurukshetra by Hon'ble Prime Minister of India, Shri Narendra Modi ji.



10th National Conference of Krishi Vigyan Kendras was organized during 16-17 March, 2018.

National Conference of Krishi Vigyan Kendras was organized during 16-17 March, 2018 at ICAR-IARI, New Delhi in which Senior Scientist & Heads of Krishi Vigyan Kendras all over India participated. The theme of the Conference was "Doubling Farmers Income by 2022".



Awards/recognition

Dr S.K. Singh Director ATARI Jodhpur received social Science Fellow Award from Uttar Pradesh Council Of Agricultural Research Lucknow. Award wasgiven by Hona,ble Governor Sri Ram Naik on 14th June 2017.Honable Agriculture Minister Sri Surya Pratap Sahi, Dr panjab Singh, Dr Rambadan Singh, Dr Mangla Rai and other dignitaries were present on the occasion.



On the occasion of Krishi Unnati Mela, 2018 the Pandit Deen Dayal Upadhyay Krishi Puruskar Zonal Award was conferred to KVK-Kurukshetra by Hon'ble Prime Minister of India, Shri Narendra Modi ji.



On the occasion of 89th ICAR Foundation Day which was celebrated on 16.07.2017 at A P Sindhe Hall of NASC Complex, New Delhi, the Jagjivan Ram Abhinav Kisan Puruskar 2016/Jagjivan Ram Innovative Farmer Award (National) has been received by Sh.Karan Sikri, Village-Dhangali, PO-Jandheri, Shahabad Markanda, Distt.-Kurukshetra, Haryana-136135 and Jagjivan Ram Abhinav Kisan Puruskar 2016/ Jagjivan Ram Innovative Farmer Award (Zonal) has been received by Sh.Poonam Chand Patidar, P.O.-Dityakhedi, Via-Raipur, P.S.-Jhalarapatan, Distt.-Jhalawar, Rajasthan, Pin-326036 and Sh.Mahaveer Singh Rathore, Village & Post-Rupaheli Kalan, Tehsil-Hurda, Distt.-Bhilwara, Rajasthan, Pin-311026.

Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar (Zonal) 2016-17 has been awarded to Sh.Satpal Singh, Village-Gohran, Kaithal, Haryana. N.G. Ranga Farmer Award for Diversified Agriculture 2016 has been conferred to Sh.Harbir Singh, S/o Sh.Narinder Singh, Vill. Dadlu, P.O. Rawa,Teh. Shahabad (M), Distt. Kurukshetra (Haryana).

Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar 2016-17 has been conferred to KVK Borkhera, Kota, Rajasthan.

CHAPTER 3

RAINFALL PATTERN AND DROUGHT MITIGATION

Drought is one of the major constraints affecting food security and livelihoods of more than two billion people that reside on dry area, constitute 41% of the world's land surface. Since, drought is the deficiency of precipitation over an extended period of time resulting in water scarcity hence our efforts should be concentrated where the greatest challenges lie today. The emphasis must be on new solutions to cope up with the challenges facing dry areas particularly drought and water scarcity. Drought is a climatic event that cannot be prevented, but interventions and preparedness to drought can help to : (i) be better prepared to cope with drought; (ii) develop more resilient ecosystems (iii) improve resilience to recover from drought; and (iv) mitigate the impact of droughts. Coping with drought and water scarcity are critical to address major development challenges in dry areas viz., poverty, hunger, environmental degradation and social conflict. A detailed account of rainfall occured in all districts of the Rajasthan, Haryana and Delhi during the monsoon 2017 has been compiled. From these data, average rainfall of Rajasthan, Haryana and Delhi for the monsoon period has been calculated and is presented in Fig. 3.1.

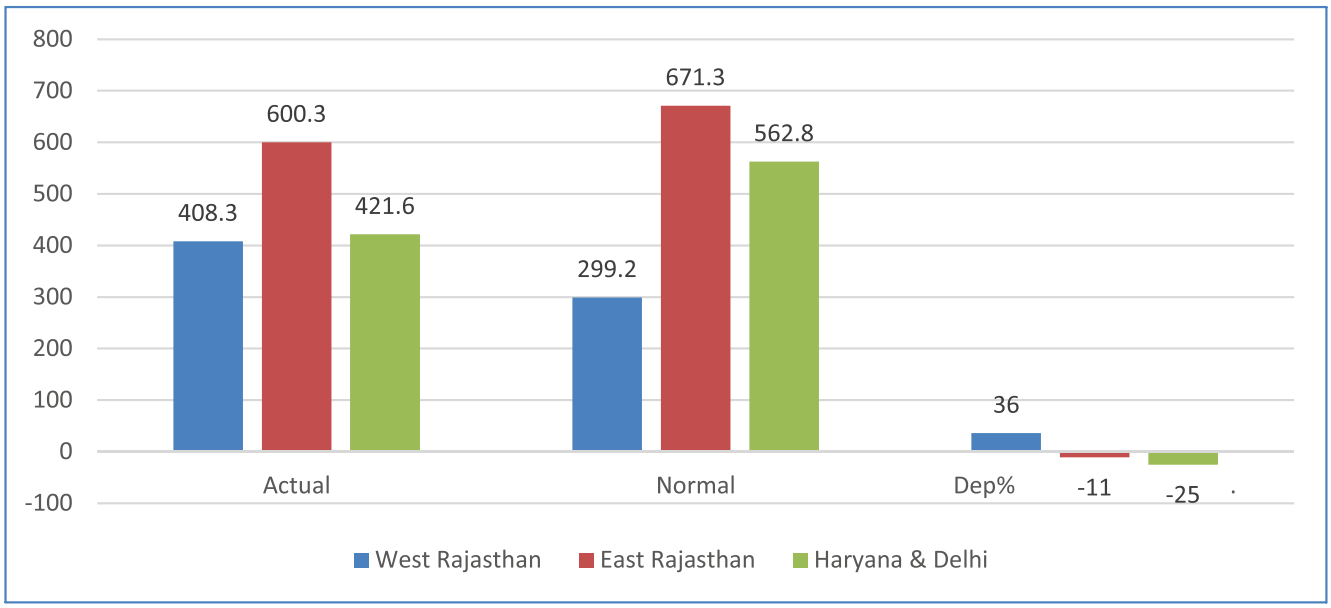


Fig. 3.1 Average Rainfall During Monsoon 2017 in Rajasthan, Haryana and Delhi

Rainfall Pattern and Agricultural Status in Rajasthan, Haryana and Delhi during 2017

The annual rainfall in Rajasthan, Haryana and Delhi during 2017 is given in table 3.1. On the whole western Rajasthan received excess rainfall and in east Rajasthan the rainfall was almost normal in comparison to Haryana and Delhi Regions which received less rainfall than normal.

Intervention on Aberrant Weather Condition

KVKs of the these states are actively involved to search out a way for mitigating aberrant weather condition for sustainable development of agriculture. Various activities undertaken for the mitigation of aberrant weather conditon by the KVKs are given below.

Introduction of Alternate Crops/Varieties

KVKs have identified and introduced alternate varieties of different crops to reduce adverse effect of drought on productivity of crops, vegetables, fodders, etc. in Rajasthan, Haryana and Delhi states. In these states, total of 915.20 ha area have been covered under these varieties during year and 9402 farmers have taken advantage of these varieties. State wise details of crops and their varieties are given in the table 3.2.

Major Area Coverage under Alternate Crops/Varieties

With the effort of KVKs of the Zone-II farmers have adopted drought tolerating alternate crops and varieties. Total 935.20 ha

Table 3.1. Annual Rainfall in mm during monsoon 2017-18 in Rajasthan, Haryana and Delhi

State	Actual	Normal	Dep%
West Rajasthan	408.3	299.2	36
East Rajasthan	600.3	671.3	-11
Haryana & Delhi	421.6	562.8	-25

Table 3.2. Introduction to Alternate Crops/Varieties by KVKs.

Crops/ cultivars	Variety	Area (ha)	Number of farmers
Rajasthan			
Sesame	RT-315	35	35
Black gram	Pant Urd-31	40.2	40
Cumin	GC-4	20	9
Green gram	IPM-02-03	30	30
Sorghum	CSV-27	10	10
Rajasthan Total		135.2	124
Haryana & Delhi			
Castor	CH-1	800	800
Haryana & Delhi Total		**800**	**800**
Zone Total		935.20	924

area was covered under different category of crops and 924 numbers of farmers were benefited. State-wise details of area covered under different category of crops and number of farmers is given in table 3.3.

Farmers-scientist Interaction on Livestock Management

Animals are the alternate source of income in case of crop failure. Farmers-scientist interactions were carried out on livestock management in KVKs of Rajasthan, Haryana and Delhi to promote livestock production in the zone. Total 4 interactions were organized in the zone in which 559 farmers participated and get benefited.

Animal Health Camps Organized

A total of 11 animal health camps were organized during the year in the zone. Total number of 3709 animals treated in these camps involving 459 farmers of different categories (small, marginal & landless, medium, large, etc.). The details are given in Table 3.4.

Large Scale Adoption of Resource Conservation Technologies

The various resource conservation technologies introduced by KVKs like moisture resistant varieties, rain water harvesting, micro irrigation, ridge & furrow method of sowing, multching, etc. were adopted by farmers in Rajasthan and Gujarat on large scale is given in the Table 3.5. Total 150623 ha area were covered under these technologies with active involvement of 79812 farmers by adopting these resource conservation technologies in the zone.

Awareness Campaign

Awareness campaigns were organized in Rajasthan, Haryana and Delhi, under which various activities were organized like meetings (128), gosthies (111), field days (48), farmer's fair (38), exhibition (43), film shows (109).

Table 3.3. Major area Coverage under Alternate Crops/Varieties

Crops	Area (ha)	Number of farmers
Rajasthan		
Oilseeds	158.80	457
Pulses	180.20	592
Cereals	115.60	360
Vegetable crops	454.00	66
Rajasthan Total	908.60	1475
Haryana & Delhi		
Oilseeds	1275.50	1560
Pulses	425.00	560
Total Gujarat	1700.50	2120
Zone Total	**2609.10**	**3635**

Table 3.4. Animal Health Camps Organized

State	Number of camps	No. of animals	No. of farmers
Rajasthan	10	2148	359
Haryana	1	120	100
Total	11	2268	459

Table 3.5. Large Scale Adoption of Resource Conservation Technologies

Crops/cultivars and gist of resource conservation technologies introduced	Area (ha)	Number of farmers
Rajasthan		
Napier Grass	1.0	28
Vermi compost	2.0	10
Intercropping of pulses with oilseeds	110	222
Thinning of crops	75	185
Mid season corrections	15	60
Dust mulching	110	235
Weed management	110	325
Life saving irrigations	40	35
Short duration crops and varieties	65	150
Foliar spary of liquid fertilizers	15	32
Rajasthan Total	543	1282
Haryana & Delhi		
Zero-Tillage technology in wheat	6000	5400
Laser land levelling	18000	14000
Green manuring	35000	32000
Zero tillage technology in wheat in non rice wheat system of S-W Haryana	580	750
Laser Leveller	**70000**	**23000**
Drip Irrigation in Kinnow	**8800**	**550**
Green Manuring	**9000**	**1500**
Fertiliser use on soil test basis	**1600**	**1000**
Cultivation of summer moong	**600**	**110**
Happy seeder	**500**	**220**
Haryana and Delhi Total	150080	78530
Zone Total	150623	79812

State-wise details of various activities and number of farmers benefited are given in the table 3.6.

Trainings on Rainwater Harvesting Structure and Micro-Irrigation System

Majority of the area under Rajasthan, Haryana and Delhi is covered under arid and semi arid climatic condition, so rain water harvesting and micro irrigation are the important component for water conservation and drought mitigation. KVKs of the zone have conducted trainings on these issues to provide technical skill to farmers to conserve water in adverse climatic condition. A total 5 KVKs conducted 8 training courses for 198 participants including 151 male and 47 female participants. Out of these participants a total of 174 were from SC/ST category including 144 male and 30 female. State-wise details are given in Table 3.7.

Soil Water and Plant Analysis by KVKs

Soil and water testing laboratories have been established in total 61 KVKs and 61 KVKs had analysed soil and water samples for the betterment of farming community. KVKs are also utilizing these facilities for giving recommendations to the farmers regarding suitability of water for irrigation, nutrient application based on soil test for conducting OFTs and FLDs as well as rendering advisory services to the farmers. A total of 38076 samples of soil, water, plant etc received from 31926 farmers belonging to 3458 villages have been analyzed and realized an amount of Rs. 20.49

Table 3.6. Activities Conducted under Awareness Campaign by KVKs

Activities	Rajasthan		Haryana & Delhi		Total	
	No.	No. of farmers	No.	No. of farmers	No.	No. of farmers
Meetings	**33**	**1584**	95	3796	128	5380
Gosthies	**45**	**2216**	66	3683	111	5899
Field days	**43**	**2726**	5	133	48	2859
Farmers fair	**7**	**5681**	31	5659	38	11340
Exhibition	**36**	**17924**	7	3151	43	21075
Film show	**108**	**5155**	1	3206	109	8361

Table 3.7. Trainings on Rainwater Harvesting Structure and Micro-Irrigation System

State	No. of KVK	No. of Courses	No. of Participants including SC/ST			No. of SC/ST Participants		
			Male	Female	Total	Male	Female	Total
Rajasthan	6	7	148	27	175	144	30	174
Haryana	1	1	3	20	23	0	0	0
Total	7	8	151	47	198	144	30	174

lakh. Out of these, 26953 were soil samples followed by water (9179) and plant samples (1926). State-wise details are given in the Table 3.8.

Table 3.8. Soil Water and Plant Analysis by KVKs

State	Samples	No. of samples	No. of Farmers	No. of villages	Amount realized (Rs.)
Rajasthan Total	Soil	20537	17158	536	1928889
	Water	6091	5200	295	67850
	Plant	51	51	21	0
	Manure	0	0	0	0
	Total	26679	22409	852	1996739
Haryana & Delhi Total	Soil	6416	5140	1196	42230
	Water	3106	2640	1021	11020
	Plant	1875	1737	389	0
	Manure	0	0	0	0
	Total	11397	9517	2606	53250
Zone Total	Soil	26953	22298	1732	1971119
	Water	9197	7840	1316	78870
	Plant	1926	1788	410	0
	Manure	0	0	0	0
	Total	38076	31926	3458	2049989



Sh. Radhamohan Singh ji, Hon'ble Minister for Agriculture and Farmers Welfare, Government of India on the occasion of World Soil Day at KVK, Jhajhar, Haryana on 05th December, 2017.

CHAPTER 4

RESEARCH ACHIEVEMENTS

Highlights of Sponsored and Institute projects

Various sponsored schemes and project from Ministry of Agriculture & Farmer Welfare, Ministry of Entrepreneurship & Skill Development, Ministry of Earth Science, Ministry of Food Processing & Industry, etc. have been implemented by KVKs of Rajasthan, Haryana and Delhi during 2017-18. Institute funded projects have also been executed and brief description of each sponsored and institute project and scheme is given herein.

3.1 Attracting and Retaining Youth in Agriculture (ARYA)

Under the ICAR-ATARI, Zone-II, Jodhpur, ARYA project is being implemented by KVK, Banswara (Rajasthan) and KVK, Gurugram (Haryana). In each district, 200 rural youth have been identified for skill development through entrepreneurial activities and establishment of related micro-enterprise units with following objectives.

- To attract and empower the youth in rural areas to take up various agriculture, allied and service sector enterprises for sustainable income and gainful employment in selected districts,
- To enable the farm youth to establish network groups to take up resource and capital-intensive activities like processing, value addition and marketing, and
- To demonstrate functional linkage with different institutions and stakeholders for convergence of opportunities available under various schemes/program for sustainable development of youth.

KVK, Banswara (Rajasthan)

KVK, Banswara has taken up poultry production, nursery raising & management and goat farming enterprises to train and establishment of economic units at youth's door steps. Total 64 rural youth were trained in Poultry Production. From these, 32 youth have established enterprises for self-employment. Average annual income of the youth from poultry farming has been reported as ₹ 1,60,000. In Nursery management, total 22 rural youth were trained. From total trained youth, 7 youth have established their enterprise for their self-employment at village level. Through preparation of planting materials of mango and seasonal vegetables, each youth earned ₹ 72,000 annually. Banswara district is a tribal dominated district best suited to the goat farming. Total 64 rural youth were trained by KVK, Banswara in goat farming where 4 youth have already established their own enterprise.

KVK, Gurugram (Haryana)

KVK Gurgaon has taken up value addition, protected cultivation, goat farming and mushroom production to train and establishment of units at their home at village level. Value addition is the major enterprise promoted by KVK, Gurgaon. Total numbers of 34 rural youth were trained all 34-youth established enterprise for self-employment. The average annual income of each youth is ₹ 60,000/-. Protected cultivation is also one of the enterprises where 16 rural youth were trained. All 16 youth have established enterprise and earning ₹ 20000 annually. Preparation of seedlings of vegetables (tomato, onion and capsicum) has been raised in 02 poly houses. Total 10 rural youth were trained in goat farming. All the 10 youth have established enterprise for self-employment. Total 14 rural youth were trained in mushroom farming. All 10-youth established enterprise for self-employment where each youth is earned from ₹ 1,65,000 to ₹ 1, 90,000 per year from selling button mushroom in market.

3.2 Project: Demonstration of Climate Resilient Integrated Farming System (IFS) through KVKs.

Demonstration of Climate Resilient Integrated Farming System (IFS) through KVKs.

National Mission for Sustainable Agriculture (NMSA) is one of the 8 missions under National Action Plan on Climate Change (NAPCC). Mission seeks to address issues regarding Sustainable Agriculture in context of risks associated with climate change by devising appropriate adaptation and mitigation strategies for ensuring food security, equitable access to food resources, enhancing livelihood opportunities and contributing to economic stability at the national level. The mission acknowledges that the risks to the Indian agriculture sector due to climatic variability and extreme events would be accentuated at multiple levels including at the levels of crop or livestock, farm or cropping system and the food system. Ministry of Agriculture & Farmers Welfare, Government of India, New Delhi has initiated one of the important mission mode projects under NMSA to established demonstration units of Climate Resilient Integrated Farming System (IFS) through 100 KVKs across the country under NMSA. Under ICAR-ATARI, Zone-II, Jodhpur various components have been integrated and IFS models suitable to the local agro-climatic conditions have been established with an emphasis to demonstrate and optimize farm productivity to enhance profitability and sustainability for regular source of income. These demonstration units of IFSs are created to have commercial as well as educational value. These components will minimize risk against local climate aberrations enhancing additional livelihood security and farm income.

For implementing the project, 12 KVKs have been identified in which 8 KVKs are from Rajasthan and 4 KVKs from Haryana state. Financial support has been provided to each KVK @Rs.3.00 lakh to establish various components of Integrated Farming System (s) at KVK farm as demonstration units for wider

acceptability among farming community. Sustained economic growth in agriculture sector is essentially required from crop diversification, agri-processing and secondary agriculture to provide ancillary income to farmers. In arid and semi-arid zone, livestock as a component of IFS will ensure the nutritional, food, livelihood and social security. Details of KVK wise components of IFS have been depicted in table-1& table-2.

KVKs have established IFS demonstration units during 2017-18 for technology uptake and Farmers empowerment under real prevailing farming situations and resource affordability. units/components. Table-3 depicts that 5 KVKs i.e., Alwar-I, Jodhpur-I, Faridabad, Sawai Madhopur and Karnal have started to generate income from the established units. Many components have been implemented i.e., establishment of orchards will provide income after a certain period of time (3-4 years).

Table 1. IFS components established at farm of KVKs in Rajasthan.

Name of KVKs	Components of IFS
Bikaner-I	Poultry unit Gotary unit
	Water harvesting structure
Alwar-1	Water harvesting structure
	Vermi-compost unit
Dausa	Renovation of water harvestings structure
	Vermi-compost unit
Sawai Madhopur	Renovation of water harvesting structure
	Vermi-compost unit
Nagaur-1	Rainwater harvesting unit
	Vermi-compost unit
	Goat unit
	Azolla unit
Pali	Rainwater harvesting unit
	Vermi-compost unit
Tonk	Small ruminant unit
	Bee-keeping
	Vermi-compost unit
	Water lifting devices
Jodhpur-1	Dairy unit
	Renovation of tanka
	Vermi-compost production unit

Table 2. IFS components established at farm of KVKs in Haryana.

Name of KVKs	IFS components
Faridabad	Drip irrigation
	Vermi-compost
	Fruit production
	Crop production
Gurgaon	Goat unit
	Mushroom unit
	Beekeeping unit
	Vegetable production
	Flower production
	Agro forestry
	Fodder and Field crop production
Karnal	Fish unit
	Beekeeping unit
Mahendragarh	Dairy unit
	Vermi-compost
	Beekeeping unit
	Drip irrigation
	Goat unit
	Fruit production

Table 3. Income generated by KVKs from IFS components during 2017-18.

Name of KVK	IFS component established	Income generated (in Rs.)
Alwar-1	Vermi compost	-
	Azolla unit	5650.00
	Seedling production	42218.00
Jodhpur-I	Arable farming system	120000.00
	Silvi-pasture farming system	5075.00
	Horti-pasture farming system	3000.00
Faridabad	Old Guava, Ber, Aonla and Citrus	92000.00
Sawai Madhopur	Renovation of farm pond	-----
	Vermi-compost unit	22000.00
	Guava fruit plantation	----
	Cereal crops production	31496.00
Karnal	Fish farming	268000.00
	Bee keeping	58000.00





Poultry unit at KVK Bikaner-I



Azolla Unit, KVK Alwar-I



Water Harvesting Structure, KVK, Sawai Madhopur



Water Harvesting Structure, KVK, Nagaur-I



Vermi-compost, KVK, Pali



Goatry Unit, KVK, Tonk



Vermi-compost Unit, KVK, Tonk

3.3 Promotion of Sustainable Livelihoods through Skill Development of Farmers

Promotion of Sustainable Livelihoods through Skill Development of Farmers.

To make farming as profitable and attractive venture amongst rural youth and farmers, there is need to recognize that agriculture is a highly skilled profession. People who are involved in this sector are partially skilled or unskilled. They need up-skilling and knowledge enhancement. Agricultural activities from production to post-harvest management and marketing need to be performed in scientific manner. Skill development is needed to enhance the productivity and quality which automatically translates into income enhancement and reduction in migration. Large portion of farming community in India is marginal and small holders. To make agriculture sustainable, it has to be supplemented by some other sources of income. Other sectors can be dairy, poultry, fisheries, processing and so on, to ensure regular income. Skill development is an integral part for equipping workforce to improve product not only for domestic market but also for export market.

Therefore, to achieve rapid growth in the agriculture sector through intensive skill development, Agriculture Skill Council of India (ASCI) and Department of Agriculture Cooperation and Farmers Welfare started collaborative efforts with department of skill development & entrepreneurship, GOI, New Delhi to provide skill development trainings of 200 hrs through KVKs. ICAR-ATARI, Zone-II, Jodhpur coordinated the identified institutes and KVKs for implementation of scheme. Table-4 depicts skill development trainings organised by KVKs and institutes in diverse fields during 2017-18.

A total of 7 skill development trainings were conducted in collaboration with ASCI through a network of 6 KVKs (5 from Rajasthan and 1 from Haryana) and one by ICAR institute (ICAR-NRCSS, Ajmer) on different Job Roles to provide opportunity to get gainful employment generation for their sustainable livelihood. As per the guideline of National Skill

Table 4 Skill Development Trainings conducted by KVKs during 2017-18.

Name of KVK/ICAR Institute	Job Role/QPs of trainings	No. of participants
Ambala	Quality seed grower	20
Barmer-I	Community service provider	16
Jhunjhunu	Agriculture extension service provider	21
Sikar	Agriculture extension service provider	20
Sriganganagar	Agriculture extension service provider	20
Kota	Agriculture extension service provider	20
NRCSS, Ajmer	Seed processing worker	20
	Total	**137**

Qualification Framework (NSQP); Occupational Standards (NOS), Qualification Packs (QPs) and Curriculum were developed for each Job role. A total of 137 rural youth were trained including 117 from Rajasthan and 20 from Haryana states. The third party assessment of the master trainers as well as trained rural youths was done with external agency and certificates were provided to the participants on successful completion of training. Online database has been created for all the participants, training organizations and master trainers.





Training at ICAR-NRCSS, Ajmer (Rajasthan)





Training at KVK, Sikar (Rajasthan)





Training at KVK, Bikaner (Rajasthan)





Training at KVK, Ambala (Haryana)

Creation of Seed Hubs for Increasing Indigenous Production of Pulses in India.

Inadequate seed availability undermines productivity and limits rural incomes in India. The pulsea seed replacement rate is extremely low – only 2-7% as compared to the recommended rate of 25-30%. Total 150 pulses seed hubs have been sanctioned and 97 seed hubs are being executed by KVKs across country. ICAR-ATARI, Jodhpur has been given responsibility to coordinate and monitor quality seed production of Kharif, Rabi and Summer pulses through 10 KVKs including 8 from Rajasthan and 2 from Haryana. These KVKs actively involved in procurement, production, cleaning, grading, labelling, marketing of seed of farmers preferred varieties for speeding-up dissemination rates, and broaden the appeal and adoption of pulses production technologies. Farmers are started to generate additional income through the sale of seeds.

Table 5 Target & achievement of seed production under seed hub during Kharif 2017.

Name of KVK	Crop	Variety	Seed Production (in q)				
			Target (in q.)	Area sown (in ha.)	Production (in q.)	Category of Seed (F/S, C/S, T/L & B/S)	Reason of Short fall
Ajmer	Green gram	IPM-02-03, PM-5 & RMG-975	300.00	47.50	308.15	TFL, B/S	
Alwar-I	Green Gram	Samrat & IPM 2-14	300.00	30.00	92.00	F/S, B/S	Severe water stress at crop maturity stage
Bundi	Urdbean	PU-31, PU-1	300.00	31.80	475.00	F/S, B/S	
Jhalawar	Urdbean	PU-31	250.00	28.00	256.00	F/S, B/S	

Name of KVK	Crop	Variety	Seed Production (in q)				
			Target (in q.)	Area sown (in ha.)	Production (in q.)	Category of Seed (F/S, C/S, T/L & B/S)	Reason of Short fall
Jhunjhunu	Green Gram	IPM-02-03	300.00	29.20	57.37	TFL	Total rainfall of the season was only 135 mm
Kota	Green Gram	IPM- 02-03	100.00	08.00	93.00	B/S	
	Urd bean	PU-31	150.00	15.00	130.00	B/S, T/L	
Nagaur-I	Green Gram	GM-4, GM-5, MH-421	350.00	90.00	270.00	TFL	Total rainfall of the season was only 157 mm
	Moth bean	RMO-435	40.00	8.00	30.00	TFL	
Bhiwani	Green Gram	MH-421	200.00	50.00	160.00	TFL	
		Total	**2290.00**	**337.50**	**1871.52**		

Table 6. Target & achievement of seed production under seed hub, Rabi 2017-18.

Name of KVK	Crop	Variety	Target (in q.)	Area Sown (in ha)	Production (in q.)	Category of Seed (F/S, C/S, T/L & B/S)
Ajmer	Chickpea	CSJ-515	300.00	20.00	512.00	TFL/F/S
Alwar-I	Chickpea	CSJ-515	600.00	40.00	600.00	B/S, F/S
	Field pea	HFP-529	100.00	10.00	100.00	B/S, F/S
Bundi	Chickpea	GNG-1958	600.00	30.00	602.00	F/S, C/S
Jhalawar	Chickpea	GNG-1958	500.00	40.00	692.74	B/S, F/S
	Field pea	Vikas	20.00	2.50	21.10	
Jhunjhunu	Chickpea	GNG-1581	400.00	30.50	186.08	C/S
Kota	Chickpea	GNG-1958	350.00	20.00	422.50	F/S, C/S
Nagaur-I	Chickpea	GNG-1581	550.00	60.00	610.00	F/S, C/S
Udaipur	Chickpea	GNG-1581	300.00	50.00	398.76	F/S
Bhiwani	Chickpea	CSJ-515, HK-2	500.00	52.00	630.00	C/S
		Total	**4220.00**	**355.00**	**4775.18**	




KVK, Udaipur-I (Rajasthan)




KVK, Nagaur-I (Rajasthan)




KVK, Kota (Rajasthan)

Construction of Seed storage and installation of seed processing equipments have been completed at KVK Kota, Bundi, Jhalawar, Nagaur, Udaipur, Jhunjhunu in Rajasthan. Seeds of different varieties are kept in the godown and seed replacement rate has increased in these districts (25-30 percent). Availability of seeds of farmer preferred varieties have also been ensured which has imparted on yield enhancement of pulse crops during kharif & rabi season in major pulse growing districts of Rajasthan. Critical monitoring is done by ICAR-ATRI, Jodhpur. More than 80 percent funds have been released to

3.4 NICRA Report 2017-18

As part of NICRA, under Technology Demonstration Component, under ATARI Jodhpur total seven districts, 5 districts viz, Bharatpur, Jhunjhunu, Jodhpur, Kota and Barmer-I from Rajasthan and 2 districts viz., Sirsa and Yamunanagar from Haryana are actively involved in carrying out component wise programmes and activities in the selected villages. During the year 2017-18 seven NICRA KVKs of Zone-II carried out different activities under Technology Demonstration Components comprised of various modules. Under this project involved 14654 farmers (NRM-1434, crop production-1617, livestock and fodder production-1709, institutional interventions-223, capacity building-2992, extension activities-5137 and custom hiring-1542.

During rabi-2017 total 602 demonstrations on improved varieties of wheat, barley, mustard, raya, gram, coriander and garlic were carried out involving 567 partner farmers to cover 1002.6ha area and 76890ha area covered in adjoining NICRA villages. Further 14 successful farm innovations on different climate resilient agricultural technologies have been documented by 7 NICRA KVKs of Rajasthan and Haryana states.

Under NRM 1434 demonstrations were carried out covering 2200.7 ha area which involved 1434 practicing farmers in Zone-II. In-situ moisture using resource conservation technology demos were conducted on 1740ha area which have been successfully implemented in the NICRA villages and involved 826 partner farmers. Several demonstrations were conducted on water saving technology using sprinkler, micro and drip-irrigation systems by 181 farmers covering an area of 113.0ha during the year 2017-18.

On short duration varieties, total 195 demonstrations were conducted which covered an area of 78.7ha; involving clusterbean (RGC-1055, 1017), mustard (DRMRIJ-31, NRCHB-101), pearlmillet (MPMH-17), mothbean (CZM-2) and greengram (GM-4). These crop varieties recorded significantly higher yield varying from 10.30 to 64.71% as compared to locally grown varieties by the farmers. On drought tolerant varieties total 477 demonstrations were conducted which covered an area of 201.2ha; wheat (KRL-210, KRL-213), barley (RD-2592), chickpea (GC-5), cumin (GC-4), cluster bean (RGC-1017), greengram (RMG-44, GM-4), pearlmillet (MPMH-17) and mothbean (RMO-435, CZM-2). These crop varieties yielded significantly higher yield varying from 11.61 to 59.0% as compared to locally grown varieties by the farmers.

Total 28 demonstrations were conducted on water saving paddy cultivation methods (DSR) which covered an area of 4.40ha. The percent increase yield in paddy crop recorded 7.05% as compared to farmers' practice. Total 16 interventions conducted on location specific inter-cropping system improved yield in 5.40ha area on soybean+maize (5:2 row), soybean+black gram (5:2 row) which recorded an increase of 13.8 to 22.5% yield over local check. Under crop diversification 31 demonstrations were conducted in 12.8ha area including garlic (G-282), greengram (GM-4), Onion (GWO-1). It was observed that yield of these crops was significantly higher than farmer's practice, which ranged from 14.5 to 36.80 per cent.

Various livestock based interventions were implemented through 1709 demonstrations which covered 5132 different categories of livestock. Total 40 livestock owners produced

4500.0q fodder on 10.0ha area for their animals. Breed improvement porgramme was carried out on Murrah buffalo bull, Tharparkar bull, Marwari and Sirohi bucks was undertaken in NICRA villages by involving 44 animals. Due to feeding of mineral mixture and UMMB, deworming and vaccination of the lactating animals a significant improvement in the milk production of animals (7.90 to 15.70%) was recorded. NICRA KVKs had earned total revenue of Rs 2.83 lakh through creation of Custom Hiring Centres by which 1542 farmers completed different agricultural operations timely covering an area of 1690ha. Total of 90 training courses were conducted on various thematic areas during the year, in which 2992 partner farmers and farm women (2567 male and 425 female) actively participated. A total of 303 activities were organized on various thematic areas in which 5137 practicing farmers (7177 males and 952 farm women) took part.













3.5 Farmer FIRST Programme

There are 12 ICAR and SAUs institutes from Delhi, Haryana and Rajasthan states under Farmer FIRST Programme. Total 28 villages have been selected involving 8716 farm families under this flagship programme. The consortia team consisted of IASRI, NCAP, DKMA and NAARM to study the impact assessment of the programme. The physical and financial progress of these partner institutes was reviewed at New Delhi in Annual Review Workshop held during 21-22 February, 2018. Total budget of Rs 438.18 lakh was sanctioned during 2017-18 for Institutes under ICAR-ATARI, Jodhpur. The institute-wise major achievements are given as under:-

Delhi State

IARI New Delhi: Four components under FFP implemented in 3 villages involving 1105 farm families have been covered. Under crop based modules of potential crop varieties were introduced in all the three villages in wheat, paddy, mungbean and pigeonpea which have been well received by farmers.

Wheat: A new variety HDCSW 18 (released in 2015) on an average was yield 54q/ha as compared to HD 3086 which yielded up to 52 q/ha. Another variety HD 3059 (Late sown) could yield up to 44 q/ha. All the varieties were well accepted by the farmers due to their special attributes like heat tolerance, disease resistance and ability to sustain under limited irrigation and abiotic stress.

Paddy: PB 1637 a basmati paddy variety gave highest yield (44 q/ha) followed by PB 1121 (39.15 q/ha) and PB 1509 (short duration requiring less water) yielded 38 q/ha. Among the basmati varieties, PB 1121 could fetch highest market price of Rs 3200 per quintal. Another non-basmati paddy variety Pusa 1612 (disease resistant) yielded 40 q/ha.

Mungbean: Pusa Vishal (tolerant to YMV) was grown in summer which yielded 8.5 q/ha as compared to local check variety.

Pigeonpea: Pusa 992 (duration 140 days) yielded 13.00 q/ha; while Pusa 991 (duration 140 days) yielded 12.5 q/ha. Both varieties were accepted well by the farmers, as the grain were medium large and sustained in rainfed saline soils.

Horticulture based technology modules: Mango and grapes orchards were established. Marigold, as a cash crop was also taken up by few farmers. Nutritional kitchen garden was demonstrated to selected households. Improved varieties of Garden Pea, okra, bottle gourd were also demonstrated.

Mango and Grapes: Two each high-density mango orchards of 25 and 35 mango saplings and grape gardens were set up with 20 and 25 grape were established. Mango and grapes saplings were also planted in all nutritional kitchen gardens.

Kagzi lime: One plant was planted in each of 25 nutritional kitchen gardens.

Marigold: Demonstration of Marigold variety Pusa Narangi Gainda (large sized saffron coloured flowers) was organised at the fields of 20 farmers in 0.5 acre each. Farmers received average net profit of Rs 46950/acre with CB ratio 1:3.84.

Nutritional kitchen garden: In order to boost nutritional security at farm household level, 120 farm families were encouraged to establish nutritional kitchen garden in their farmsteads with Palak, Methi, Brinjal and Okra in addition to saplings of fruit trees- Mango, Grapes & Kagzi lime.

Vegetables cultivation: About 335 farmers were encouraged to cultivate vegetables for marketing in Palwal and Faridabad. Four vegetables Garden Pea, Carrot, Bottle gourd and Mustard leaf vegetables (Sag Sarson). Farmers earned higher incomes and the B:C ratio; Garden Pea is 1:3.14, that of Bottle gourd is 1:3.13 that of Carrot is 1:3.41.

Livestock Module: Twenty farmers were encouraged to supplement mineral mixture to their cattle and buffaloes. Deworming was also done.

Enterprise: Nursery of Papaya and Tomato cherry were raised and sold to other farmers in two insect proof net-house. Two farmers raised of-season Muskmelon in off season and could realize a B:C ratio of 1:3.5.

Integrated farming system: IFS is established in one-hectare area in which a fish pond was dug, crops and fruit tree system was raised. Mango and Grapes were planted around the boundary. Cash crops like sweet corn and baby corn came up well. Vegetables crops Okra, Onion and Bottle gourd were also grown.

Drudgery Reducing Farm Implements: To reduce drudgery in weeding, four wheel weeder, wheel hoe was demonstrated and these implements were well accepted by the farmers. Safety device was also introduced in 15 chaff cutters which was also well received by farm women and farm families.

NCAP, IASRI, DKMA, NAARM: The consortia team under the leadership of NCAP has identified 6 common interventions among 51 institutes and 26 different technologies for economic assessment and their validation in the concerned areas using different methodologies. IASRI has developed the webpage of FFP (http://.ffp.icar.gov.in) at New Delhi and all the partner institutes have been given login ID and Password for submitting the on-line progress report. DKMA has compiled the brochure and graphical abstracts of different modules being implemented by the partner institutes under Farmer FIRST programme. NAARM Hyderabad has completed all the training and capacity development programmes at 5 different locations (New Delhi, Bhopal, Dehradun, Lucknow, Chennai) for the PIs and Co-PIs who are actively involved in implementing the different activities of the programme through their institutes.

Content management platform enabling off and online access: A web portal of the project has been designed and developed. It has been hosted at ICAR Data Centre, ICAR-IASRI, New Delhi. The portal can be visited through URL https://ffp.icar.gov.in/. The developed system provide information about FFP programme, projects details, interventions, news and highlights, achievements, success stories, latest publications, FFP in media along with image gallery. This system can facilitate to disseminate the knowledge generated under FFP projects to the farmers and other stakeholders. The developed system has the potential to impart

agricultural knowledge which is relevant, searchable and up-to-date. Role-based user module has been developed for PI(s) of the project, ATARI(s), ICAR Headquarter and Administrator. PI can upload and edit information of the respective project. ATARI user can monitor the progress (based on the information uploaded by SAUs/Institutes under its zone) of the projects. ICAR Headquarter can monitor the progress of all projects under FFP. Login credentials for all 52 PIs and ATARIs have been created and communicated to the respective stakeholder.

Functionality has been created for project PI to add intervention, budget of project and event/training programme organized under the project. Developed the functionality to upload images, videos and publications by selecting the category viz. event, intervention and others activities under the respective project. Report module has been developed. The user can view ATARI and organization wise report. Public user can view all the project information except budget. Functionality for monitoring of projects has been developed for ATARIs, ICAR Hq and Admin. Portal has been enriched with information such as news, achievements, publications and success stories.

Haryana State

CSSRI Karnal: Four components under FFP implemented in 5 villages involving 3167 farm families. Under NRM module recharge structures have successfully improve the water table and ground water quality. Reclamation of sodic soils and neutralization of RSC waters through amendments (gypsum) /pressmud) either individually or in combination resulted higher rice productivity as compared to crops irrigated with available RSC waters cultivated on sodic soils as such. Varietal intervention through inclusion of wheat variety KRL 210 proved an important strategy to counter yield reduction under salty environments. Yield gain with Pusa 1121 over CSR 30 a sharp decline observed with increasing soil alkalinity.

Diversifying Rice-wheat system with Rice-Pea-Okra/Onion found suitable for this area. Rice residue management was effective using mulcher/ straw chopper. Animals have been selected for amelioration of thermal stress effects by using herbal/non-herbal feed supplements on milk, growth and physiological parameters. One mobile app has been developed for the dissemination of farmer friendly technologies under salt affected agro-ecosystems by CSSRI for the farming community. A three days training programme on "Importance of Spray Technique in Crop Production" was organized at Krishi Vigan Kendra, Kaithal during September 6-8, 2017 in which 57 farmers participated from Farmer FIRST adopted villages. Another three days Skill Development Programme on "Marketing of Agricultural Produce" was organized at ICAR-CSSRI, Karnal during 26-28 February 2018 in which 29 farmers from FFP adopted villages participated.

NDRI Karnal: Four components under FFP implemented in 5 villages involving 832 farm families. Under crop module sensitization of farmers regarding saving of critical inputs and alteration in the production system through direct seeded rice technology which enhanced yield up to 16 to 18q/ha. Farmers were

encouraged to adopt non-monitory inputs/ on farm inputs at their own end. Integration of chemicals such as insecticides and fungicides were suggested to handle diversified pest control in paddy crop which produced paddy up to 22 to 25q/ha. Effective weed management measures in wheat using Pre-emergence herbicide application of Pendimethelene followed by just after sowing (less than 3 DAS) application of Stomp @ 1.25 lit/acre for higher productivity has been adopted by farmers.

Growing Dhaincha crop provided leguminous fodder @160 q/ha. In addition by incorporating dhaincha into soil has reduced the pH and EC and increased organic carbon. NDRI has developed SMS web portal to provide the SMS services to the farmers of project area. Under enterprise module milk processing units have been developed for additional income generation. Under fruit cultivation supply of Mango 115 plants of Mallika variety and 253 plants of Amarpali variety saplings were provided to 30 farm families and plant survival is 70% in field conditions .Under livestock module green fodder production farmers were able to get round the year green fodder to the tune of 900-1050 q/ha in maize-oat and 1190-1340 q/ha in maize-berseem rotation at farmers field. Endo and ecto-parasite control camps were organized in the project area. Feeding of optimum quantity (40-60g/animal/day) of good quality mineral mixture + vitamin supplementation per animal initiated in adopted project village. Oestrus Synchronization protocol applied was observed as 76% success which is very much encouraging and proved to be a set tool to tackle the existing infertility problem in dairy animals.

CIRB Hisar: Only two components under FFP implemented in 3 villages involving 427 farm families. Under crop diversification three women farmer have started small units of bee hives (10 hives) at their own having additional source of income through apiary unit. Under livestock module Micronutrient Supplementation in participatory mode implemented in field livestock and 72% of Best buffaloes conceived within 60 days of calving. For breed improvement promising progeny with AI from progeny tested/ elite bulls initiated in field and 66% animals improved significantly.

CCSHAU Hisar: Four modules under FFP implemented in one Gurana village involving 1000 farm families. Under crop module rice-wheat (WH-1105) cropping system of zero tillage has been popularized. Pre-emergence application of pendimethaline @ 3.30 l/ha + need based application of post-emergence herbicides proved economical (with B:C ratio 2.15). Under varietal performance wheat varieties WH-1105 HD-2967 performed very well with highest grain yield 55.25 and 56.0q/ha, respectively. Insect-pest and disease management in mustard using first two spray of Neembicidine 0.03% followed by spray of Dimethoate 30 EC @ 350 ml/ac has been found effective and economic.

Under horticulture module 19 demonstrations of 0.2 ha each of promising guava cultivar Hisar Safeda were given at 19 farmers' fields. Promotion of bee keeping as subsidiary farm enterprise has been started through 60 colonies. Supplementation of ration with mineral mixture in milking buffaloes has been initiated in 500 farm animals.

Rajasthan State

CAZRI Jodhpur: Four modules under FFP implemented in 4 villages involving 500 farm families. Under crop module in Kharif introduced pearlmillet (MPMH-17), moongbean (IPM-2-03), mothbean (CAZRI-Moth-2) and clusterbean (RGC-1033) performed very well. In rabi wheat (Raj-4083, KRL-201) and Cumin (GC-4) have been demonstrated. Under horticulture module round melon and clusterbean showed an impressive yield increase of 33.33% over the local, whereas the snap melon showed 27.58 % yield increase over the existing variety. The B: C ratio of Tinda was highest (2.62) followed by clusterbean vegetable (2.54) and Snap Melon (1.67). In case of chilli, when compared to the local, it was found that the demonstrated green chilly yield was increased by 102.6%. Distribution of 680 perennial fruit saplings of Ber and Gunda to enhance additional income per unit area observed a survival rate of ber trees varied from 51-53 per cent, whereas it was 92.5 per cent for Gunda.

Under livestock module for breed improvement 15 Marwari Rams have been provided. Feeding of MNFB to cattle and buffalo resulted 5.2% increase in milk yield. Under NRM module issued 250 Soil Health Cards and tested 31 water samples of 250 partner farmers. Provided 15 units of water harvesting structure (Tanka) with micro irrigation system for nutrition security to the farm family along with increased cropping intensity. Introduced fodder production in IFS module using giant hybrid fodder in 10 units.

CSWRI Avikanagar: Four modules under FFP implemented in 4 villages involving 847 farm families with a total population of 3864 villagers including women and children. Nearly 12% households belong to below poverty line in four villages. Buffalo (39%) is the main species farmers are rearing followed by sheep (26%), goats (21%) and cattle (14%) on livestock numbers basis. Land use pattern of the four villages showed that 84% of total land is being used as agricultural land followed by 10% as habitat and remaining 6% as pasture land and other uses. In Rabi season, Mustard is the main crop being sown in 68% of area followed by wheat in 19% of area. In Kharif season, moong is the main crop being cultivated in 37% of the area.

There were 13 sheep flocks in all four villages having sheep in the range of 600 to 900. In lambing season total flock strength went up and after selling of lambs before onset of summer season flock strength went down. Under crop module introduced improved verities of Guar (RGC-1055), Moong (IPM-02-3), Urd (IPU94-1) and Til (RT-127) for higher production in farmers' fields. In rabi season mustard varieties (Giriraj (timely sowing) and Bharat sarson-1, (late sowing), improved wheat variety (Raj 4079) in project villages have been encouraged and the yield improved significantly.

AU Jodhpur: Four modules under FFP implemented in 3 villages involving 1043 farm families. Under crop module Pearl millet hybrid MPMH-17 recently released by AU, Jodhpur was demonstrated to 300 Farmers in the selected Villages. Yield data of demonstrations revealed that this hybrid was found superior over the

farmers grown varieties and local pearl millet and gave average seed yield of 20.6 q/ha. Current average price is Rs 14.25/kg farmers are getting net return of Rs 29355/ha under rainfed condition in the fields. It was higher over local cultivar by 18.6 per cent. Pearl Millet hybrid MPMH-17 was found safe from bird damage and it was disease and pest free during the crop pendency. Seed of improved varieties Raj 4083 was demonstrated to 50 farmers for raising crop in 0.4ha area. Wheat variety Raj 4083 was suitable for timely sown in irrigated conditions. Farmer got net income of Rs 38287/-only with B: C ratio of 2.09 by the average seed yield of 45.10 q/ha as against seed yield of 37.8 q/ha under local plots. Pusa Mustard 26 was given to













50 farmers in selected village under irrigated flatbed cultivation with small size of holding. Variety was found superior over local cultivar suitable for late sown (November sowing) conditions and gave average seed yield of 16.04 q/ha. Average increase of 10.7 per cent in seed yield was observed over local mustard.

Under horticulture module new varieties of onion (NHRDF-2 and 3) and carrot (Pusa Rudhira) yield enhanced by 12% over local check. New varieties of Tomato (Arka Raksha) and Chilli (RCh-1) earned more profit to farmers. Temporary insect proof net structures were distributed to 150 farmers in selected village; Tomato and Cabbage seedlings grown found healthy and completely viruses free at the time of transplanting. Value addition in Mint, Nagauri Methi and Rose Flower petals by drying the product in covered shade net of size 4.0X12.5m found beneficial.

Under NRM module Single Super Phosphate application @ 200 kg/ha in 0.4ha area of carrot crop increased carrot yield by 17-22% over untreated plots. Use of Hydrogel and Aqua-sorb for moisture conservation in pearlmillet crop gave seed yield of 23.9 q/ha under rainfed condition which was 14.3 per cent higher over untreated plot under similar condition. Under livestock module introduction of Azolla 80 farmers were selected for raising Azolla beds of size 10x3.0x1.0 feet and filled with water for balanced livestock feeding. For goat breed improvement 33 farmer were selected for distribution of Sirohi bucks and animal health camp for vaccination were organized at village.

3.6 Mera Gaon Mera Gaurav

In this zone, a total of 446 teams have been formed involving 1530 Scientists from 18 ICAR institutes and 08 Sate Agricultural Universities of Rajasthan, Haryana and New Delhi states. These teams have adopted 1617 villages. All teams have collected baseline information of the adopted villages. Teams have conducted total 21537 activities including interface meetings, demonstrations related to oilseeds, pulses, cereals, vegetables etc. and training programmes covering crops, animals, horticulture and fisheries aspects in adopted villages during the year 2017-18. Under farm advisory services total 20325 SMS have been sent to the farming community involving 310098 farmers under MGMG programme. Activities have been carried out through creating strong linkages with Government, Non-government, Cooperatives and other stakeholders in convergence mode.

Goals, aims and objectives and activities of various centrally sponsored schemes have been appraised by teams amongst farmers. Follow-up studies have also been initiated to assess suitability, accessibility and appropriateness of various location specific technologies. Majority of ICAR and SAUs have reported that advisory role is playing pivotal role in timely management of insect-pests in crops, vegetables and fruits etc.

Total visits to villages 3119 which covered 63179 part farmers, 2130 interface meetings/gosthis were organized involving 94648 partner farmers. Total 1006 training were conducted for 36027 trainee farmers; while 5438

demonstrations were conducted at 30808 farmers' fields. During the year total 21530 advisory were given to 188300 practicing farmers and 7031 literature was made available to 45861 partner farmers. Total 2531 Awareness programmes were also organized about different aspects related to crop, livestock, horticulture, IFS, plant protection, fisheries, poultry, be keeping etc which involved 48836 participants. Total 5070.60 Q. input in the form of seeds fertilizers, vermi compost, planting material and bio-fertilizers etc were made available to 8887 farmers of different categories. Thus, total 42785 activities were conducted by 26 institutes including ICAR institutes and State Agricultural Universities of Rajasthan, Haryana and New Delhi states involving 516546 farmers. State-wise progress is briefed hereunder :

In Rajasthan a total of 184 teams have been formed involving 541 Scientists from 6 ICAR institutes and 6 Sate Agricultural Universities have carried out different activities under MGMG. These teams have adopted 609 villages, which have conducted total 8109 activities including interface meetings, demonstrations related to oilseeds, pulses, cereals, vegetables etc. and training programmes covering crops, animals, horticulture and fisheries aspects in adopted villages during the year 2017-18. Under farm advisory services total 9430 SMS have been sent to the farming community involving 144481 farmers under MGMG programme. Activities have been carried out through creating strong linkages with Government, Non-government, Cooperatives and other stakeholders in convergence mode.

Haryana State: It has been observed that in Haryana state a total of 126 teams have been formed involving 402 Scientists from 6 ICAR institutes and 2 Sate Agricultural Universities have carried out different activities under MGMG. These teams have adopted 341 villages, which have conducted total 2970 activities including interface meetings, demonstrations related to oilseeds, pulses, cereals, vegetables etc. and training programmes covering crops, animals, horticulture and fisheries aspects in adopted villages during the year 2017-18. Under farm advisory services total 3629 SMS have been sent to the farming community involving 126082 farmers under MGMG programme. Activities have been carried out through creating strong linkages with Government, Non-government, Cooperatives and other stakeholders in convergence mode.

New Delhi State: It has been observed that in New Delhi state a total of 136 teams have been formed involving 587 Scientists from 6 ICAR institutes have carried out different activities under MGMG. These teams have adopted 667 villages, which have conducted total 10458 activities including interface meetings, demonstrations related to oilseeds, pulses, cereals, vegetables etc. and training programmes covering crops, animals, horticulture and fisheries aspects in adopted villages during the year 2017-18 Under farm advisory services total 7266 SMS have been sent to the farming community involving 39535 farmers under MGMG programme. Activities have been carried out through creating strong linkages with Government, Non-government, Cooperatives and other stakeholders in convergence mode.

Activities undertaken

In Brief: Total visits to villages 3119 which covered 63179 part farmers, 2130 interface meetings/gosthis were organized involving 94648 partner farmers. Total 1006 training were conducted for 36027 trainee farmers; while 5438 demonstrations were conducted at 30808 farmers' fields. During the year total 21530 advisory were given to 188300 practicing farmers and 7031 literature was made available to 45861 partner farmers. Total 2531 Awareness programmes were also organized about different aspects related to crop, livestock, horticulture, IFS, plant protection, fisheries, poultry, be keeping etc which involved 48836 participants. Total 5070.60 Qt input in the form of seeds fertilizers, vermi compost, planting material and bio-fertilizers etc were made available to 8887 farmers of different categories. Thus, total 42785 activities were conducted by 26 institutes including ICAR institutes and State Agricultural Universities of Rajasthan, Haryana and New Delhi states involving 516546 farmers.



Kisan Gosthi- NBAGR Karnal (Haryana)


Health camp by NDRI, Karnal


Field Visit by DRMR, Bharatpur


Kisan Ghosti by NBPGR, Karnal


Input Distribution by MPUAT, Udaipur


Women's Awareness Prog.: SKNAU, Jobner (Jaipur)


Farmers Training: CIRB, Hisar


Awareness about taking soil sample: DRMR Bharatpur



Demo at field: IIWBR Karnal (Haryana)

Tribal Sub Plan

Tribal Sub-Plan

ICAR-ATARI, Jodhpur has identified 22 districts in Rajasthan for execution and implementation of need based programmes and activities related to agriculture and allied enterprise since 1st April, 2017. First planning meeting was held on 03.05.2018 at ICAR-ATARI, Jodhpur in which Nodal Scientists of 22 KVKs took active part. Based on thorough discussion, action oriented workplans were finalized for execution in participatory mode with objective IS to bridge gap between Scheduled Tribes (ST) population and other by accelerating the development of Scheduled Tribes by securing to them. Substantial reduction in poverty and employment, creation of productive assets and income generating opportunities, KVKs are actively engaged to address different issue related to food, nutritional and livelihood security by conducting/implementing following activities in time bound manner.

- Capacity building & training
- Seed production, storage bank and village
- Infrastructure for grain storage
- Demonstration on goat and poultry production
- Interventions/demonstration for post-harvest technology/primary processing
- Demonstration on Integrated Farming
- Linkage to Gramin Retail Market Infrastructure
- Study of agricultural and allied production and management system, marketing and value addition.

Summary of programmes and activities carried out during 2017-18 is presented in Table given below.

Majority of KVKs implemented direct benefitting programmes by enhancing income of tribal farm families. Poultry (Back yard poultry farming) especially for the purpose of egg production has been accepted by tribal farm

Details of activities carried out during 2017-18 under TSP

Activity	Unit	Target	Achievement
On-farm testing (No. of technologies taken up for OFT)	Number	20	28
Frontline demonstrations (Number)	Number	2100	2160
Farmers training (in lakh)	Lakh	0.29	0.34
Extension Personnel training (in lakh)	Lakh	0.003	0.0032
Participants in extension activities (in lakh)	Lakh	0.45	0.48
Production of seed (in tonnes)	Tonnes	42.00	48.00
Planting material production (in lakh)	Lakh	1.7	2.00
Live-stock strains and finger lings production (in lakh)	Lakh	0.02	0.025
Soil, water, plant, manures samples to be tested (in lakh)	Lakh	0.1	0.12
Mobile agro- advisory (No. of messages)	Number	2500	2600
Mobile agro- advisory to farmers (No. of farmers)	Number	40000	48000

women in 22 districts of Rajasthan. Goat rearing has also been found as income generation as well as gainful employment on sustainable basis. Tribal farmers have been empowered to store at least 10-15 percent produce of demonstrations as seeds of cereals, pulses and oilseeds crops. Bhilwara KVK has created awareness and improved skill in rabbit rearing, Azolla Units were established in majority of villages with technical intervention of KVKs in participatory mode. Feeding management and vaccination aspects were carried out under livestock management by almost all KVKs. Farmers-Scientists' interface, field days, group meetings, farm women day, diagnostic field visits, etc. were organised to sensitize tribal farm families on different proven agriculture and allied enterprise related technologies for speeding up adoption and diffusion process.

Institute Funded Project

I. Effectiveness of Indigenous Technical Knowledge (ITK) in Bovine Health Management

Under livestock project the survey work in the selected villages through 5 KVKs of Rajasthan i.e. Alwar, Jaipur-I, Jodhpur-I, Kota and Udaipur have been completed. The pre-structured questionnaires of the selected 15 livestock farmers from each village have been completed about ITKs being used for different ailments of livestock in the selected villages. The data collected from 75 livestock owners have been tabulated and have been classified as per the different health management practices being followed by the livestock owners at village level. The effective ITKs would be listed from each village and further efforts would be made for their identification and authentication with the support and active involvement of animal research institutes at National level.

Documentation and Validation of Indigenous Technical Knowledge Practices Used by Livestock Owner's in Rajasthan

1. List of ITKs Practices in Districts - Alwar

S.No	Health Problem	ITKs Practices by Livestock Owner
1.	**Retention of Placenta**	• 500gm Barley feed to animal after calving • Plant of onga (Lat Jeera) tie on the horn of caved animal help early discharge of Placenta
2.	**Foot & Mouth Disease**	• Roots of Aak & Ber boil in water drink to animal and wash the wound with same • Roots of Ber boil in water and apply on affected parts of mouth & Hoof
3.	**Bloat**	• Ajwain 100gm with edible oil 250 ml.
4.	**Bloat & Gastric**	• Ratanjot (Jatrofa) oil 5 ml in hot water drink to animals • Powder of Beal fed to animal with Concentrate
5.	**Calf Scour**	• 100 ml Mustard Oil drench to calf
6.	**External Parasites**	• Tobacco water apply on affected body parts • Apply neem oil on the affected body parts
7.	**Muscles pain**	• Fitkari boil in water
8.	**Pain/Strain**	• Termite hole Soil (dimak ki bombi), Crushed & Sieved, Prepare paste in water & Apply on affected parts

2. List of ITKs Practices in Districts - Jaipur

S.No	Health Problem	ITKs Practices by Livestock Owner
1.	**Indigestion** **Indigestion of Calf**	• Ajwain 50 gm + Jaggery 500 gm per day for 5 days • 100 gm surf powder give orally animal/day twice. • 300 gm Harad + 300 gm Black Cumin + 250 gm Rock Salt + 400 gm Meetha Soda + 300 gm Turmeric, mixed it well and divided into 3 doses and per part is given in a per day orally • Boiled 100 ml milk, given orally
2.	**Retention of Placenta**	• Mixed Colostrum 500 gm + Sugar 250 gm, given orally • 3-4 cloves mixed in Jiggery Ball and given orally
3.	**Foot & Mouth Disease (FMD)**	• Ajwain keep inside jute bag and burn and smoking to the animals • Grinded 500 gm Gorya Moth + Bajra 100 gm, making chapatis and given orally • Chapati of Moth, 3 days two times
4.	**Mastitis**	• Meetha Soda 250 gm + Sugar 250 gm, give orally 3-4 times in a day
5.	**Ketosis**	• 5 kg. Heated Mustard Oil then cool it and add 2 kg. lime juice and give orally 250 gm/day/animal
6.	**Bloat**:	• Fresh Milk 250 gm + Mustard Oil 250 gm, mixed it and given orally
7.	**Manze**	• Coating Mustard oil on body between two days interval for one week
8.	**Bloody Diarrhoea**	• 40 gm Sonth + 50 gm Loonia Ghee + 100 gm Mishri + 1 kg. Barley Flour, mixed and divided into three doses and given orally upto 3 days
9.	**Prolapse of Uterus**	• Deshi Ghee 50 gm daily 10 days before calving • Apply of Deshi Wine on prolapsed part
10.	**Internal Parasite**	• Jaggery 125 gm + Chilli Powder 200 gm through orally one time • Grinded Rai seed 10 gm + 100 gm Buttermilk, given orally two times in day
11.	**External Parasite or Mange**	• Coating Kerosene oil on body
12.	**Infertility**	• 2.0 kg. Germinated Wheat for 5 days/animal • 1 Packet of Match-sticks (Masala), add in a Jaggery ball, give orally • Powder of Bilav (Weed Seed) add in a Jaggery ball and give orally (100 gm/day/animal upto 7 days)
13.	**Fever**	• Chapati of Moth, 3 days two times • Ajwain 200 gm + 4-5 cloves + 250 gm Jaggery, mixed and given orally • A piece of Bait prepared with 200 gm Wheat Flour and after opened, this piece of Bait cut into two halves and squeezed a piece of lemon, then again ovened and given orally upto two days
14.	**Cold and Cough**	• Sonth 400 gm + Meetha Soda 20 gm + Salt 40 gm + Jaggery 200 gm + Ajwain 50 gm, mixed and given orally upto 3 days

3. List of ITK Practices in Districts - Jodhpur

S.No	Health Problem	ITKs Practices by Livestock Owner
1.	**Enteritis**	• Whey (Butter milk) 500 ml and 50 gms haldi • Husk of Poppy fruit 200 gms-300gms
2.	**Simple Indigestion**	• Bark of acassia boil in water and sieved through muslin cloth and give orally
3.	**Lameness**	• Haldi 10-20-g with water, PO, 5 days • Hot fomentation at affected area
4.	**Retention of placenta**	• Hingota fruit 4-5 and water one litre boil till 250 ml and give orally
5.	**Prolapse of uterus**	• Apply of poppy milk on prolapsed part or deshi wine and manually insert it
6.	**For Fracture**	• Immobilize the part with splint of bamboo
7.	**Metritis**	• Atta singada 200-400 gms and one broom make it in powder and divide in 3-4 part and give orally
8.	**Tympany**	• Drenching the vegetable oil approx. 250 ml, Heeng 10-20 gms for the treatment of tympany • Inhale the kerosene oil with cotton swab in tympany • inhale kerosene oil
9.	**Ecto-parasite**	• For the ecto-parasite control apply neem oil apply locally • Butter milk appox. 1 lit and one hand full common salt and give bath for ecto-parasite control
10.	**Snake poisoning**	• Ghee 500gm -1 lit and tanta mantra
11.	**For dislocation**	• Dham on affected area
12.	**Wound**	• Paste of roasted seed of tumba apply locally on wound
13.	**Fracture**	• Charcoal of kair root

4. List of ITK Practices in Districts - Kota

S.No	Health Problem	ITKs Practices by Livestock Owner
1.	**Retained Placenta**	• Bamboo leaves @ 4, boiled in 300 ml water and sieved through muslin cloth and give orally after cooling with the help of bamboo hollow pipe (naal) to animal after 7 hr of calving. • Sugarcane leaves @ 4-6, boiled in 200-300 ml water and sieved through muslin cloth and give orally after cooling with the help of bamboo hollow pipe (naal) to animal after 7 hr of calving. • Bark of CACUN @10 gm boil in water and sieved through muslin cloth and give orally with the help of bamboo hollow pipe (naal). • 100 ml Simla/chawara barks @ 250g, boiled in 1 liter water and sieved through muslin cloth and give orally @ 100ml dose per animal after cooling with the help of bamboo hollow pipe (naal)/glass bottle to animal after 7 hr of calving.

S.No	Health Problem	ITKs Practices by Livestock Owner
2.	**Indigestion**	• Ajwain (Carom Seeds) @ 50-60g boiled in 500-750g Jaggery give orally after cooling with the help of bamboo hollow pipe (naal).
3.	**Bloat**	• Heeng @ 50g in 300ml water is given orally to animal for the treatment of tympani
4.	**Fever**	• Deshi ghee @ 200-250g give orally for 3 times for 3 days continuously with the help of bamboo hollow pipe (naal).
5.	**FMD**	• Well dipped one chapatti in kaccha oil given orally to FMD affected animals, so that ulcer of mouth cracked. • Tantra mantra from bhopha/jhad-fhunkh with the help of neem branches. • Fish (fry/fingerling) boiled in water and prepared water solution is applied on ulcers of FMD affected animals. • Breaking oil on foot ulcer taking far of insect/house fly (*Bamesia tabaci*).
6.	**Lameness**	• Haldi (*Curcuma longa*) 10-20g with water, given orally for 5 days to animals.
7.	**Eye Ulcer/damage**	• Boiled Kushum /soybean oil, add 1 pinch of Salt after cooling @ 2 drops put in affected eyes • Two peaks of eatable tobacco with lime mix after chewing by human with the help of mouth directly.
8.	**Heat/Estrus**	• Total 1 liter Luke warm Palm /soybean oil after cooking poodi/gulgula (puye) @100ml given after mixing in Fodder/ food materials daily till 10 days.
9.	**Milk poisoning**	• Grinded powder of Black pepper @ 50gm, mixed in 250 ml Deshi Ghee given orally with the help of bamboo hollow pipe (naal)/Glass bottles. • For Sorghum poisoning use human urine @ 500ml give orally after control death of HCN/Dhrvin/ Prussic Acid affected animals
10.	**Endo-worms**	• Stomach Worms: Deshi Wine/ Liquor) @1 quarter per animal given orally with the help of bamboo hollow pipe (naal)/ Glass bottles. For newly born calf only half quarter is sufficient. • Provide eatable salt @ 100-120g in water daily to animals. • Provide eatable oil @ 50ml give orally with the help of bamboo hollow pipe (naal) /glass bottle to animal.
11.	**Sterility**	• Total 5 liter common flax or linseed/ alsi (*Linum usitatissimum*) oil @ 250ml per day/animal mixed in food material/ cake.
12.	**Prolapse of Uterus**	• Apply big/motti supari doses after grinding @ 500g (powder) in 250-300ml Deshi ghee in total 2-3kg ghee before 4 month of calving of animal, it controls effectively
13.	**Fracture/dislocation**	• Dham on affected area • Leaches/Jokes (insects): Salt powder is rubbed on jokes/ affected animals' skin.

5. List of ITKs Practices in Districts - Udaipur

S.No	Health Problem	ITKs Practices by Livestock Owner
1.	**Dystokia**	• This is a special technique in which, the animal is calved by reversing the animal and by putting the hand inside vaginal tract and expel out calve in case of abnormal pregnancy. • Use special technique in abnormal pregnancy cases
2.	**Retention of Placenta**	• Wash the expel part by lukewarm water. Tie the fore leg with rope and try to set the expel part and also put a cloth structure for 15 days in such a way that it does not come out. • Boil 250 gm Jaggary in 1 lit water and drench it and also feed 2 sugarcane top part to the animal.
3.	**Constipation / Tympany**	• Mix 200 gm Salt, 100 gm. ajawain powder and 1 lit. sour butter milk. Drench it both morning and evening. • Tension in hind legs veinm -_Tie rope on fore legs and apply warm wet soil on thighs of animal. • Boil 100 gm. pods of Amaltas in 1.6 litres of water. Boil it up to the time it becomes one fourth.
4.	**External Parasites**	• Take wood of stem of white Khakhra tree (200 gm). Boil it in water and apply it to whole body. It should also be repeated after 10 days.
5.	**Internal Parasites**	• Drench 100 gm Mustard oil to the small calves.
6.	**Diarrhoea / Haematuria** **A. Diarrhoea in Goats**	• Soak 100 gm leaves of mehndi and wood of stem of Aavertaki in 1 lit of water. Sieve it and drench it in next 5 days. • Grind 50 gm leaves of Shisham in 100 ml. water and sieve it and drench it for two days
7.	**Wadi**	• Boil 500 gm of grinded powder Jhasi adusi (Justica adatoda) in 1.5 lit. of water. Boil it up to the time it becomes one half. Drench it to animals as per their size. It can be used in Cows, buffaloes, camels and goats. • Boil 1 piece of gulvel, 1 piece of galtivela and 100 gm grinded Adusi in water and prepare Kada. Drench it to the animal.
8.	**Maggot Wounds**	• Apply paste of leaves of Bhutbangra 100 gm on wound. The maggot will die soon. and the wound would heal.
9.	**Fever** **a. Fever in Cow and Buffaloes**	• Boil 60 gm Neemgiloy, 20 gm Kalmegh and 20gm Nami in 1.6 lit. of Water. Boil it up to the time it becomes one fourth. Drench it for three days once in a day. • Boil 150 gm Adusa, 150 gm Gur, Giloy one branch thumb size, 10 gm Turmeric Powder, tea powder 3 spoon in 1.5 lit water. Boil it when it becomes up to 1 lit. Sieve it and drench 2-3 times lukewarm water.

S.No	Health Problem	ITKs Practices by Livestock Owner
10.	**Prolapse of Uterus**	• This is a special technique in which, he apply milk of ratanjyot on hand and set the uterus. also drench Kada of roots of Khata Limbu. • Fix the uterus inside and apply paste of Bhang leaves on heaps of animal two or three times.
11.	**Worms** **a. Worms in Goat**	• Grind 50 gm. fruits of Karemadi (Type of Neem) and mix in 100 ml water and drench it to the animal thrice a day for two days. • Drench 100 ml. Mustard oil of pure ghani (Ispeller) to calves/buffaloes calves. If not comes out then repeat it. • Grind 50 gm Bark of Katodia in water thrice in a day eliminates worms.
12.	**Fracture** a. Fracture in legs b. Fracture in legs of Camel c. Fracture of Bones	• Boil 250 gm grinded powder of Ratanjot root or 250 gm grinded Powder of Khata limba root. Drench it for two days. • Tie the fracture part by bamboo sticks in such a way that it supports the fractured part. • Grind the ball of Arunjia and mix it in half lit. of water and drench it to animals • 1 Kg. grinded powder of Ratanjot root and mix it in 1.5 lit of water and sieve it. Drench it for two days. It is also useful in case of cows, buffaloes, and Goats. Try that the animal should not stand during these two days. • Grind 250 gm. Jhadli and mix well in cold milk and drench it to animal. • Tie bamboo sticks on goat's leg and bandage it. • Drench mixture of hot milk with three deshi eggs for 3 days.
13.	**Phoola in eyes**	• Grind and make paste of horn of Antelope and add 2 gm sindoor and apply in eyes. It clears in 15 days. • Use 2-3 drops of milk of Ratanjot branch in eyes cures phoola in case of cow, Goat and Buffaloes
14.	**Internal Injury**	• Boil 10 gm Turmeric Powder, 200 gm Gur, 15 gm Tea leaves in 1 lit. water. Sieve it and drench it to animal.
15.	**Eating of Iron objects**	• Boil 150 gm Bijora nimbu and 100 gm Pattherchata in 2 lit. of water. Boil it up to the time it becomes one half. Drench it for three days once in a day in the morning with empty stomach.
16.	**Breaking of animal Horn**	• Fill the horn by the mixture of hair, 20 gm Sindoor and smooth soil.
17.	**For more production**	• Mix Shatavari (Naharkata ki root) root with Concentrate / Dalia / Cotton seed and boil it and feed for 7 days.








II. Impact Assessment of Agricultural Technologies Disseminated by Krishi Vigyan Kendras at Farmers Fields

Objectives:

- To analyse the socio- economic profile of the farmers/farm women.
- To assess the impact of selected technological interventions by KVKs
- To study linkages of KVKs with other development organisation
- To test mobile app for effective delivery of agro-advisories.

Progress/Achievements:

- Suitable schedules have been prepared to measure socio-economic attributes of farmers/farm women. Schedules for measuring the functional linkages of KVKs with other departments were also prepared.
- Prominent technologies have been enlisted like Livestock (Paravet/Malnutrition); horticulture (Nursery Management/Protected cultivation); crop based (Horizontal expansion of variety); Natural Resource Management (RCTs/Zero tillage); Water conservation (Micro-irrigation; sprinkler) & other enterprises (Beekeeping, Mushroom, Azolla cultivation etc.,
- Eight KVKs (Sirohi, Pali, Sawai Madhopur, Alwar-I, Sriganganagar; Tank, Dungarpur, and Udaipur) have been selected for testing of mobile apps for agro-advisories to farmers.
- Knowledge index for cultivation of pulses and oilseed crops were prepared to measure the knowledge gap.

CHAPTER 5

HUMAN RESOURCE DEVELOPMENT

Human Resource Development (HRD)is extremely important because organizations recognize that any value added to an employee is value added to the organization. Employees are eager for the opportunities to develop their skills and add value to their institutes. It is as an essential part of development and focuses on a series of actions directed at helping participants in the development process to increase their knowledge, skills, understandings and develop attitudes needed to bring about desired developmental change?. Training is just one element of capacity development which focuses on providing skills for specific problems. Capacity building encompasses whole range of activities designed to empower individuals and institutions including the analysis of policy contexts, awareness building, institutional adjustments, policy research, policy immersion and more.

For the effective coordination, implementation, monitoring and evaluation of trainings at ICAR institutes including ICAR-ATARI, Jodhpur, has assessed training needs of employees involving in skill development of employees.

During 2017-18, total 8 training for Scientific, Technical, Administrative & Financial staff were planned (Table-1). Out of total training planned, 50% realization of planned trainings was achieved. The financial targets & achievement has been presented in Fig-2.

Table 1. Physical and Financial Target and Achievements during 2017-18.

S. No.	Category	Total No. of Employees	No. of trainings planned for 2017-18 as per ATP	Total No. of employees undergone training during the year 2017-18
1	Scientist	3	3	0
2	Technical	1	1	1
3	Administrative & Finance	4	4	3
	Total	**8**	**8**	**4**



Fig-1 Training planned and employees undergone in training during year 2017-18.

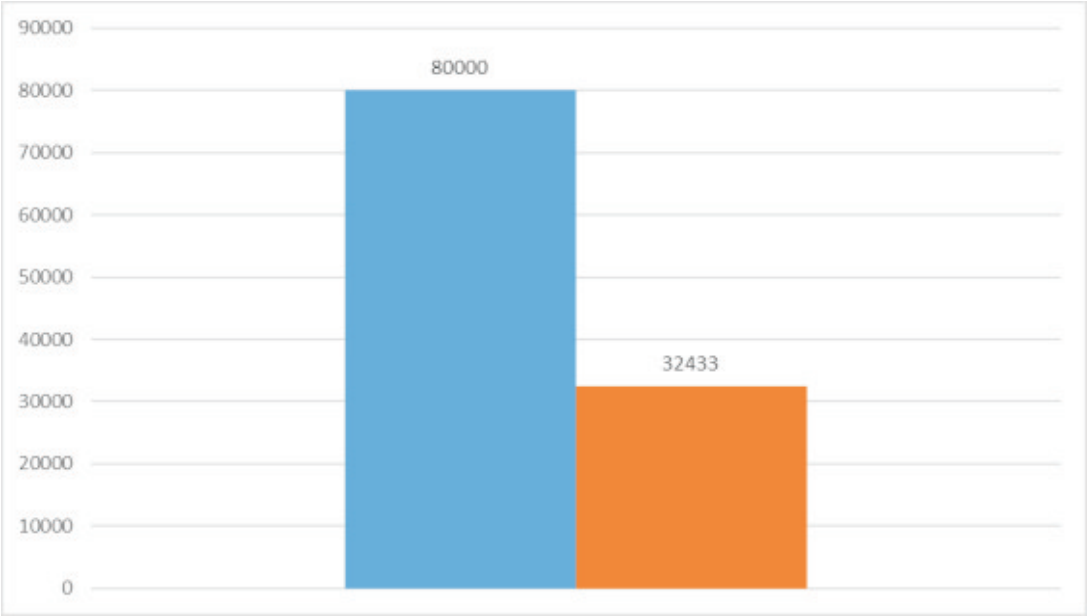


Fig-2 Financial targets and achievements during year 2017-18.

Table 2. Training attended by Technical staff during 2017-18.

S.No.	Name of employee	Designation	Discipline/Section	Training attended
1	Mr. P. K. Satapathy	ACTO	Computer	Networking: Basics and Management.

Table 3. Training attended by Administrative & Finance staff during 2017-18.

S.No.	Name of employee	Designation	Discipline/Section	Training attended
1	Mr. N. S. Gehlot	AAO	Administration	Goods and Service Tax.
2	Mr. Permod Sharma	JAO	Finance	General Financial Rules 2017
3	Mr. Permod Sharma	JAO	Finance	Public Financial Management System (PFMS) & other related issues.

CHAPTER 6

DIRECTORATES OF EXTENSION EDUCATION

Agricultural extension involves the whole gamut of complex interactions between farmers/farm women, extensionists, input dealers, local traders, etc. and researchers for empowering the farming community. These interactions result in enhancement of productivity and profitability from the available limited resources, existing farming situation and need of the farmers. Directorate of Extension Education (DEE) is a nodal agency of State Agricultural Universities (SAUs) for promoting agricultural development by strengthening forward and backward linkage in the concerned region/state. Transfer of agricultural technologies is done through providing training, advisory services and supply of farm information to both extension professionals, personnel and farmers. DEEs are also involved in assessment, and transfer of agricultural technologies through on-farm testing and front line demonstrations. Being a Central part of SAUs, DEEs plan, monitor, implement and evaluate extension programmes of KVKs. DEEs also extend their supports to State Departments through training, workshop, meeting and publishing literature on different enterprises of agriculture and allied subjects. Directorate of Extension Education has multi-disciplinary team of scientists who work in participatory mode in close co-ordination with Department of Agriculture, Animal Husbandry, Horticulture, Forestry, Co-operatives, Panchayat Samities and other agencies engaged for upliftment of socio-economic status of the rural people.

The broad objectives of DEEs are:

- To develop partnership in diagnosis, identification, prioritization of field problems and their communication to research system of University.
- To impart the trainings to the in-service personnel and functionaries of the line departments of state government and non-governmental organisations.
- To conduct short and long-term vocational trainings for farmers, farm women, youth & school dropouts.
- To assess and disseminate the latest agricultural technologies through on farm research for its wider replication and adoption, and
- To provide farm advisory/information services including literature for fosterning dissemination process of agricultural technologies.

Seven DEEs are functioning in Rajasthan and Haryana states. Out of these, 6 DEEs functioning in Rajasthan and one DEE are

delivering extension services in Haryana state. The state wise distribution of DEEs is given in Table 6.1.

6.1 Human Resource Development

Human resource development of KVK functionaries is an important activity for enhancing knowledge and upgrading skills of subject matter specialists and Senior Scientist & Heads. During 2017-18, DEEs organized 24 training programmes under capacity development programmes in which 929 participants took part.

Table 6.1. Director of Extension Education & Technology Backstopping to KVKs.

Sl. No.	Director's name	SAUs	Technological backstopping for KVKs (no.)				
			SAU/ CAU	ICAR	NGO	DU	Others
1	Dr. S. K. Sharma	SKRAU, Bikaner (Rajasthan)	7	0	1	0	1
2	Prof. G. S. Tiwari	MPUA&T, Udaipur Rajasthan)	7	0	1	0	0
3	Dr. Iswar Singh	Agricultural University, Jodhpur	6	2	1	0	0
4	Dr. K.M. Gautam	Agricultural University, Kota	6	0	0	0	0
5	Dr. G.S. Bangarwa	SKNAU, Jobner	7	1	1	0	1
6	Dr. P. N. Dhuria	RAJUVAS, Bikaner	1	0	1	0	0
7	Dr. C. S. Huda	CCSHAU, Hisar	14	2	2	0	1

Table 6.2. HRD activities organized by DEEs in Zone-II.

DEEs	Training areas	Trainings (no.)	Participants (no.)	KVKs (no.)
DEE, SKRAU, Bikaner	One year Training on Nursery Management.	1	25	0
	Total(a)	1	25	0
DEE, MPUAT, Udaipur	Climatic Change and its Implications in Agriculture	1	17	4
	Total (b)	1	17	4
DEE, AU, Jodhpur	Post-Harvest Management of Vegetables and Arid Fruits grown in Arid Regions of Rajasthan	1	20	5
	Improved POP of seed spices grown in Jodhpur region	1	25	4

DEEs	Training areas	Trainings (no.)	Participants (no.)	KVKs (no.)
	Scientific cultivation of Garlic, Onion, Carrot and Other crops	1	17	6
	Total (c)	3	62	15
DEE, SKNAU, Jobner	Four days Institutional in-service training programme on "Promotion of Public Private Partnership under Extension Reforms"	1	31	7
	"PRA tools and techniques for SREP development"	1	25	8
	Total (d)	2	50	17
DEE, AU, Kota	Training on seed production and requirements for seed certification.	**1**	26	6
	Acquaintance with accounts rules and regulations	**1**	26	6
	Preparation of action plan 2018-19	**1**	20	6
	Total (e)	3	72	18
DEE, CCSHAU, Hisar	Workshop on 50 years of Haryana : Media perspective	1	23	19
	Workshop on Natural and Spiritual farming	1	22	14
	Seminar on Nurturing business incubation and entrepreneurial approach in agriculture	1	26	14
	SCOPUS Database	1	40	19
	Gem	1	52	19
	Agriculture Officers Workshop Rabi	1	250	19
	Demo on soil testing mini kit	3	42	14
	Training on Doubling of Farmers' Income	1	125	19
	Farmers empowerment and entrepreneurial development in agriculture	1	1	1
	Meeting regarding the OFT/FLDs	1	65	20
	Training on judicious of petrochemicals in agriculture	1	25	19
	Meeting on Accounts & Audit	1	32	19
	Total (f)	14	703	196
	Grand Total	24	929	250

6.2 Workshops/Meetings Organized

The DEEs organized various meetings and workshops for guiding, advising and supervising the activities of KVKs. Details of workshops/meetings organized by the DEEs in Zone–II and participation of KVKs are given in the table 6.3.

Table 6.3. Workshops/meetings organized by DEEs

Sl. No.	Workshop/meeting conducted	No. of KVKs participated
SKRAU, Bikaner, Rajasthan		
1	Review meeting of KVKs	2
2	Meeting for GRAM-Kota	2
MPUAT, Udaipur, Rajasthan		
1	Review Workshop cum Monthly meeting to monitor activities & progress of KVKs of MPUAT was held at KVK, Rajsamand on 11th April and 13th September, 2017.	6
2	18th Extension Education Council meeting of MPUAT was held on 27th July, 2017 (Hon'ble Vice-Chancellor, MPUAT, Prof. U. S. Sharma, Director, ATARI, Jodhpur, Dr. S. K. Singh, Former Director Extension, Dr. M. S. Shaktawat, Deans & Directors of MPUAT, Joint Directors and Officers of line department of Agriculture, ZDRs, HODs, Progressive farmers & Farm women participated.	7
3	Workshop of KVKs of MPUAT to finalize Annual Action Plan for the year 2018-19 was held on 16th December, 2017	6
4	Mid Review and Planning State Level Workshop of KVKs of Rajasthan to finalize Annual Action Plan (2918-19) was held on 27-28th December, 2017.	42
AU, Jodhpur		
1	2 days state level seminar on "Improved Production Technology and Value Chain Management of Onion and Garlic for uplifting Farmer's Income in Rajasthan"	6
2	Live telecast at DEE, AU, Jodhpur of Krishi Unti Mela held on 17th March at IARI Campus, New Delhi	6
3	4 days farmer Scientist Interaction workshop from 28th to 31rd Jan. 2018 held at DEE, AU, Jodhpur during RAF 2018 sponsored by Ministry of Agriculture And farmer welfare	9
4	Second meeting of Extension Education Council on 30th August, 2018	9
5	One Regional Agriculture Fair 2018 from 28th to 31st Jan., 2018,	9
6	Kharif farmer fair on dated 15th Sep., 2017 at DEE, AU,Jodhpur	9
7	International Honey Bee Day at DEE, AU, Jodhpur held on 19 August, 2017	4

Sl. No.	Workshop/meeting conducted	No. of KVKs participated
8	Soil Health Day at DEE, AU, Jodhpur held on 5 Dec., 2017	6
SKNAU, Jobner		
1	Second Extension Education Council meeting on October 27, 2OI7 at the University Headquarter.	7
2	One day workshop on Positive Attitude for better performance was organized fointly by the Directorate of Extension Education, SKNAU, Jobner & EEI, Anand (Gujarat) on 2nd August 2017 in which 7O University Officials and Research Students participated.	7
AU, Kota, Rajasthan		
1	KVKs monthly meetings	6
CCSHAU, Hisar		
1	Workshop on 50 years of Haryana : Media perspective	19
2	Workshop on Natural and Spiritual farming	19
3	State level Work Plan Workshop for KVKs of Haryana and Delhi	19
4	Seminar on Nurturing business incubation and entrepreneurial approach in agriculture	19
5	SAC Meetings	14
6	State Agriculture Plan Meeting	19
7	AOW	19
8	3rd Agriculture Leadership Summit	14

6.3 Visits of Directorate of Extension Education Personnel to KVKs

During 2017-18, Directorate of Extension Education personnel made 334 official visits to KVKs for distinguished purposes (Fig.6.1). The maximum visits (81) made for training programmes of KVKs followed by 64 visits for SAC Meetings, 50 visits for field days, 33 visits were for workshops/ seminar of KVKs and 17 visits were for technology week celebrations of KVKs and 89 visits for various activities of KVKs.

6.4 Publication and Updating of Technology Inventories

Assessing demonstrations of agricultural technologies for its best suitability in local conditions is one of the important functions of DEEs. In the current year, 34 technology inventories published by DEEs, while 31 technology inventories updated for benefit of farming community (Fig. 6.2).

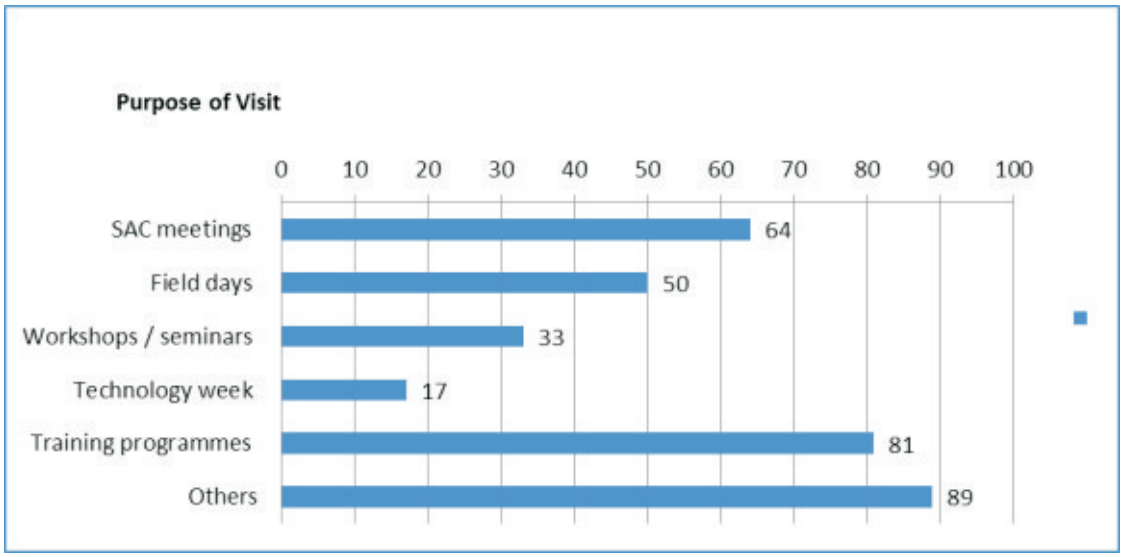


Fig. 6.1 Visits of Directorate of Extension Education personnel to KVKs.

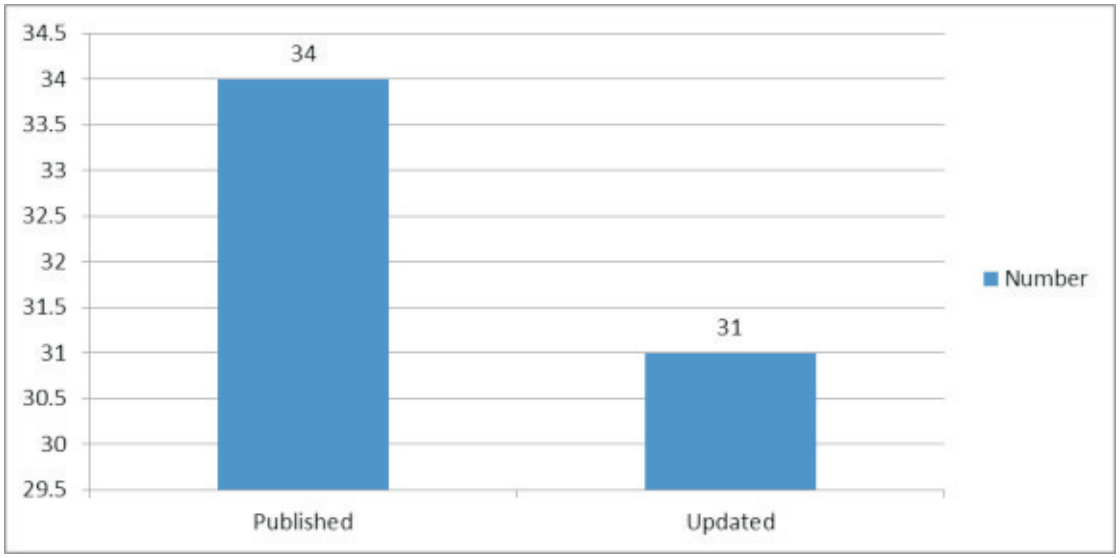


Figure 6.2 Technology inventory published & updated by DEEs.

6.5 Technological Products Provided to KVKs

DEEs provided technological products to KVKs under their jurisdiction in Zone-II as given in fig.6.3. Seed materials supplied to 44 KVKs, planting material to 30 KVKs, Bio-products to 26 KVKs, Livestock breed to 14 KVKs, Livestock product to 20 KVKs, Poultry breeds and poultry product to 14 KVKs. The details about technological products provided to KVKs are given in fig. 6.3.

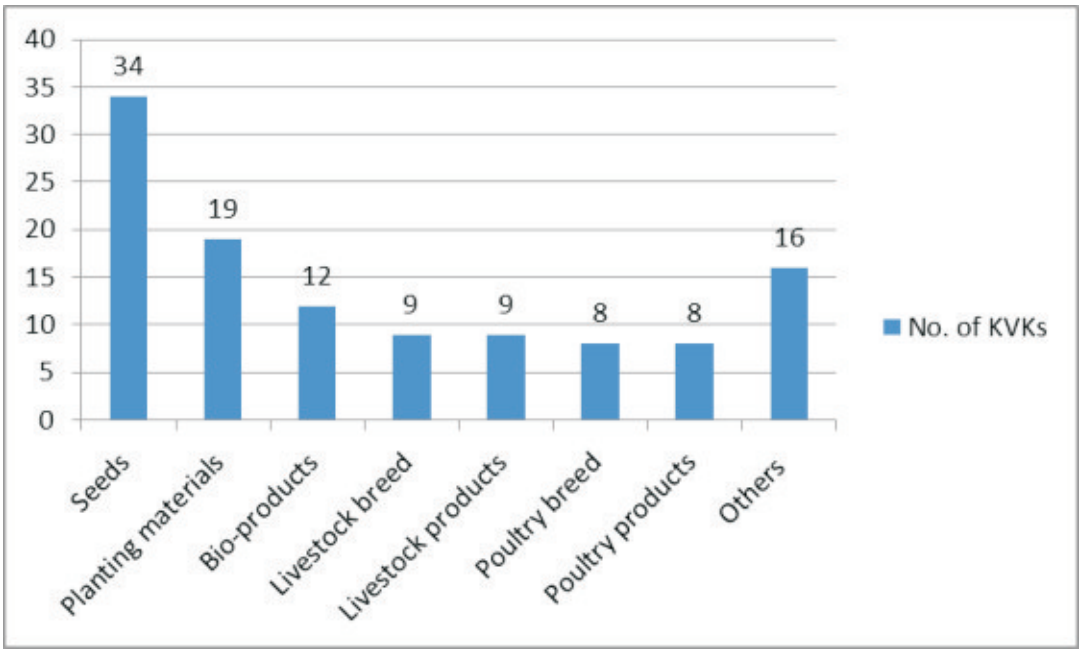


Fig. 6.3: Technology/planting material/breeds/products provided to KVKs.



Visit of DEE, RAJUVAS, Bikaner to Farmer's Field

CHAPTER 7

AGRICULTURAL TECHNOLOGY INFORMATION CENTRE

Agricultural Technology Information Centre (ATIC) is a single window delivery system which provides the services and information on recent technologies to the farmers for the areas in which the concerned institute is involved. This "single window" also acts as a delivery system for the technological products available at institute of State Agricultural University to the farmers and other interested groups as process of innovativeness in technology dissemination at the institute level. It also facilitates the farmers to access the institutional resources available in terms of technology, advice, technology products, etc. for reducing technology dissemination losses; and will provide mechanism for feedback from the users to the institute. Presently seven ATICs are working in the Rajasthan and Gujarat (Table 7.1). The details of activities undertaken by the ATICs during 2017-18 are listed in Tables 7.2 to 7.7, respectively.

7.1 Farmers' visit to ATICs

A total number of 36622 farmers had visited ATICs to get first hand technology information followed by 62759 farmers to purchase technology products developed by research institutes or agricultural universities and 8421 farmers visited for diagnosis of plant, soil and animal etc. Details of farmers' visits and the purpose of visits to ATICs are given in Table 7.2.

7.2 Operational Facilities in ATICs

ATICs are having the facilities of exhibition / technology museum and farmers' feedback register. Six ATICs are having reception counter and sales counter. Touch

Table 7.1 ATICs functioning in Rajasthan and Gujarat

S. No	Name of ATIC	Host Institute	ATIC Manager
1.	CAZRI, Jodhpur	CAZRI, Jodhpur	Dr.Bhagwan Singh
2.	SKRAU, Bikaner	SKRAU, Bikaner	Dr Meenakshi Chaudhary
3.	MPUA&T, Udaipur	MPUA&T, Udaipur	Dr. I. J. Mathur
4.	IARI, New Delhi	IARI, New Delhi	Dr. N. V. Kumbhare
5.	NDRI, Karnal	NDRI, Karnal	Dr Arun Kumar Misra
6.	CCSHAU, Hisar	CCSHAU, Hisar	Dr. Avtar Singh

Table 7.2 Farmers' visits to ATICs

S. No	Purpose of visit	Number of farmers' visited
1	Technology Information	32265
2	Technology Products	14336
3	Others (Diagnosis of plant, soil and animals)	538

screen Kiosk, cafeteria facilities are available in three ATICs. The details of operational facilities available ATICs of Zone-II are given in Table 7.3.

7.3 Technology information provided by ATICs

All the ATICs are responsible to provide latest information to the farmers on the various components like varieties / hybrids, pest and disease management, agro-techniques, soil and water conservation, post harvest technology and value addition, animal husbandry and fisheries. The number of farmers benefiting by the information provided on these commodities through Kisan Call Centre / other phone calls from farmers (20998), Video Shows (3895), letters received and replied (380), training to farmers / technocrats / students (285), others (122). The details of technology information provided by ATICs are given in Table 7.4.

7.4 Publications (Print & Electronic Media)

ATICs of Rajasthan, Haryana and Delhi are actively involved in distribution of information to the farmers through publications viz. print and electronic media related to agriculture and allied sectors. Various publications benefited the large number of farmers viz. books (7060), technical bulletins (14063), technology inventory (29) and others (29) like newsletters, folders, leaflets, etc. The details of publications (print & electronic media) provided by ATICs are given in Table 7.5.

7.5 Technology Products

ATICs provided technology products like seeds (3918.52 q) and planting materials 120464

Table 7.3 Operational Facilities in ATICs

S.No.	Particulars	Availability (Please √ mark)	Number of ATICs
1	Reception counter	√	6
2	Exhibition / technology museum	√	6
3	Touch screen Kiosk	√	2
4	Cafeteria	√	3
5	Sales counter	√	6
6	Farmer's feedback register	√	6

Table 7.4 Technology information provided by ATICs in Zone- VI

Information category	No. of ATICs	No. of Farmers benefited	Category of information						
			Varieties / hybrids	Pest manage -ment	Disease manage -ment	Agro-techniques	Soil and water conser-vation	Post harvest technology and Value addition	Animal husban-dry and fisheries
Kisan Call Centre / other Phone calls from farmers	5	20998	14135	1581	2168	1359	938	1082	3373
Video shows	4	3895	597	871	646	145	268	45	1294
Letters received	4	80	31	7	41	6	0	0	0
Letters replied	3	300	251	25	50	24	5	10	6
Training to farmers / technocrats / students	2	285	0	0	0	0	30	0	255
Others	1	122	0	0	0	0	0	0	122

Table 7.5 Publications (Print & Electronic media) provided by ATICs in Zone- VI

S. No	Particulars	Number sold	Revenue generated (Rs.)	Farmers benefited
1	Books	7060	195307	12432
2	Technical bulletins	14063	48500	5508
3	Technology Inventory	29	0	29
4	CDs	22	0	22
5	Others (Leaflets and Folders)	29	0	29

nos.), poultry (2872 nos.) and bioproducts (1.78 q) to 19715, 28495, 0 and 17 number of farmers, respectively. The details of technology products provided by ATICs are given in Table 7.6.

7.6 Technology services

ATICs provided technology services like soil and water testing, plant diagnostics, services to line departments and others (animal treatment and FLD) benefiting 1557, 788 and 3581 number of farmers, respectively. The details of technology services provided by ATICs are given in Table 7.7.

Table 7.6 Technology Products provided by ATICs

S.No	Particulars	Quantity	Unit of quantity	Value (Rs.)	Number of farmers benefited
1	Seeds	3918.52	Quintal	19630631	19558
2	Planting materials	120464	Numbers	1706796	10915
3	Poultry	2872	Numbers	991500	1228
4	Bio-products	26.39	Quintals	242090	1066

Table 7.7 Technology services provided by ATICs in Zone- VI

S. No	Particulars	Number of farmers benefited
1	Soil and water testing	1557
2	Plant diagnostics	788
3	Services to line departments	3581



Visitors at ATIC-IARI, New Delhi

CHAPTER 8

ON FARM TESTING

Importance of location specificity in development of appropriate technology, keeping agro-ecological, socio-economic and cultural parameters in view has been fully exploited. This has paved way for technology assessment in different micro environment to suit varied situations through participatory approach by improving scientists- farmers linkages. The multi-disciplinary team of scientists of the centres and farmers involved in different micro farming situations jointly decided in nature of interventions in fully participatory mode. The process of technology integration, therefore, is of paramount importance for increasing the farm output with productivity, stability, sustainability and equitability consideration. The details of interventions for different fields, viz. crops vegetable crops, fruit crops, plantation crops, fodders, spices livestock, mushroom, apiary etc. taken by each KVK are presented in according to the nature of intervention. Another noticeable feature of interventions is the priority for meeting domestic needs of food, fuel, fodder, economic viability and suitability of technology within households recourses; stability of production and sustainability of technology in small production system. The results of On-Farm Testing will help in extrapolation for deciding the recommendations domains of different technology/technology modules.

Natural Resource Management

Problem definition: Low yield of Castor

Technology Assessed: Intercropping of mung bean and cluster bean in castor

KVK, Bhiwani in Haryana conducted on-farm trial to assess effect of intercropping on additional return in castor. The intercrop system of planting of castor as main crop and growing mung bean and cluster bean between two rows had realized a net return of Rs. 61311 ha and Rs. 62291 /ha respectively as compared to the recommended practice with net returns of Rs. 30588/ha. The effect of using intercropping mung bean and cluster bean was found remunerative and the average increase in net return per ha was found 100.4% & 103% respectively in mung bean and cluster bean).

Majority of farmers have accepted suitability and profitability low cost intercropping intervention. They will follow same during kharif 2018 in their fields.

Problem definition: Low yield in late sown wheat under long duration Basmati area

Assessed (Comparative performance of Wheat sowing with different methods)

KVK, Ambala in Haryana conducted on-farm trial to assess Comparative performance of Wheat sowing with different methods and Relay seeding perfomed better than Conventional method & Zero tillage due to B C Ratio (3.8).

Table 1. Assessment of Mung bean & cluster bean as inter crop in Castor

Technology Option	No. of trials	Yield (Kg/ha)	Net Returns (Rs. In Thousands./ha)
Sole castor (Farmers practice)	10	2058 kg/ha	30588.00
Intercropping of castor with mung bean (1:3)		1600 kg/ha + 900 kg/ha	61311.00
Intercropping of castor with guar (1:3)		1600 kg/ha + 1000 kg/ha	62291.00

Table 2. Assessment of new Paddy variety (PR-126)

Technology Option	No. of trials*	Yield (q/ha)	Net Returns (Rs. in lakh./ha)	BC Ratio
T_1 – Conventional method (F.P.)	3	49.1	62,825.00	2.95
T_2 – ZT (CCSHAU) -Rec.		52.5	73,550.00	3.7
T_3 – Relay seeding (Ass.)		52.2	73,970.00	3.8

*No. of trials are no. of replications.

Problem definition: Non Judicious use of Fertilizers in cotton.

Technology Assessed: Efficient use of fertilizer in cotton crop.

Cotton is main cash crop of Hanumangarh district in Kharif season. Farmers of this area usually prefer use of Di-ammonium phosphate (DAP) in standing crop of cotton after first irrigation. They believe that it increases plant growth and yield. KVK Hanumangarh-I, conduted on farm trial to assess the efficacy of fertilizers in cotton. Use of fertilizers as per recommendation and foliar application of Urea phosphate (17: 44), NPK (19 : 19 : 19) and Potassium sulphate (0 : 0 : 45) had realized a net return of Rs 56902/ha as compared to recommended practices with net return of Rs. 50412-/ha (12.87% increase in net return per hectare).

Overall perception of farmers is quite satisfactory. Farmers have committed to apply foliar application in coming season.

Varietal Evaluation

Problem definition: low productivity of fodder crop variety and non availability of green fodder for longer duration.

Technology Assessed or Refined (as the case may be): Yield performance of berseem varieties

KVK, ICAR-NDRI, Karnal conducted On Farm Trials on varietal evaluation of berseem varieties i.e. BL-42, BL-10 and Mescavi. The result indicated that BL-42 recorded highest average fodder yield 1352 Qtls/ha and green fodder availability up to first week of June. Variety BL-10 average green fodder yield recorded 1272 Qtls/ha and green fodder availability upto second week of June. Variety.

Table 3. Effect of fertilizer application on cotton

Technology Option	No. of trials	Yield (q/ha)	Increase yield (%)	Net Returns (Rs./ha)	B:C
Use of DAP in standing crop. (Farmers Practice)	6	19.60	--	44060.00	1.98
Use of fertilizers as per recommendation. (Recommended Practice)		21.28	8.57	50412.00	2.06
Use of fertilizers as per recommendation with foliar application of Urea phosphate (17 : 44), NPK (19 : 19 : 19) and Potassium sulphate (0 : 0 : 45)		23.48	19.80	56902.00	2.11

Table 4. Yield performance of Berseem variety

Technology Option	No. of trials	Green Fodder Yield (qt./ha)	Increase in yield (%)	Net Return (Rs./ha)	B:C Ratio
Mescavi (Farmers Practice)	24	988	--	148200.00	3.50
BL-42		1352	26.92	160500.00	4.79
BL-10		1272	22.32	148500.00	4.51

Berseem variety BL-42 and BL-10 grown in place of mescavi in Karnal district area for long duration of green fodder availability as found in this assessment.

Farmers have shown interest towards both varieties and as per availability of seeds, farmers will sow in coming season.

Problem definition: Low yield of old varieities

Technology Assessed or Refined (as the case may be) Assessment of Paddy variety

KVK, Ambala in Haryana conducted on-farm trial to assess the yield of new variety of paddy (PR-126) with PR-114 and PR-126. And PR-126 perfomed better than PR-114& PR-124 due to higher yield (7.5 t/ha) & B C Ratio (3.32).

Based n performance of PR-126 variety of paddy, farmers have committed to use seeds in coming kharif 2018.

Problem definition: Low yield of mustard in upland topography

Technology Assessed: Performance Evaluation of Suitable Mustard varieties

KVK, Udaipur conducted on-farm trial to assess suitable mustard variety for the area. Three varieties of mustard, viz. Pusa Jai Kisan, Laxmi and RH-749 were assessed at the fields of 10 farmers. Laxmi was found to be most suitable with yield of 16.48 q/ha in comparison to RH-749 (16.25 q/ha) and Pusa Jai Kisan (14.05 q/ha). The net return was also found to be highest with Laxmi, although RH-749 also provided similar returns and hence it can be adopted as an alternate variety for mustard in the region.

It has also been narrated by farmers that Laxmi variety performed better in upland topography as water retention capacity is low.

Table 5. Assessment of new Paddy variety

Technology Option	No. of trials*	Yield (t/ha)	Net Returns (Rs. in lakh./ha)	BC Ratio
T_1 – P.R.114 (F.P.)	3	5.96	57,380.00	2.64
T_2 – P.R.-124 (PAU) - Rec.		6.46	61,130.00	2.36
T_3 – P.R.-126 (PAU)-Ass		7.5	81,250.00	3.32

*No.of trials are no. of replications.

Table 6. Performance of alternate varieties of Mustard:

Technology Option	No. of trials	Yield (q/ha)	Net Returns (Rs. in lakh./ha)
Pusa Jai Kisan (Bio – 902) (Farmers Practice)	10	14.05	0.269
Laxmi (RH-8812) (Recommended Practice)		16.48	0.353
RH-749		16.25	0.343



OFT on Mustard – RH- 749



OFT on Mustard varieties

Problem definition: Low yield of Maize during Kharif season.

Technology Assessed: Assessment of maize variety

Maize is one of the staples in the diet of the people of Udaipur region. The farmers in the region are still using older varieties with lower yield potential. In order to provide farmers with more varietal options, KVK, Udaipur conducted on farm trial to assess the suitable variety of maize in the region. Two varieties namely PHI 3502 and Bio 9682 were assessed. PHI 3502 was found to be more suitable.

Farmers told that size of cabs is more attractive of RHI-3502 in comparison of Bio-9682.

Table 7. Assessment of suitable varieties of Maize

Technology Option	No. of trials	Yield (t/ha)	Net Returns (Rs. in lakh./ha)
PHI 3502	10	4.38	0.324
Bio 9682		4.25	0.295





OFT on Maize Variety

Problem definition: Poor yield of Chilli

Technology Assessed: Assessment of suitable variety of Chilli for Udaipur District

Chilli (Capsicum annum L.) is an important condiment and a cash crop of the area but its productivity is quite low. Among several factors, lack of improved varieties is the main constraint for getting higher production. A few high yielding varieties have been released and recommended for cultivation in different locations but no information is available for this agro climatic condition. The farmers are growing the local types with poor yield. Therefore, the present OFT was undertaken by KVK Udaipur to find out suitable variety of chilli for popularization in the region. Sitara variety was found to be most suitable as compared to others with highest yield of 7.85 t/ha.

Table 8. Assessment of varieties of Chilli:

Technology Option	No. of trials	Yield (t/ha)	Net Returns (Rs. in lakh./ha)
T1 : Local	10	5.31	0.54
T2 : Star-2		6.03	0.69
T3 : Sitara		7.85	1.05
T4 : Priya		7.00	0.88

Assessment of suitable kharif onion varieties

KVK, Anta in Rajasthan conducted on-farm trial to assess performance of kharif onion varieties available in the market. In kharif season only limited varieties are grown by the farmers and generally dual season variety N-53 is grown by the farmers in large area. However, this centre assessed the varieties of NHRDF, Kota and DOGR, Pune for the better yield and quality production. The yield of Bhima Subhra was found highest (391q/ha), but cost benefit ratio is low, due to low market price in local market. The variety Bhima Super was found better in quality in terms bulb size and got highest cost benefit ratio (4.01).

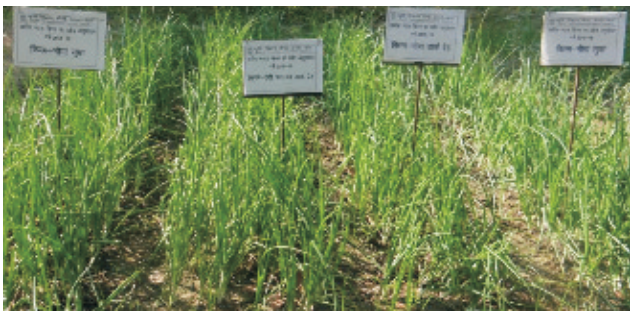


Table 9. Assessment of kharif onion varieties

Technology Option	No. of trials	Yield (Q/ha)	Net Returns (Rs. lakh./ha)	B:C ratio
T_1- Farmers practices (ADR/N-53)	5	356.00	3.61	3.71
T_2- Bhima Super (DOGR)		366.00	4.17	4.01
T_3- Bhima Subhara (DOGR)		391.00	3.89	3.88
T_4- Bhima Dark Red (DOGR)		360.00	3.92	3.95

Assessment of garlic varieties.

KVK, Anta in Rajasthan conducted on-farm trial to assess performance garlic varieties available in the market. In rabi season only G-282 variety is grown by the farmers and generally used as seed material for the next year. The quality in term of size and neck thickness is deteriorated along with re-sprouting. However, this centre is tested the varieties of NHRDF, Kota for the better yield and quality production. The yield of G-50 was found highest yield (88.94q/ha) with high benefit cost ratio.

Farmers have accepted yield potential of garlic variety but majority of farmers opined about vary poor market price and loss remunerative return of garlic cultivation since last two years.



Table 10. Assessment of kharif onion varieties

Technology Option	No.of trials	Yield (Q/ha)	No. of cloves/bulb	Bulb wt. (g)	Cost of cultivation	Gross return	Net return	B:C ratio
T_1- Farmers practices G-282	5	82.67	21.30	32.14	120000.00	264500.00	144500.00	2.20
T_2- G-386		72.86	19.13	24.86	120000.00	233000.00	113300.00	1.94
T_3- G-50		88.94	22.50	37.01	120000.00	284000.00	164000.00	2.36

Problem definition: Low yield of mustard

Technology assessed: To assess the feasibility of mustard varieties

Mustard is a major crop of Bundi district in Rabi season covering 75 thousand hectare area out of 251 thousand hectare net cultivated area of the district. Productivity of mustard crop in district is low due to several factors. Lack of seeds of high high yielding new varieties is one of the major factors causing low productivity of mustard. Keeping view, KVK Bundi assesses the feasibility of mustard varieties to sort out the problems at farmer's field through on farm testing. The result revealed that variety Giriraj (DRMR IJ 31) recorded highest yield (20.4 q/ha) followed by NRCHB 101 (19.3 q/ha), NRCDR 2 (18.55 q/ha), RH 749 (17.47 q/ha) and lowest yield recorded in check Boi 902 (17.22 q/ha). In respect to economics highest net return and B C ratio were observed in Giriraj (DRMR IJ 31) followed by NRCHB 101, NRCDR 2, RH 749 and lowest in check BIO 902

Seeds of especially Giriraj variety has been kept for coming rabi 2018-19 multiplication.

Table 11. Assessment of new mustard varieties in Bundi district

Technology Option	No. of trials	Yield (qt./ha)	Increase in yield (%) over check	Gross Return (Rs./ha)	Net Return (Rs./ha)	B:C Ratio
T1- RH 749	4	17.45	1.33	69800.00	42420.00	2.55
T2- NRCHB101		19.3	6.51	77200.00	49820.00	2.82
T3- Girriraj		20.4	18.47	81600.00	54220.00	2.98
T4- NRCDR 2		18.55	7.72	74200.00	46820.00	2.71
T5- BIO 902 (Check)		17.22	-	68900.00	41520.00	2.52

Technology Assessed: Assessment suitable fenugreek variety

Farming Situation - Irrigated

Problem - Low & instable productivity

Fenugreek is the most important seed spices crop of the district. Due to lack of seeds of improved varieties mostly farmers are using local seeds. As a result reduction in yield and quality parameter, KVK-Chittorgarh conducted varietal assessment of Fenugreek developed by NRCSS, Ajmer

Duration, grain colour, size of grain, less incidence of disease and higher yield were found as preferred traits in fenugreek.

Integrated (Balanced) Nutrient Management

Problem definition: Low yield of baby corn

Technology Assessed or Refined (as the case may be): Assessment of different fertilizer doses in Baby corn

KVK, Soniapt conducted on-farm trial on Integrated nutrient management in Baby corn.

Table 12. Assessment of different varieties of Fenugreek

Technology Option	No. of trials	Yield (qt./ha)	Increase in yield (%)	Net Return (Rs./ha)	B:C Ratio
Local seed	03	12.90	-	28860.00	1.92
AFG-1		14.70	13.95	34980.00	2.33
AFG-2		15.30	18.60	37020.00	2.46
AFG-3		15.80	22.48	38720.00	2.58
AFG-4		16.40	27.13	40760.00	2.71

Farmers have not standardized fertilizers doses for this new emerging crop in region hence low productivity is reported. To overcome this cause comparison of different fertilizers recommendations were done.

Table 13. Integrated nutrient management in Baby corn

Technology Option	No. of trials	Productivity Per Unit(qt/ha)		Net Return(Profit) in Rs/unit	B:C Ratio
		COBS	GREEN FODDER		
Farmers Practice(NPK) 100:50:00	03	15.2	184.0	113235.00	2.72
Rec. Dose of Fert(NPK) 150:60:60(Maize)		16.4	196.5	136000.00	3.16
Rec. Dose of Fert in Baby Corn (DMR) 180:60:60		17.6	221.0	151250.00	3.36

Problem definition: Low yield of Ber of 10 years orchards

Technology Assessed: Assessment of foliar spraying of micro nutrients.

KVK, Pali in Rajasthan conducted on-farm trial to assess performance of foliar spraying micro nutrient in 10 years old orchards of ber fruits. The effect of spray of micro nutrient in ber plants had net return of Rs. 2,080/plant- with B:C ratio 4.1 as compared to farmer practice with net return of Rs. 1,425.50/plant- with B:C ratio of 2.2.

Low yield of cumin

Cumin (*Cuminum cyminum* Linn) is one of the most important seed spice and crop of arid and semi- arid region of Rajasthan. The on-farm trial on nutrient management in cumin was conducted at Palari Ranawata an operational village of Krishi Vigyan Kendra, Jodhpur, Rajasthan to assess performance of foliar

Table 14. Nutrient Management in ber plant

Technology Option	No. of trials	Yield (kg/plant)	Net Returns (Rs. /plant)	B:C ratio
Farmer practice	3	55.2	1425.5	2.2
Recommended Fertilizer Dose (N:P:K 1.1:0.6:0.2 per plant)		68.3	1607.00	2.8
Recommended Fertilizer Dose+ Spraying of zinc sulphate (0.5% in September)		77.6	1804.00	3.9
Recommended Fertilizer Dose+ Spraying of zinc sulphate and borex (0.5% in September)		80.4	2080.00	4.1

spraying of micro nutrients under irrigated conditions.

Problem diagnose

Deficiencies of micro nutrient in soil.

Details of technologies selected for assessment/refinement

The treatments undertaken were:

T1 Farmer practice (Available seed use &fertilizer)

T2 Evaluation (Seed GC-4+Fertilizer+

1. Vegetative Stage (55days after sowing) spray FeSO4 0.25% +0.1% Citric acid
2. Flowering (75days after sowing) FeSO4 0.50% +0.1% Citric acid

Source of technology: State Agriculture department, ICAR and SAU

Production system and thematic area: Nutrients management

Observation Record

1. Yield

2. B:C Ratio

Results on farm trials

Crop/ Enterprises	Farming situation	Problem Diagnosed	Title of OFT	No of trial	Technology assessed	Parameter of assessment	Data on the parameter		Result of assessment	Feeds back from the farmer	Any refinement done	Justification of refinement
1	2	3	4	5	6	7	8		9	10	11	12
							T-1	T-2	% increased			
Cumin	Irrigated	Deficiencies of micro nutrient in soil.	Low yield of cumin	3	Integrated Nutrient Management	Plant height	26.8cm	30 cm	11.94	Farmers appreciated the variety due to wilt resistant and high yield	-	-
						Branch of plant	7	8	14.28			
						No. of umbel	5	7	40			
						Yield	8.40	10.20	21.43			
						B:C	3.51	4.03	-			

Technology assessed		Productivity per unit (Q/ha.)		Cost of cultivation (Rs/ha)		Net return (Rs./ha.)		BC Ratio	
T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Farmer Practice	Evaluation (Seed GC-4+Fertilizer)	8.40	10.20	25650	28550	90080	115063	3.51	4.03

Assessment of efficacy of foliar spraying of micro-nutrient in Guava

An OFT was conducted by KVK, Baran, Rajasthan to find out appropriate nutrient management practice for management of flower and fruit drop and to ensure the quality and productivity in guava orchards. In this practices on and two-time foliar application of 0.3% boric acid were tested. The assessed practice of two-time foliar application of 0.3% boric acid on 20 Oct. and 20 Nov. was found to be better fruit set and quality with 14.11% increase in yield as compare to farmers practice (control) and 9.44% increase in yield as compare to one-time foliar application (recommended practice) of boric acid.



Table 15. Effect of Boric acid application on growth, yield and quality of guava fruit.

Technology Option	No. of trials	Fruit weight (g)	Fruit size (cc)	TSS (Bricks)	Ascorbic acid (mg $100g^{-1}$)	Yield (kg $plant^{-1}$)	Increase in Yield (%)	Net return (Rs./ha)	B:C Ratio
No use of boron (Farmers Practice)	05	132.42	135.47	10.45	181.46	43.43	--	198483	2.34
One time foliar spray of Boric acid @ 0.3% on 20 October (Recommended Practice)		137.24	138.34	11.25	183.23	47.37	9.44	206588	2.32
Two times foliar spray of Boric acid @ 0.3% on 20 October & 20 November (Assessment)		141.63	142.65	12.20	185.45	51.84	14.11	229482	2.44

Assessment of nutrient management in wheat.

KVK, Baran in Rajasthan conducted on-farm trial to find out appropriate nutrient & its dose to minimize the physiological disorder and growth of wheat crop. Wheat is the major crop of the district grown in about 80000 ha. and it can be easily cultivated in late rabi conditions. Application of zinc is the main micro nutrient affect the plant growth. In this practices against the farmer's practices i.e. unbalance use of multi-micronutrient based in the form of high power or not use of proper dose of micronutrient especially Boron, KVK Baran was tested two other treatments i.e. basal application of zinc sulphate and ferrous sulphate @ 25kg/ha and one foliar application of zinc sulphate and ferrous shlphate 5g/L at 35 DAS, that were found to be better 18.55% yield increase than farmer practice. The foliar application of zinc sulphate decrease the incidence of yellowing of plant of wheat.



Table 16. Effect of micro nutrient wheat.

Technology Option	No. of trials	No. of tiller plant^{-1}	Grain yield (kgha^{-1})	Straw yield (kgha^{-1})	% increase over control	Cost of cultivation (Rs.ha^{-1})	Gross return (Rs.ha^{-1})	Net return (Rs.ha^{-1})	BCR
No use/One FS of multi micro nutrients @ 2ml^{-1} water (Farmers Practice)		13.52	4797.5	5181.3	-	28437	91920	63483	2..23
Basal application of $ZnSO_4$ @25kgha^{-1} & $FeSO_4$ @25kgha^{-1} (Recommended Practice)	05	14.12	5267.2	5688.6	9.79	30687	100919	70232	2.39
T_2-+FS of $ZnSO_4$ and $FeSO_4$ @ 5gL^{-1} 35 DAS (Assessed Practice)		15.06	5487.5	6142.5	18.55	31887	108972	77085	2.42

Nutrient Management

Problem definition: Low productivity

Technology Assessment: Effect of balance use of fertilizers (as per STV) with bio-fertilizer on curd quality and productivity of cauliflower

Cauliflower is an important vegetable crop of Chomu area, but it has been observed that cauliflower growers are not applying proper nutrient management and not seedling treatment with any liquid bio-fertilizers, so that the cauliflower productivity and curd quality are affected. Then the on-farm-trials were conducted the assessed technology of cauliflower seedling deep with Azospirillum and PSB @30 ml/liter of water before transplanting and found increased yield of 28.23% and good curd quality of cauliflower.

Table 17. Effect of balance use of fertilizers (as per STV) with bio-fertilizer on curd quality and production of cauliflower

Technology Option	No. of trials	Av. Yield (q/ha)	Increase yield (%)	Gross Return (Rs.900/ qt.)	Cost (Rs./ha.)	Net Return (Rs./ ha.)	B:C Ratio
100-150 kg/ha. Urea or mix fertilizers (12:32:16), 150 kg/ha, Sulphur 10-15 kg/ha and Agromin (micro nutrient) 30 kg/ha. (Farmers Practice)	5	255	--	2,29,500	1,09,285	1,20,215	2.10
Use of 120:80:60 kg/ha NPK, half dose of recommended nitrogen and full dose of P&K applied as basal and half N applied top dressing and 1.0 kg/ha ammonium molybdenum in basal application (Recommended Practice)		288	12.94	2,59,200	1,10,230	1,48,970	2.35
Recommended dose of fertilizer (RDF) (as per STV) and cauliflower seeding treatment with Azospirillum and PSB @30ml/liter of water before transplanting		327	28.23	2,94,300	1,11,080	1,83,220	2.65

OFT on "Low Productivity and Poor Curd Quality in Cauliflower"



Treatment T-1



Treatment T-2





Treatment T-3

Integrated Pest Management

Problem definition: Heavy infestation of white fly in cotton – KVK Fatehabad

Technology Assessed: white fly Management in cotton

Cotton is an important cash crop of Haryana. However, there is severe attack of white fly in cotton which resulted in quality & yield loss of cotton. Two of Spray of neembicidin (1 litre/acre +dimethoate @ 300ml /acre) reduced white fly population 6,10,11 & 21.11 increase yield

Date of sowing 2nd week of May 2017

Date of harvesting 1st week of Nov. 2017

Variety BT Cotton Sriram-6588

Table 18. Effect of different insecticides for control of white fly incotton

Technology Option	No. of trials	White fly population before spray(month of july august & sept.)	White fly population after spray(month of july august & sept.)	Average yield (kg/ha)	% increase in yield	B:C Ratio
Farmers Practice	8	10,11,8	13,12,15	2250	-	-
Neembicidine 2 spray (1lit/acre)+ dimethoate 300ml/ acre		6,10,11	6,6,7	2725	21.11	1.20
Neembicidine 2 spray (1lit/acre)+ difenuthioran 350gm/ acre		8,10,8	5,6,7	2675	16.67	`1.14
Neembicidine 2 spray (1lit/acre)+ bufrofengin 350ml/ acre		10,8,10	6,4,5	2600	15.55	1.07





Problem definition: Heavy infestation of rhizome rot in ginger

Technology Assessed: Assessment of insecticides/biopesticides against rhizome rot disease

Ginger used to be a very popular crop of Jhadol block in Udaipur district of Rajasthan. But with continuous attack of rhizome rot in the crop, farmers have stopped the cultivation of ginger after facing heavy losses in yield. KVK Udaipur conducted an OFT to identify the suitable treatment for rhizome rot by comparing the package (T2) of soil application, seed treatment and sprays of insecticide with farmer's practice of M 45 (T1). T2 was found to be most effective and yield was increased by 56.88 percent as compared to T1.



Table 19. Assessment of insecticides/biopesticides against rhizome rot disease

Technology Option	No. of trials	Incidence of rhizome rot (%)	Yield (t/ha)	% Increase in yield over farmer's practice
Farmer practice : Application of Ditham-45	20	80	4.41	133.78
Soil application of trichoderma with FYM(3 kg per qtl FYM),Seed treatment with chloropyriphos (@ 5 ml/kg seed),streptocyclin(@ 3gm/20kg seed),tebuconazole(@ 2gm/kg seed) and bavistin(@ 2.5gm/kg seed) also two spray with SAAF(@ 2gm/lit water) at 30 and 60 days of crop and if needed and also saaf at storage 5 gm per kg seed		15	10.34	

Problem definition: Low productivity of soybean

Foliage feeding pests attack in soya bean resulting in higher losses of yield in the crop. KVK Udaipur conducted OFTs to assess efficacy of spinosad, Beauveria bassiana and Azadirachtin on reducing the attack of these pests as compared to farmers' practice of Trizophos. Spinosad was found to be of better performance against foliage feeding pest as it resulted in 52.54 percent yield increase over farmers' practice, whereas Triazophos led to an increase in yield by 43.81 percent.

Table 20. Effect of pesticides in control of foliage feeding pest in soybean

Technology Option	No. of trials	Incidence of pest (%)	Yield (kg/ha)	% Increase in yield over farmer's practice
Farmers practice : Triazophos40 EC 2ml per lit	3	17	1582	43.81
Spinosad 45SC 0.5 ml/lit (3 spray at 25,40 and 55 days after germination)		12	1678	52.54
Beauveria bassiana 6.5 ml/lit (3 spray at 25,40 and 55 days after germination)		28	1499	36.27
Azadirachtin (1st spray 5 ml/lit at 25) + Beauveria bassiana 6.5 ml/lit (2 nd spray at 40 and 3rd at 55 days after germination)		35	1355	23.18



Assessment of technology for management of pests in soybean

Assessment of technology for management of pests in soybean

Problem definition: Low yield of gram

Technology Assessed: Management of pod borer in chickpea

Gram is one of the major crops of Udaipur region. Pod borer is one of the most damaging factors in gram productivity. To identify the most suitable solution to the gram pod borer problem, KVK Udaipur conducted an OFT with 10 farmers testing 3 possible technologies. T3 having a combination of Quinolphos and NPV showed lowest pest infestation (15%) and highest yield (21.96 q/ha).

Table 21. Bio-intensive pest management in gram pod borer in chickpea

Technology Option	No. of trials	Incidence of pest (%)	Yield (qt/ha)	% Increase in yield over farmer's practice
Quinolphos 2 ml per litre water	10	23	18.88	34.85
NPV@250 LE two spray 30 and after 60 days or incidence of pest		29	17.13	22.35
First NPV & second with quinalphos		15	21.95	56.78



Problem definition: Low productivity of wheat

Technology assessed or refined (as the case may be): Management of termite in wheat

Wheat is an important crop of Tonk district covering 69184 ha area. High incidence of Termite in wheat crop right from seed germination to maturity is major cause in the district. The assessment of seed treatment with fipronil 5SC @ 6 ml/kg seed, reduced the damage over control was 17.46% and yield was increased from 38.74 q/ha to 44.25 q/ha i.e. increase in yield was 14.25%.

Table 22. Assessment of seed treatment by new insecticides on germination, termite damage and yield in wheat

Observation Parameters	Fipronil 5SC	Chloropyriphos 20 EC
No. of Effective seedling	42.6/m^2	38.6/m^2
No. of Effective tillers	5.2/plant	3.85/plant
% increase over effective seedling	10.36%	-
% increase over effective tillers	35.06%	-
Ear head damage	2.6/m^2	3.15/m^2
% Control over recommended	17.46%	-

Technology Assessed	No. of Trials	Productivity (q/ha)	Cost of Cultivation (Rs.)	Net Return (Profit) in Rs. / unit/ha	B:C Ratio
T_1: Farmers practice Chloropyriphos 20 EC @ 6.5 ml/ kg/ seed	05	38.74	30250	62968	2.08
T_2: Fipronil 5 SC 6.0 ml/kg seed		44.25	30250	71906	2.38

Management of shoot and fruit borer of brinjal

An assessment trial was conducted by KVK Dungarpur on management of shoot and fruit borer of brinjal. T1- Farmers practice (No proper use of PP measures); T2- Use of pheromone trap + spray of azadirachtin @ 5ml/ l + spray of Emamectin benzoate 5% SG @ 0.4g/l at the incidence of insect that yield (T2) was the 207.45 % higher (280.40q/ha) than T1 group and giving more profit (Rs 252000 with B:C ratio 2.07) as compared to T-1 (91.20q/ha).



OFT on brinjal, KVK, Dungarpur

Technology Option	No. of trials	Yield (Qtl/ha)	% Increase in yield over farmer's practice
Farmer practices- no proper use of PP measures	6	91.20	
Use of pheromone trap + spray of azadirachtin @ 5ml/ l + spray of Emamectin benzoate 5% SG @ 0.4g/l		280.4	207.45

Problem definition: Low productivity of early cauliflower

Technology Assessed: Integrated pest management of major pests of early cauliflower.

KVK Ajmer conducted 20 On Farm Trials to manage major pests of early cauliflower. The trials were laid out in village Bhanwata & Tabiji (Pisangan). The assessed practice of 3 foliar application of Spinosad 2.5% SC @ 500 ml/ha with sticker Sandovit at ETL and installation of pheromone traps @ 10-12 traps per ha recorded 16.33% increased yield over local check. Besides this, it also gave higher net return of Rs. 2,74,300/- and BC ratio of 3.02 in comparison to farmer practice.

Table 23. Integrated pest management in early cauliflower.

Technology option	No. of trials	Average yield q/ha	Increase in yield (%)	% plant infested	Net return (Rs/ha)	BC ratio
Farmer practice – 3-4 sprays of non-specific insecticide without sticker at random	20	196.00	-	36.50	228182	2.71
3 foliar sprays of Spinosad 2.5% SC % EC @ 500 ml/ha with sticker Sandovit at ETL and installation of pheromone traps @ 5 traps per ha		228.00	16.33	14.80	274300	3.02





Problem definition: Low productivity of wheat due to heavy infestation of Nematodes.

Technology assessed: Nematodes Management in Wheat.

A trial was conducted by KVK Nohar, Hanumangarh-II to assess nematodes management in Wheat. Under T-1 (Farmer's practices) Carbofuran @ 2.5 Kg/ ha at first irrigation; T-2 (Recommended practice) Paciliomayces lilacinus culture @ 4 liter with 4 quintal farm yard manure per ha. The results revealed that T-2 Paciliomayces lilacinus culture @ 4 liter with 4 quintal farm yard manure per ha was recorded higher yield (55.80q/ha) also gave maximum net returns of Rs 59,270/ha with higher B:C ratio (2.54) as compared to T-1.

Table 24. Nematodes Management in Wheat

Technology Option	No. of trials	Yield (Qtl/ha)	Net Returns (Rs./ha)	BC Ratio
T1 : (Farmer's practices) Carbofuran @ 2.5 Kg/ ha at first irrigation	06	48.40	48100	2.31
T2 : (Recommended practice) Paciliomayces lilacinus culture @ 4 liter with 4 quintal farm yard manure per ha		55.80	59270	2.54

Problem definition: Poor yield in Mandarin

Technology Assessed: Management of Black Fly and Sooty Mould in Mandarin orchard

Mandarin is an important commercial orchard crop of Jhalawar district of Rajasthan, popularly known as Chota Nagpur in Rajasthan. However, there is high incidence of Sooty mould disease (Kali Massi) resulting in drastic yield loss. KVK Jhalawar conducted OFT to assessment on management of Black Fly and Sooty Mould in Mandarin orchard. The assessed technology of round the year schedule sprays of refinement technology reduce the percent of disease incidence from 26.70 to 6.30 and yield was increase by 37.10 percent.

Table 25. Management of Black Fly and Sooty Mould in Mandarin orchard

Technology Option	No. of trials	Incidence of Sooty Mould (%)	Yield (kg/ha)	% Increase in yield over farmer's practice	BC Ratio
T_1 = Farmer's practices (No spray or untimely spray, spray when completely sooty mould develop).	05	26.70	16630	-	-
T_2= Recommended practices spray of Imidacloprid 0.5 ml/L or Dimethoate 2ml/L water as per needed.		18.38	20200	21.46	1:2.06
T_3= **1st application –** Foliar spray of Imidacloprid 17.8 SL @ 0.5 ml/L with mixing 1.0% starch on the lower sides of leaves covering the entire tree canopy at 50% egg hatching stage (1st and 2nd week of April) then after 15 days spray of neem based pesticide @3 ml/L. **IInd application –** Dimethoate 30 EC @ 2.0 ml/L water with mixing 1.0% starch (2nd and 3rd week of July) then after 15 days spray of neem based pesticide @3 ml/L water and Carbendazim @2g/L water **IIIrd application-** Foliar spray of 10imethoate 30 EC @ 2.0 ml/L water with mixing 1.0% starch (1st and 2nd week of December).		6.30	22800	37.10	1:3.20



Black fly and sooty mould infested mandarin



Sooty mould free fruits in mandarin orchards

Majority of mandarin cultivators have shown acceptance towards performance of treatment (T3) in managing attack of insect pests.

Integrated Disease Management

Problem definition: Nematode problem in wheat

Technology Assessed: Management of Molya Nematode in wheat

Wheat is an important rabi crop of Haryana. However, there is severe incidence of molya nematode in Bhattu & fatehabad block of the district due to sandy soil in nature which resulted in yield loss of wheat.

Date of sowing	2nd week of Nov, 2017
Date of harvesting	2nd week of April, 2018
Variety	HD 2967

Feedback: Farmers were satisfied with crop rotation mustard in nematode problematic area.







Table 26. Effect of different practices for management of molya nematode in wheat

Technology Option	No. of trials	Initial cyst nematode population in 200 cc soil	Final cyst nematode population in 200 cc soil	% reduction in cyst nematode population	Average yield (kg/ha)	% increase in yield	B:C Ratio
Farmers Practice	8	10	19	+90	3700	-	1.07
Application of carbofuran@ 13 kg /acre at the time of sowing		10	9	-10	4200	13.51	1.28
Diversification through Mustard var.RH-749		10	5	-50	2400	Mustard crop gave beter yield as compared to wheat as well as decreases no. of cyst population upto 50%	1.46

Problem definition: Nematode problem in polyhouse

Technology Assessed: Effect of polythenesheet mulching in polyhouse against root knot nematode population

There are about more than 50 polyhouses in the district Fatehabad. Out of these more than 50% polyhouses are affected with root knot nematodes. The study indicates that soil solarisation with polythene sheet increases the sub soil temperature as compared to outside and also significantly reduced root knot nematode population

Date of covering of polythene sheet
14th June 2017

Date of removing of polythene sheet
24th July 2017

Initial root knot nematode population
285 per 200 cc soil

Final root knot nematode population
115 per 200 cc soil

Date	No. of trials	Temp. inside the beds covering polythene sheet (^{0}C)	Temp. outside the beds without covering polythene sheet (^{0}C)	Temp. outside polyhouse (^{0}C)
15-6-17	2	64	60	47
24-6-17		58	55	38.5
5-6-17		62	57	35
15-7-17		59	56	37
23-7-17		60	57	38





Problem definition: Severe incidence of Nematode in Guava

Technology Assessed: Management of Nematode in newly established Guava orchard

KVKs Sawai Madhopur, Rajasthan took up on-farm trials on management of nematode problem in newly established Guava orchard. The results indicate that the (a) At planting time :- Dip the plant root in solution of carbosulfan 1.5 ml/ lit water for 5 to 7 minute and Carbofuran 20 gm/pit before planting (b) After planting :- Carbofuran 3G @ 40gm for 1 yrs, 80 gm for 2 yrs and 100 gm for 3 years (Apply in dry condition, mix in soil around the plant) after 2 days. Propiconozol 2ml/ lit + neem based pesticide (1500ppm) @ 3 lit for 1 yrs, 5 Litre for 2 yrs and 10 Ltre for 3 years after 15-20 days in winter season. NEMA (Paecilomyces lilacinus 1.0 % WP, 2x 106 CFU/gm minimum) 10 gm/ plant, Trichoderma 10 g/ plant mix in vermicompost for 10 days then apply @ 200-300 gm/ plant gave 80% per cent survival rate over Farmer Practice and Dip the plant root in solution of carbosulfan 1.5 ml/ lit water for 5 to 7 minute and Carbofuran 20 gm/pit before planting.

Table 27. Management of Nematode in newly established Guava orchard

Technology Option	No. of trials	Plant Survival percent
T_1= Farmer practice (unknown about Nematode problem & use of Chloropyriphos) .	10	-
T_2= =(a) At planting time :- Dip the plant root in solution of carbosulfan 1.5 ml/ lit water for 5 to 7 minute and Carbofuran 20 gm/pit before planting (b) After planting :- - Carbofuran 3G @ 40gm for 1 yrs, 80 gm for 2 yrs and 100 gm for 3 years (Apply in dry condition, mix in soil around the plant) after 2 days - Propiconozol 2ml/ lit + neem based pesticide (1500ppm) @ 3 lit for 1 yrs, 5 Litre for 2 yrs and 10 Ltre for 3 years after 15-20 days in winter season - NEMA (Paecilomyces lilacinus 1.0 % WP, 2x 10^6 CFU/gm minimum) 10 gm/ plant, Trichoderma 10 g/ plant mix in vermicompost for 10 days then apply @ 200- 300 gm/ plant		80






KVK-Bikaner-II

Problem definition: Heavy infestation of bacterial blight cause heavy yield loss in clusterbean.

Technology Assessed (as the case may be): Management of bacterial blight

Cluster bean is an important cash crop during kharif season in rainfed area of Rajasthan. However, there is high incidence of bacterial blight resulting in yield and income loss.

Table 28. Effect of different fungicide on bacterial blight on cluster bean

Technology Option	No. of trials	Incidence of bacterial blight (%)	Yield (kg/ha)	% Increase in yield over farmer's practice
Cooper oxycholoride @2.5 g/lit water	3	55	14	-
Streptocycline 2.5 g and copper oxycholoride 30g in 10 lit. water foliar spray		40	16	14
Dip cluster bean seed in 250 ppm Streptocycline solution and Two time foliar spray of 1g streptocycline and copper oxycholoride 30 gm in 10lit water		10	18	19

Problem definition: Low yield of Mustard

Technology Assessed (as the case may be): Management of white rust in mustard.

White rust, caused by Albugo candida, is a highly destructive disease of mustard. This disease is characterized by the formation of white to cream coloured zoosporangial pustules on cotyledons, leaves, stems and inflorescences. Staghead galls are formed as the result of inflorescence infection. Most commercial Indian mustard (Brassica juncea) varieties are highly susceptible to this pathogen. It has been estimated that combined infection of leaf and inflorescence causes yield losses up to 60% or more in India. Thus, on-farm-trails were conducted at five farmers fields. Therefore, spraying of Metalaxyl 8% + Mancozeb 64% @ 2 gram/litre for the management of white rust of mustard. The assessed technology "Two sprays of Metalaxyl 8% + Mancozeb 64% @ 2.0 g/liter of water at 15 days interval" increase the yield of Mustard by 15.48 per cent over Farmer Plot.

Table 29. Management of White-rust in Mustard

Technology Option	No. of trials	Yield (q/ha)	% Increase in yield over farmer's practice	Cost (Rs./ha.)	Gross Profit (Rs./ha.)	Net Profit (Rs./ ha.)	B:C Ratio
Farmers Practice (No Spray)	5	15.18	---	22,700	60,720	38,020	2.67
Two sprays of Mancozeb 75 WP @ 2.0 gm/liter of water at 15 days interval (Recommended Practice)		16.87	11.13	24,200	67,480	43,280	2.78
Two sprays of Metalaxyl 8% + Mancozeb 64% @ 2.0 g/liter of water at 15 days interval		17.53	15.48	24,200	70,120	45,920	2.90

OFT on "Low Yield of Mustard by infestation of White-rust"



Treatment : T-1



Treatment : T-2



Treatment : T-3

Integrated Weed Management

Problem definition: Low productivity of clusterbean

Technology Assessed: Weed management in cluster bean

KVKs Bhiwani took up on-farm trial on chemical weed management in cluster bean. Results showed that chemical spray of Pendimethalin @ 3.3 litres/ha (Before the germination of the weeds) recorded best economical which gives B:C ratio (1:1.42 compared to farmer & recommended practice.

Table 30. Weed management measures in clusterbean

Technology Option	No. of trials	Yield (Kg/ha)	Increase in yield (%)	Net Return (Rs./ha)	B:C Ratio
No weed management (Farmers Practice)**	10	1690	--	29033	1.57
Hoeing at 25 and 45 days after sowing- (Recommended Practice)		2100	24.2	41053	1.79
Pendimethalin @ 3.3 litres/ha (Before the germination of the weeds)		2000	18.3	40455	1.89

WEED MANAGEMENT (Agronomy)

Problem definition: Low yield of Mustard due to parasitic weed infestation/competition

Technology Assessment: Management of Orobanche weed in Mustard

Indian mustard (*Brassica juncea* L.) is the principal oilseed crop of Rajasthan and covering an area of 98,450 ha. (2016-17) of Mustard in Jaipur District. Weeds are recognized as one of the major negative factors of crop production. Broomrape Orobanche has been causing heavy losses to the mustard crop in light soils of Jaipur Region. Weed infestation during early stages reflected the crop growth and reduction in yield up to 58 percent as Orobanche is reported to be the holo-parasitic weed, it is very tough to control by following physical and mechanical weed control methods. Hence, its control by chemical means will be the cost effective option for managing losses up to economical threshold levels. With this view the present On Farm testing was carried out to find out cost effective herbicide for the control of Orobanche weed causing yield reduction in Mustard. Mustard results show that the maximum yield, Yield increase percent, net return and B:C ratio 19.74 q/ha, 38.33%, 55960 Rs/ha and 3.43 respectively recorded with use of Glyphosate 10 SL 30 gm after 30 DAS and 50 after 50 DAS as compared to farmer practices.

Majority of farmers have shown keen interest in application of Glyphosate 10 SL 30 gm after 30 DAS and 50 ml after 50 DAS in coming rabi 2018-19 in mustard.

Table 31. Effect of Weed Management on yield and economics of mustard crop

Technology Option	No. of trials	Yield (qt./ha)	Increase in yield (%)	Net Return (Rs./ha)	B:C Ratio
One hand weeding 30-35 DAS (Farmers Practice)	5	14.27	--	34,572	2.54
Use of Pendimethalin 750 gm/ha. a.i. as a pre-emergence (Recommended Practice)		16.36	14.65	42,948	2.91
Use of Glyphosate 10 SL 30 gm after 30 DAS and 50 gm after 50 DAS		19.74	38.33	55,960	3.43

*DAS – Days After Sowing

OFT on "Effect of Weed Management on Yield and Economics of Mustard Crop"



Treatment : T-1



Treatment : T-2



Treatment : T-3

Natural Resource Management

Problem definition: Low yield of paddy

Technology Assessed: Comparative assessment of different leveling techniques for water management in Paddy (DSR) - IInd year trial.

KVK, Ambala in Haryana conducted On farm trial on comparison of different leveling techniques for water management in Paddy (under Direct Seeded Rice methods). It has been found that laser land levller, saved 21% irrigation water as compared to conventional leveling. However, when slope given in laser land leveling technology then 9% additional water can be saved. The yield was at par in both the laser land leveling technique but 13-14.5%, higher than conventional level technique in direct seeded rice.

Table 32. Comparative assessment of different leveling techniques for water management in Paddy (DSR)

Technology Option	No. of trials*	Yield (t/ha)	Net Returns (Rs./ha)	BC Ratio
T_1- Conventional leveling – F.P.	3	6.05	64,295	3.0
T_2- Laser land leveling – recomm. -PAU		6.83	75,080	3.25
T_3- Leser land leveling with slope –Ass.		6.92	76,510	3.30

*No. of trials are no. of replications.

Problem definition: Low yield of wheat under saline soil

Technology Assessed: Management of saline soil

KVK, Pali conducted on-farm trial to assess suitability of varieties of wheat under saline soil. The effect of treatments had net return of Rs. 32731/ha- with B:C ratio 2.8 as compared to farmer practice with net return of Rs. 18297/ha- with B:C ratio of 1.7.

Farmers have kept more than 30 percent produce of KRL 210 variety of wheat as seed for next year multiplication.

Table 33. Assessment of wheat under trial

Technology Option	No. of trials	Yield (Qtl/ha)	Net Returns (Rs. /ha)	B:C ratio
Farmer practice	5	22.20	18297	1.7
Var. Lok 1		28.60	28121	2.4
Var. KRL 210		31.80	32731	2.8

Farmers have kept more than 30 percent produce of KRL 210 variety of wheat as seed for next year multiplication

KVK-Dungarpur

In Som Kamla Amba Command Area of Aspur block, Farmers Practice (Rice-wheat cropping system, more quantity of water to crops in irrigation, using less FYM, no green manuring, no deep ploughing, sometimes excess use of chemical fertilizers-N and P only), Farmers are not taking wheat crop in rabi season not salt tolerant crops and resulted low yield of wheat crop. Yield of barley crop in salt affected soils was assessed by KVK Dungarpur using Deep ploughing (in summer)+ Green Manuring (in rainy season) + FYM+ Salt tolerant crop (Barley, var. RD 2786). Seed rate @125kg/ha+15tone FYM /(10Tone FYM+GM)+75kg N+40 Kg P2O5 +25kg Zinc sulphate. Result showed that use of Green manuring+15ton FYM+ Seed rate @125kg/ha+15tone FYM/(10Tone FYM+GM) +75kg N+40 Kg P2O5 +25kg Zinc sulphate improved soil fertility and barley grain yield up to 37.16per cent as compared to farmer's practices during the year 2017-18.



OFT on Barley, KVK, Dungarpur

Problem definition: Low yield of chickpea

Technology Assessed: The effect of row spacing

KVK, Bundi (Rajasthan) conducted on-farm trials to assess the effect of row spacing on chickpea yield and economics. The result revealed that chickpea sowing at 30 cm row spacing (Recommended Practice) recorded highest grain yield (24.38 q/ha) followed by

chickpea sown at 45 cm row spacing (23.03 q/ha) and 22.5 cm row spacing (23.03 q/ha) . Further, in respect to economics, higher gross return (Rs 107272 per ha), net return (Rs 75422 per ha) and B C (3.37) ratio were recorded under chickpea sown at 30 cm row spacing followed by chickpea sown at 45 cm row spacing and 22.5 cm row spacing. It has been reported that spacing of row to row 45 cm has been accepted in clayloam soils and farmers will follow in coming rabi season.

Table 34. Performance chickpea in different row spacing

Technology Option	No. of trials	Yield (qt./ha)	Increase in yield (%) over check	Gross Return (Rs./ha)	Net Return (Rs./ha)	B:C Ratio
T1- Chickpea sown at 22.5 cm row spacing (Farmers Practice)	8	19.97	-	87868	56018	2.76
T2- Chickpea sown at 30 cm row spacing (Recommended Practice)		24.38	22.08	107272	75422	3.37
T3- Chickpea sown at 45 cm row spacing		23.03	15.32	101332	69482	3.18

Problem definition: Low and yield of Onion

Technology Assessed: Assement of date of transplanting in Onion

Onion Crop is a ruminative crop and farmers are facing serious problem of Bolting, which KVK Chomu in Rajasthan conducted on-farm-trial to find out appropriate management to control bolting, which deteriorate the quality as well as production of Onion, so conducted On-Farm Trial to find out appropriate management to control bolting and low as well as poor yield in Rabi season. Three measures/problems have been identified i.e. bolting formation, early transplanting of seedlings and imbalance use of fertilizer, so to overcome this problem of Onion, the date of transplanting have been managed at farmers' fields i.e. transplanting of 45 days old seedlings in the first week of January. This treatment provide better yield and quality of Onion i.e. 290 qt. Bulb per ha. with a 2.57:1 BC Ratio.

Field Observation :

Treatment	Percentage of bolting in crop (%)	Double and Nalidar Onion (q/ha)
T-1	20-30	32
T-2	10-12	18
T-3	3-4	6

Table 35. Impact of date of transplanting in quality and yield in Onion

Technology Option	No. of trials	Bulb Yield (q/ha)	Market Rate (Rs.)	Gross Profit (Rs.)	Cost (Rs.)	Net Profit (Rs.)	B:C Ratio
Early transplanting of Onion seedlings in the first week of December (Farmers Practice) (T-1)	10	265	400	1,06,000	62,000	44,000	1.70
Transplanting of Onion seedlings in the last week of December (Recommended Practice) (T-2)		270	450	1,21,000	62,000	69,000	1.95
Transplanting of Onion seedlings in the first week of January(T-3)		290	550	1,59,500	62,000	97,500	2.57

OFT on "Low Yield and Quality in Onion"





Treatment : T-1



Treatment : T-2



Treatment : T-3

Problem definition: Low productivity of wheat

Technology Assessed: Assessment of seed rate in wheat (timely sown)

Low productivity of wheat was observed due to high seed rate by KVK. Therefore recommended seed rate was assessed at the farmers field. Results of one year revealed that highest grain yield (42.80 q/ha) was recorded under T2 as compared to T1 (40.10 q/ha). On the basis of one year data highest net return (Rs. 59590/ha) & B:C ratio (1:2.25) was recorded under T2 assessed technology.

30-40 kg/ha seed sowing of improved varieties of wheat has reduced cost Rs.1200-1500 per ha and yield maximization is another important factor for enhancing income.

Table 36. Results of seed rate assessment

	T_1. Farmers practice i.e. 150 kg/ha	T_2. 120 kg/ha. – Recommended
Seed yield q./ha.	40.10	42.80
Straw yield q./ha.	61.50	60.10
Biological yield q./ha.	101.60	102.90
Harvest index	39.47	41.59
Cost of cultivation Rs./ha.	48100	47500
Gross return Rs./ha.	102930	107090
Net return Rs./ha.	54830	59590
B:C ratio	2.14	2.25

Others

OTHERS ENTERPIRZE (AGROFORESTRY) – KVK Yamunanagar

Problem definition: Low income from sole poplar cultivation

Technology assessed: Assessment of different varieties of wheat as intercropped with poplar plants.

Among different wheat varieties evaluated under poplar based agrisilvicultural system, HD 3086 performed better in terms of yield as compared to WH 1105 because of high tillering character of HD 3086 which reflected in higher net return and higher benefits on per rupee invested.

Table 37. Performance of different wheat varieties in poplar based agrisilvicultural system

Technology option	No. of trials	Yield (q/ha)	Gross Return (Rs./ha)	Net Return (Rs./ha)	BC Ratio
WH 1105	5	42.75	86995	46607	2.15
HD 3086		44.55	90658	50270	2.24
Check (WH 1105)		53.55	108658	64620	2.47
Check (HD 3086)		57.00	113348	69310	2.57

TECHNOLOGY ASSESSMENT

Livestock based interventions

KVKs of Rajasthan, Haryana and Delhi conducted agriculture eco-system analysis of selected farm families using PRA tools and based on problem- cause analysis, major causes were finalized to carry out on-farm trials. Livestock based interventions include feeding, breeding and management of cow, buffalo, goat sheep and poultry etc. Based on importance as well as severity of causes, some on-farm trials have been highlighted here in:-

- Azolla is an aquatic fern and it contains 20-24% high quality protein (on dry weight basis). KVK, Ajmer conducted 15 on farm trials at village Dang Saradhana (Pisangan). The effect of appropriate feed and fodder management practice to enhance the milk productivity in cattle was assessed. The assessed practice of feeding of roughages (ad lib) and concentrate 2.5 kg per day with supplementary feeding of azolla 1.5 kg per day for 3 months increased the milk yield by 12.50% in comparison to farmers' practice. The technological option of Azolla feeding increased fat percentage by 8.45%. Further, net return and BC ratio has been higher in recommended practice (Rs 3612/month with B: C ratio 1.37) as against farmers' practice (Rs 1718/month with B: C ratio 1.21). Farmers have committed to continue this important intervention. Similarly other farmers of village have also accepted this technology and they will follow.



- KVK Alwar-I assessed effect of feeding of roughages and concentrate 3.0kg/day and Azolla 2.0kg/day for the management of low milk yield in buffaloes. The result showed milk yield enhanced by 21.17% under recommended practice (10.35lit/day) as compared to farmers' practice (8.50lit/day). After two years of implementation of this intervention, accessibility of Azolla has been increased and more than 35 farmers have established a small unit of Azolla for supplementation with feed to maintain milk yield of buffaloes in coming years.
- Azolla has been reported as potential feed supplement for dairy animals, which has rich nutrient and mineral profile. KVK, Bundi conducted 20 on-farm trials to find out the effect of Azolla feeding on milk yield in buffaloes. Farmers of Bundi district fed only cotton seed cake to their animals, which cannot fulfill nutrient requirement of milking animals. As per recommended practice feeding Azolla 1.5-2.0kg/day/buffalo for 60 days with 2.0 kg cotton seed cake. Results showed 17.50 percent increase in milk due to Azolla feeding along-with cotton seed cake (9.4lit/day/animal) over control group 8.0lit/day/animal). This intervention has been accepted by large

number of livestock farmers in nearby villages of district head quarter Bundi. It was also decided that State Department of Animal Husbandry will popularize Azolla in convergence mode in the district.

- KVK Chittorgarh also conducted ten on-farm trials on feeding of 2.0kg fresh Azolla along-with 50g mineral mixture to dairy cows for improving milk production. It was observed that milk yield under recommended group (4.10lit/day/cow) enhanced by 12.50% as compared farmers' practice (no mineral mixture supplementation and azolla etc). Productivity of milk in Desi cows is very low (1.5 to 2.75lit/day) and Azolla has been used as supplementary feed in cows of selected villages. Two years efforts of farmers and KVK Scientist has enhanced productivity of milk and farmers have fully showed acceptance towards use of Azolla and they will continue in future.
- Similarly, 20 trials were conducted by KVK Dholpur to assess the effect of Azolla feeding on milk yield of Murrah Buffaloes. Farmers' practice (feeding of concentrate mixture 1.0kg/2.5lit milk yield/day/head and 15kg green fodder); while under recommended practice fresh Azolla was added @ 2.0kg/head/ day to farmers' practice. Results indicated that buffaloes provided Azolla yielded 10% higher milk as compared to animals under control group (12.90lit/day). Net returns and B:C ratio was also higher from buffaloes fed Azolla (Rs 306/head/day with 3.55 B:C ratio) as compared to Farmers' practice (Rs 247/head/day with 2.76 B:C ratio) in Dholpur district.
- KVK Jaipur-I assessed technology of Azolla feeding to Sirohi Goat on milk yield by conducting on-farm trial under farmers' field. T1 : Farmers' practice – No Azolla feeding to goats. T2: concentrate mixture @1.5% of body weight/head and in T3: Azolla feed @ 500gm/day/goat. The result revealed that goats reared under T3 yielded14.87% higher milk/day. Net return from goats under T3 group was also higher (Rs 49.10/animal with 3.71 B:C ratio) as compared to farmers' practice (Rs 23.0/animal with 3.23 B:C ratio).





Reproduction Management in cows and buffaloes

- KVK Alwar-I assessed the effect feeding 60gm mineral mixture/day and twice deworming in a year with two Cu-Co tablets/day for ten days on buffalo calving interval. It was found that animals under recommended group inter-calving period was recorded 14.95 months as compared to farmers' practice (18.50 month); where the buffaloes were not given mineral mixture and deworming treatment. Farmers have realized that use of mineral mixture and deworming especially in buffaloes is essential for improving inter-calving period. Deworming not only reduced the parasite count and hair-coat shining but also resulted in substantial weight gain. This is due to control nutrient loss and increase in feed intake.
- KVK, Alwar-II conducted trials to manage infertility in buffaloes through OVSYNCH protocol. Under this protocol the animals were given three injections first on 0 day with 2.5 ml GnRH and second on 7th day with 2.0 ml of PGF2α and 9th day with 2.5 ml GnRH and then two Fixed time Artificial Insemination first after 12hr and second after 24hr. The technology recommended was fine tuned in managing the infertility in buffaloes by using OVSYNCH protocol. Net profit was earned Rs 15050/animal by the livestock owners with the highest B:C ratio 16.7 as compared to non-treated animals (infertile).
- Calving interval of local cow is extremely high i.e. 20-24 months. KVK Kota also conducted trial on assessment of Ovsynch protocol. T1- Farmers' practice; T2 - recommended practice (balanced ration) and T3 – Ovsynch protocol i.e. D-0 : GnRH 2.5 ml, D-7 : PGF2α 5.0 ml, D-9 : GnRH 2.5 ml and Artificial Insemination 12hr & 24hr). Pregnancies records indicated that highest conception rate was recorded from cows under T3 (80%) followed by T2 (60%) and T1 (40%), respectively.
- In Hanumangarh district, anestrous is the problem in buffaloes, which might be due to deficiency of essential and trace minerals or hormonal imbalance, but most common is due to mineral deficiency. KVK, Hanumangarh-1 conducted trial on buffaloes to solve the problem. Result of trial showed that mineral mixture is essential for reproduction in buffalo and Cu and Co are major ions for reproduction but presence of internal parasites reduces absorption of minerals and nutrient loss in animal body. It was observed that 4 animals showed heat signs out of six animals supplemented with mineral mixture, Cu and Co tablets and deworming as compared to non-treated group of animals.
- KVK Hanumangarh-II assessed effect of mineral and vitamin supplement in heifers on reproductive performance as per following treatments:-T1- Farmers' practice: Feeding straw + cotton seed cake and T2- Assessment: T1 + mineral mixture @ 30g/day/animal & vitamin supplement @ 50g/day/animal. Result showed that out of 5 animal on trial, 4 animal successfully conceived with success rate of 80% under

T2; while only 2 out of 5 animal conceived with only 40% success rate under T1 group. Hence, it can be concluded that in order to improve reproductive performance of heifers, mineral mixture and vitamin supplements are essential. This mineral and vitamin supplement has been found to improve growth rate, milk yield, reproduction performance and management of diseases under farmers' conditions.

- Anoestrus is considered a problem when cows are not seen in heat. Pregnancy is often the first cause of cows not being seen in heat. KVK Jodhpur-I assessed anestrus in heifers of arid region. T1- Farmers' practice; T2- concentrate feeding @1.5% body weight + mineral mixture 50g per day for 20 days and T3 - T2+ heat inducing capsule 6 per day for 2 days. In anoestrus heifer, T2 group animals exhibited 16.6 percent heat symptom within two week of treatment as compared to T1 and 33.3% animals exhibited heat symptoms in T3. Overall 16.6, 50.0 and 80.0 percent heifers exhibited oeestrus symptoms during the treatment group of T1, T2 and T3 respectively. Only 20% animals did not exhibit oestrus symptoms due to pathogenic conditions. Livestock keepers have committed to follow in near future.

Livestock Feeding Management

- KVK Churu-1 conducted 9 on-farm trials to assess the home prepared balanced concentrate mixture for feeding to milch cows. In conventional practice, farmers do not feed balanced ration to their milch cows but feed only cotton seed cake. Home-made concentrate mixture consisting of maize/pearl millet/barley - 30%, cotton seed cake- 20%, cotton seed -10 %, moong churi-17%, wheat bran-20%, mineral mixture-2% and salt-1% was offered to milking cows; while cows under control group only 3.0kg cotton seed cake was offered. Data analysis indicated that feeding of balanced home-made concentrate mixture to cows resulted in 14.15 % increase in milk per day (12.50 V/S 10.95 lit/day) and 47.56 % increase in fat content over farmers' practice. Net returns and B:C ratio was also found the highest from milch cows under recommended group (Rs 259.95 with 3.33 B:C ratio) over control group (Rs 37.65 with 1.24 B:C ratio). Majority of farmers have accepted and nearly farmers have also interested to adopt this technology.

- Low milk yield in post-parturient cross breed cows was assessed by KVK Jodhpur-I. During the transition period of dairy cows, which is between three weeks pre-partum and three weeks post-partum, the body undergoes various physiological adaptations, causing large changes in the metabolic profile. All these adaptations occur in a short period of time and contribute to most of the health problems of dairy cows, including metabolic and infectious diseases. T1 as control; T2 -2.0 kg balanced concentrate (30 kg) for 15 days pre-partum and T3 – T2+ anabolic preparation (1.0 lit.)+ feed additives (14 bolus) for trial period. Milk yield per lactation and B:C ratio was found the highest from cows under T3 group (5700 lit with 1.27 B:C ratio) over control group

(4500 lit with 1.0 B:C ratio). It is amply clear that economic returns are very high of this technology and easy to adopt.

- Milk yield of local cattle is extremely low due to poor feeding management. Supplementation of minerals is inevitable to achieve optimum health and production. KVK Kota conducted trials on supplementation of mineral mixture in ration. T1 -Farmers' practice of feeding green fodder plus straw and cereals + cakes; T2 –Farmers' practice + mineral supplement @30-40g/animal/day and T3–Farmers' practice + mineral supplement @40-50g/animal/day for trial period. Peak milk yield records indicated that the highest yield was obtained from cows under T3 (5.8 lit/day) followed by T2 (5.5lit/day) and farmers' practice (4.8lit /day). It has been further observed that regular feeding of mineral mixture @ 40-50 g/day/animal improved breeding efficiency and animal health. Farmers have fully accepted for large adoption.
- KVK Tonk assessed area specific mineral mixture for improvement in buffalo milk yield and health. T1-Farmers' practice of feeding normal ration; T2- recommended dry fodder +concentrates and T3-dry fodder + concentrates +Avika Minimics @ 40-50gm/day/animal for 25 days. Results showed an increase of 36.84 percent in milk yield of buffaloes (7.80/lit/day) as compared to farmers' practice (5.70lit/day). Net income earned for the trial period was Rs 8390/animal with 1.89 B:C ratio; while net return for the same period earned under farmers' practices was Rs 6194 with 1.64 B:C ratio. Up-scaling of this intervention will be done by KVK Tonk.
- Low productivity of milk in cows due to imbalance feeding was assessed by KVK Sikar. T1- Farmers' practice and T2 - Green fodder (15kg/day) + mineral mixture (45g/day) + UMMB (25g/day) + Co Cu tablets (10 no/day) to milch cows. The results indicated that cows under assessed group yielded 30% higher milk (8.26lit/day) as compared to farmers' practice (6.33 lit/day). Net returns earned per animal per year was also higher (Rs 17566 with B:C ratio 1.45) as compared to control group (Rs 9579 with B:C ratio1.27). Based on the results, it has been concluded that UMMB is superior than mineral mixture and if used regularly results in better health besides higher milk yield.

Nutrition Management

- KVK, Hanumangarh-1 conducted on-farm trial to increase fat% and SNF% in cross breed cow's as it has been noticed that low fat% & SNF% milk farmers get low cost at milk collection centers. The feeding of bypass protein with mineral mixture realized that average milk production increased with Fat% and SNF% as compared to normal feeding of animal at farmer's level. Due to this, sale price of milk also increased from 19.8 Rs/lit to 26.6 Rs/lit and animal health condition also improved. Net returns and B:C ratio was also found the highest from cows under recommended group (Rs 262.9 with 2.43 B:C ratio) over control group (Rs 163.8 with 2.37 B:C ratio). This technology need to be up-scaled in nearby villages.

- Dairy has been a source of stable income of farmers in Jaipur district. Natural feed stuff such as maize, wheat, barley, soybean etc. contains essential trace element, which are generally feeding to calves. So chelated mineral mixture are totally available for feed and fulfill the requirement of nutrients for cross bred cows. There is a need to maximize uptake Chelates by the animals as compared to non-chelated mineral mixture. Chelate minerals also improve performance, reproductive efficiency, immunity and milk production. KVK Jaipur-I assessed nutrition management for increased milk productivity in cross bred cows. Farmers' practice- Green fodder + 2.5 kg concentrate; recommended practice- 50 gm mineral mixture + feeding of concentrate mixture (1.0 kg/3 liter milk yield and 15kg green fodder. For assessed technology, recommended practice along-with feeding of chelated mineral mixture @60gm/day/cow. Data analysis indicates that milk yield from cows under assessment group increased by 11.72% over farmers' practice and the B: C ratio was also higher (2.34 versus 2.19) for the trial period. Famers' acceptance has been found and they have started using this technology.





- KVK Jalore assessed effect of goat milk curd as probiotic supplementation on growth of goat kids. The use probiotic from indigenous micro-biota could prevent pathogenic colonization of the digestive tract; stimulate development of the immune system and its response. Curd as a natural, cheaper and easily available probiotic supplement could serve as a nutritional intervention for augmenting growth in kids. Among the available forms of probiotics in the market, fermented products like curd may more beneficial than spray/bolus. The curd was prepared daily from goat milk and fed orally containing Lactobacillus Spp. (10 6-7 CFU/ml). Farmers' practice- No supplement is given; recommended practice- 1.5% of body weight concentrate ration + 5g/kid/day and assessment - 1.5% of body weight concentrate ration+ Goat milk curd @ 15ml/ kid /day up to 13 weeks. It was concluded that although balanced feeding is better way of improving health status of grower kids but probiotic supplementation (150gm concentrate mixture/kid/day+15ml goat milk curd /kid/day) enhanced and promoted higher growth in kids (45.5%) over farmers' practice. Livestock owners have committed to follow this technology on large scale.

- KVK Swaimadhopur assessed the effect of challenge feeding during advance stage of pregnancy on peak milk yield of buffalo. T1- farmers' practice use of 1.0kg cotton seed cake and T2- T1+2.0 kg wheat dalia + 100gm mixture (satavari 20 gm + methi 20gm + Ajwain 20gm + mineral mixture 40gm) per animal per day for a period of 60 days. Peak milk yield increased 23.59 % in buffaloes under T2 group; while peak milk yield increased 3.39% in buffaloes under Control group (T1). Lactational Milk Yield (LMY) of buffaloes under T2 group was recorded 441 litre; while it was 60.9 lit in control group of buffaloes.
- KVK Jodhpur-I assessed effect probiotic supplementation on growth of goat kids. Farmers' practice- No supplement is given; recommended practice- 1.5% of body weight concentrate ration and assessment- 1.5% of body weight concentrate ration + probiotic @ 5g/ kid /day up to 13 weeks. Results indicate that kids reared under T3 fetched the highest net return (Rs 5800/animal) due to highest body weight gain (35kg) as compared to farmers' practice (Rs 4560/animal) due to low body weight gain (24kg) at marketable age.

Calf -mortality Management

- Nine on-farm trials were conducted by KVK, Dholpur on effect of colostrum feeding on survival of newly born buffalo calves. Farmer's Practices: mother milk feeding to newly born calves. Recommendation is (feeding of colostrum at an interval of two hours +benmith tablet for highest survival of calves). The results revealed that recommended feeding to newly born buffalo calves resulted highest survival rate 89% as compared to farmers' practice (50%). Further, it might be concluded that feeding of colostrum to newly born calves at the earliest provides immunity to the calves which minimized mortality and the farmers obtained more returns through sale of healthy animals. This technology also resulted better growth rate in surviving calves.

Assessment on use of milking stand and stool

- An assessment trial was conducted by KVK Dungarpur to assess the drudgery reduction while milking the animals by farm women. T1- Local practice of milking; while under T2- Drudgery reducing tool was introduced i.e. revolving milking stool and stand. It was found that use of revolving milking stool and stand increased working efficiency of farm women at the time of milking the animals and it saved 15% time as compared to traditional method of milking and 100 per cent reduction of pain in low back and feet and 50 per cent reduction of pain in upper leg/thigh by using improved tool for milking.



OFT on milking stand and stool; KVK, Dungarpur

Backyard Poultry Management

- Ten on-farm trials were conducted by KVK Banswra to evaluate the performasnce of Pratapdhan poultry birds in Banswara district. The egg prodcution from Pratapdhan birds was (162 eggs/bird/year) significantly higher (385.7%) over local poulrty birds (42 eggs/bird/year) which earned the maximum net rteutns with highest B:C ratio (4.20) over desi poultry birds (B:C ratio1.20). Similarly, ten on-farm trials were conducted by KVK Bhilwara to assess egg production in Pratapdhan birds using balanced ration @100g/bird/day along with 50g Azolla supplementation/day/bird. Results indicate that superior egg prodcution from Pratapdhan birds as comared to desi poultry birds. In both disticts farmenrs have accpeted suitability as well as profitability of Pratapdhan breed of poultry and majority of farmers particularly tribal farm-families have established as backyard poultry units to augment income round the year.

CHAPTER 9

FRONT LINE DEMONSTRATIONS

Front Line Demonstration (FLD) is a unique approach to provide a direct interface between researcher and farmers as the scientists are directly involved in planning, execution and monitoring of the demonstrations for the technologies developed by them and get direct feedback from the farmers' fields about production in general and technology being demonstrated in particular. Thus, FLDs provide an opportunity to researchers and extension personnel for understanding the farmers' resources and requirement to fine tune and modify the technologies for easy adoptability at farmers' fields. FLDs are conducted under close supervision of the scientists of the Krishi Vigyan Kendras. 61 KVKs are actively involved in conductance of FLDs under close supervision & guidance of ICAR-ATARI, Jodhpur in Rajasthan, Haryana and Delhi. Other than FLDs, farmers field days, trainings, workshops, seminars, farmers-scientists interaction etc. were conducted to facilitate interactions between researchers, extension workers and farmers/farm women. During these interactions, knowledge/ experiences/constraints were exchanged for improving performance of different technological packages under FLDs. Hence adoption of proven agricultural technologies on large scale could be ensured among farming community.

During 2017-18, a total 25369 FLDs were conducted on crops (23842), kitchen gardening (931), dairy (108), farm implements (136), and others allied sectors (332). These FLDs were undertaken on 10056.82 ha area including 1439 units, respectively. FLDs undertaken by KVKs of ICAR-ATARI, Jodhpur categorized into various sub-heads which are given in Table 9.1.

Table 9.1 Achievements of FLDs conducted during 2017-18 by KVKs of ICAR-ATARI, Jodhpur.

Sl. No.	FLDs	Rajasthan			Haryana & Delhi			Zone Total		
		Farmers	Area (ha)	Units	Farmers	Area (ha)	Units	Farmers	Area (ha)	Units
1	Oilseed crops under NMOOP	6299	2602		1217	500		7516	3102	0
2	Other Oilseed crops	1020	514.1		145	58		1165	572.1	0
3	Pulse crops under NFSM	6506	2759.6		1558	680		8064	3439.6	0
4	Other Pulse crops	922	384.8		483	193.2		1405	578	0
3	Cereal crops	1678	611.5		1257	551.6		2935	1163.1	0
4	Commercial crops	100	40		322	128.8		422	168.8	0
5	Fodder crops	352	62		54	14.42		406	76.42	0

Sl. No.	FLDs	Rajasthan			Haryana & Delhi			Zone Total		
		Farmers	Area (ha)	Units	Farmers	Area (ha)	Units	Farmers	Area (ha)	Units
6	Horticultural crops							-	-	-
	Fruits	101	21.25		10	4		111	25.25	0
	Vegetables	625	316.25		102	32.8		727	349.05	0
7	Medicinal Crops	30	12		-	-		30	12	0
8	Millet Crops	216	89.5		10	4		226	93.5	0
9	Spice Crops	835	268.4		-	-		835	268.4	0
	Total (a)	**18684**	**7681.4**	**0**	**5158**	**2166.82**	**0**	**23842**	**9848.22**	**0**
10	Fishery							0	0	0
11	Dairy	108		108				108	0	108
12	Poultry	20		400				20	0	400
13	Farm implements	9	0		127	58		136	58	0
14	Farm women							0	0	0
15	Kitchen gardening	865		865	66		66	931	0	931
16	Others	272	124.6		60	26		332	150.6	0
	Total (b)	1274	124.6	1373	253	84	66	1527	208.6	1439
	Grand Total (a&b)	19958	7806	1373	5411	2250.82	66	25369	10056.82	1439

Cluster Front Line Demonstrations (CFLDs) on Pulses under National Food Security Mission:

A ICAR-DAC&FW collaborative project entitled "Cluster Frontline Demonstrations on Pulses Production Technology" is being implemented with the active involvement of Division of Agricultural Extension, ICAR, New Delhi through a network of 534 KVKs across the country since October 2015. Total 49 KVKs including 34 KVKs from Rajasthan and 15 KVKs from Haryana have been actively involved in conductance of CFLDs in Kharif, Rabi and Spring/Summer season during 2017-18.

During 2017-18, total 8800 CFLDs on pulses were allocated for demonstration to harness production potentialities of the newly released varieties along with full package of practices in the 3520 ha area (Table 9.2). CFLDs were organized during Kharif-2017, Rabi-2018 and Summer-2018 in participatory mode. A critical gap analysis has been done by a team of KVK's scientists to rationalize demonstration of different critical inputs and critical practices as per needs and prevailing farming situations based on financial provision under CFLDs. An area of 3439.60 ha was covered with active involvement of 8064 partner farmers under CFLDs.

Table 9.2 Targets and achievement of CFLDs on pulses under NFSM during 2017-18

State & Season	Sanctioned		Implemented	
	Demo	Area	Demo	Area
Rajasthan (Kharif 2017)	3300	1320.00	2787	1229.60
Haryana (Kharif 2017)	275	110.00	203	100.00
Rajasthan (Rabi 2017-18)	3450	1380.00	3469	1430.00
Haryana (Rabi 2017-18)	650	260.00	480	230.00
Rajasthan (Summer 2018)	250	100.00	250	100.00
Haryana (Summer 2018)	875	350.00	875	350.00
Total	**8800**	**3520.00**	**8064**	**3439.60**

Table 9.3 State wise & crop wise yield gap between CFLDs, farmer practice & state average yields (2017-18)

Name of State	Name of Crop	Demo yield (q/ha)	Farmers practise (q/ha)	*State average yield (q/ha)	**National average yield (q/ha)	Yield gap between demo & farmers practise (q/ha)	Yield gap between demo & state avg. yield (q/ha)
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(3-4)	(8)=(3-5)
Rajasthan	Green gram-Kharif	6.84	5.26	4.52	418.44	1.58	2.32
Haryana	Green gram-Kharif	9.20	6.15	6.99		3.05	2.21
Rajasthan	Moth bean	5.01	3.59	3.00	-	1.42	2.01
Rajasthan	Black gram	8.34	6.25	6.06	547.05	2.09	2.28
Rajasthan	Chickpea	18.10	13.79	10.53	858.60	4.31	7.57
Haryana	Chickpea	17.31	12.50	8.45		4.81	8.86
Haryana	Lentil	10.72	8.11	8.70	791.61	2.61	2.02

*http://www.agriculture.rajasthan.gov.in/content/agriculture/hi/Agriculture/statistics.html

**http://mospi.nic.in/statistical-year-book-india/2017/177

Performance of CFLDs on Moth bean during Kharif Season (2017) in Rajasthan:

Moth bean is an important pulse crop of arid and semi-arid regions of India. Moth bean is a hot weather and drought resistant legume. The crop is generally grown in north western desert regions of India especially in area where moong bean suffers from drought. Moth bean crop is extensively grown in Rajasthan. Moth bean demonstrations were laid out in 110 ha area at 265 farmers' field in five districts of Rajasthan state (Table 9.4). The average yield under demonstration was 5.01q/ha with net return of Rs. 6336/ha compared to local variety (3.59/ha). Under demo, a yield advantage of 42.83% was observed.

Table 9.4 Performance of CFLDs on moth bean during Kharif-2017-18 in Rajasthan

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety demonstrated	Area (ha)	No. of demo	Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
I a – Arid western plains zone	Jodhpur-I	3.68	CZM-2	30.00	75	4.30	5.13	19.30	3700	5790	1.40	1.60
	Barmer-I	0.85	RMO-435	20.00	50	2.50	5.21	108.4	3450	6785	1.32	1.59
			Total	**50.00**	**125**	-	-	-	-	-	-	-
			Average	-	-	**3.40**	**5.17**	**63.85**	**3575**	**6287**	**1.36**	**1.59**
II a – Transitional plain of inland drainage	Nagaur-I	3.93	CZM-2	20.00	50	2.83	3.00	6.01	-960	1156	0.90	1.11
II b - Transitional plain of Luni basin (Semiarid)	Pali	3.14	CZM-2	20.00	40	4.50	6.60	46.67	5525	8418	1.40	1.77
I c- Hyper arid and partially irrigated western plain (Arid)	Churu- I	3.68	RMO-257	20.00	50	3.82	5.11	33.77	5168	9529	1.63	2.03

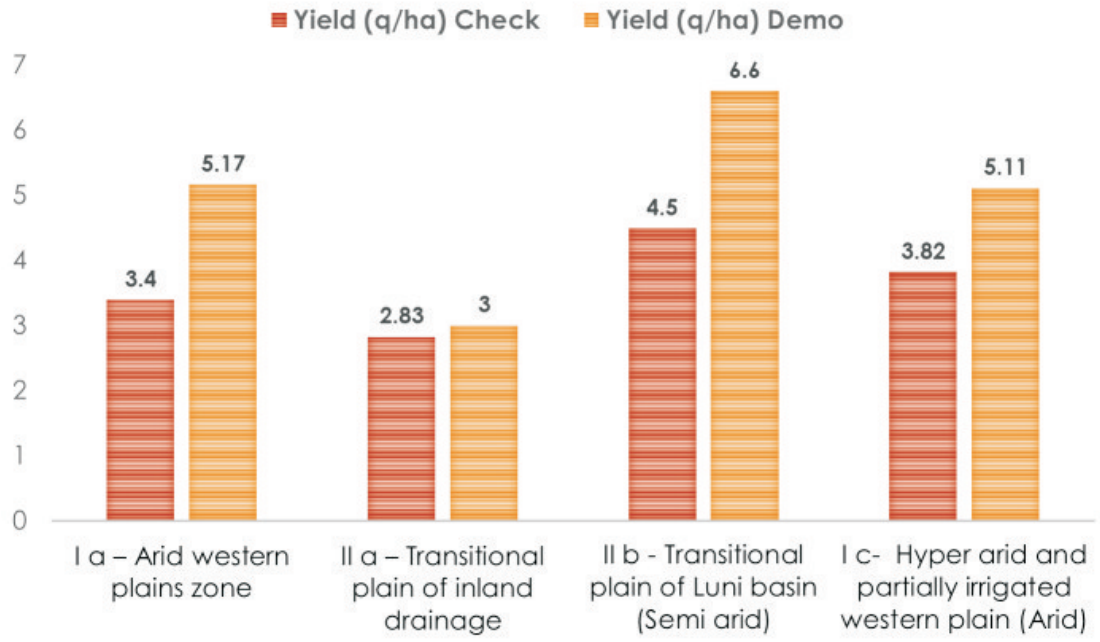


Fig-1 Agro climatic zone wise performance of moth bean in Rajasthan during Kharif-2017.



Moth bean variety - CZM-2 at KVK Nagaur-I (Rajasthan)

Performance of CFLDs on Green gram during Kharif Season (2017):

Green gram is one of the important pulse crops in India. It is grown in approximately 3.50 million ha area in India and 1.10 million ha in Rajasthan. It is a drought resistant crop and suitable for dry land farming and is predominantly grown as an intercrop with other crops in typical arid region especially in Barmer and Jaisalmer districts. Green gram supplies protein requirement of vegetarian population of the country. It contains about 25 percent protein,

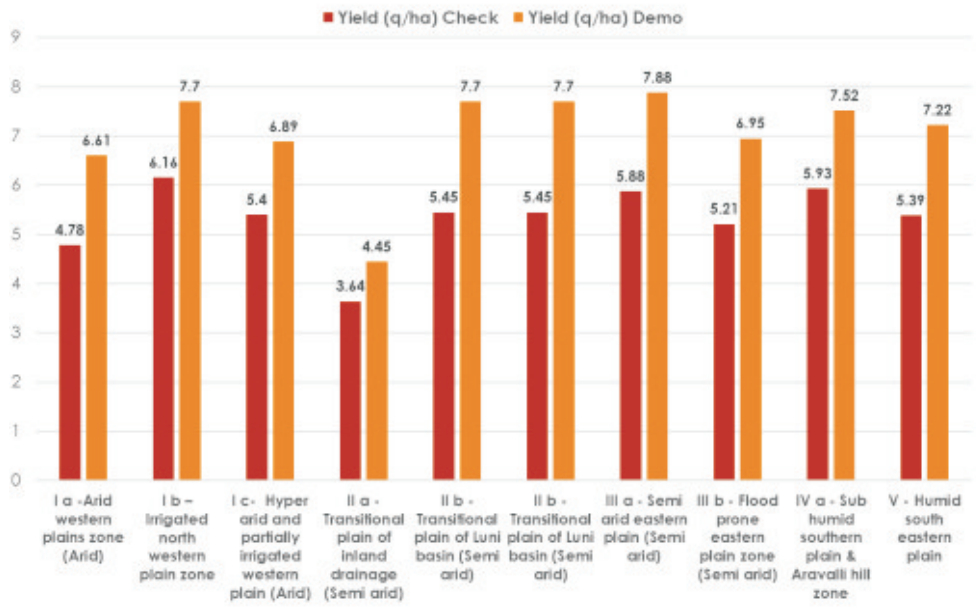


Fig-2 Agro climatic zone wise performance of green gram in Rajasthan during Kharif-2017.

which is almost three times that of cereals. It is consumed in the form of split pulse as well as whole pulse.

A total of 1694 CFLDs were laid out in 789.6 ha area in Rajasthan and Haryana states during Kharif 2017 (Table-9.5 and Table-9.6). Out of total CFLDs, 1516 demonstrations were conducted in 699.6 ha area of Rajasthan state while 90 ha area covered under 178 demonstrations in Haryana. Highest average yield was observed in semi-arid eastern plain (Semi-arid) (III a) i.e., 7.88q/ha which involved Ajmer, Tonk & Jaipur-I district. In Rajasthan, maximum yield of 10.27q/ha was recorded by KVK, Ajmer under green gram package demonstration including improved variety IPM-02-03. The performance of CFLD of green gram is depicted in Fig-2. Majority of farmers have followed application of Post emergence herbicide (Imazethapyr @50 g ai ha^{-1}on 15-20 DAS) in green gram. Management of sucking pests was done by all partner farmers under CFLD of green gram. Farmers have committed to follow management of sucking pests in green gram during Kharif-2018.

Table 9.5 Performance of CFLDs on green gram during Kharif-2017-18 in Rajasthan

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demon-strated	Area (ha)	No. of Demo	Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
I a -Arid western plains zone (Arid)	Barmer- I	1.21	GAM-5	30.00	43	4.30	6.89	60.23	17510	25181	2.38	2.90
	Jodhpur-I	3.96	IPM-02-03	30.00	75	5.25	6.33	20.57	16169	20890	2.23	2.45
			Total	**60.00**	**118**	-	-	-	-	-	-	-
			Average	-	-	**4.78**	**6.61**	**40.40**	**16839**	**23035**	**2.31**	**2.68**
I b – Irrigated north western plain zone	Hanumangarh-I	4.84	MH-421	20.00	50	6.16	7.70	25.00	20247	26732	2.44	2.65
			Total	**20.00**	**50**	-	-	-	-	-	-	-
			Average	-	-	**6.16**	**7.70**	**25.00**	**20247**	**26732**	**2.44**	**2.65**
I c- Hyper arid and partially irrigated western plain (Arid)	Bikaner- I	6.83	IPM-02-03	20.00	50	6.59	8.10	22.91	13178	18520	1.91	2.19
	Jaisalmer- I	3.55	IPM-02-03	40.00	50	4.80	6.40	33.33	15614	22104	2.45	2.69
	Churu- I	2.81	IPM-02-03	30.00	75	4.80	6.18	28.75	9592	16636	1.91	2.37
			Total	**90.00**	**175**	-	-	-	-	-	-	-
			Average	-	-	**5.40**	**6.89**	**28.33**	**12794**	**19086**	**2.09**	**2.42**
II a - Transitional plain of inland drainage (Semi arid)	Jhunjhunu	5.75	IPM-02-03	50.00	125	3.02	3.62	19.87	964	1274	1.08	1.09
	Sikar	8.35	IPM-02-03	20.00	50	5.50	6.59	19.82	11650	15105	1.78	1.89
	Nagaur-I	6.02	GM-4	31.60	79	2.41	3.14	30.29	-2029	889	0.84	1.07
			Total	**101.60**	**254**	-	-	-	-	-	-	-
			Average	-	-	**3.64**	**4.45**	**23.33**	**3528**	**5756**	**1.24**	**1.35**

II b - Transitional plain of Luni basin (Semi arid)	Pali	3.82	IPM-02-03	48.00	80.00	5.20	7.90	51.92	15195	22593	1.22	2.22
	Jalore	3.55	IPM-02-03	50.00	124.00	5.70	7.50	31.58	9750	21900	1.52	2.13
	Sirohi*	3.61	IPM-02-03	50.00	125.00							
			Total	**148.00**	**329.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Average	**-**	**-**	**5.45**	**7.70**	**41.75**	**12472**	**22246**	**1.37**	**2.18**
III a - Semi arid eastern plain (Semi arid)	Ajmer	7.01	IPM-02-03	50.00	85.00	7.34	10.27	39.92	19915	32237	2.19	2.69
	Jaipur-I	6.81	IPM-02-03	50.00	125.00	4.85	5.91	21.86	8876	12191	1.84	2.06
	Tonk	7.19	IPM-02-03	40.00	65.00	5.45	7.45	36.70	18250	22675	2.19	2.24
			Total	**140.00**	**275.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Average	**-**	**-**	**5.88**	**7.88**	**32.82**	**15680**	**22367**	**2.07**	**2.33**
III b - Flood prone eastern plain zone (Semi arid)	Karauli	5.00	IPM-02-03	20.00	50.00	7.20	10.00	38.89	23460	37590	2.65	2.95
	Alwar-I	5.00	SML-668	30.00	40.00	3.21	3.90	21.50	7646	12078	1.54	1.82
			Total	**50.00**	**90.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Average	**-**	**-**	**5.21**	**6.95**	**30.19**	**15553**	**24834**	**2.10**	**2.39**
IV a - Sub humid southern plain & Aravalli hill zone	Rajsamand	4.95	IPM-02-03	30.00	75.00	6.65	8.12	22.11	10098	14703	1.59	1.83
	Bhilwara	5.35	IPM-02-03	30.00	75.00	5.20	6.91	32.88	10300	16390	1.98	2.46
			Total	**60.00**	**150**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Average	**-**	**-**	**5.93**	**7.52**	**27.49**	**10199**	**15546**	**1.78**	**2.14**
V - Humid south eastern plain	Sawai Madhopur	4.96	IPM-02-03	30.00	75	5.39	7.22	33.95	13544	19652	2.27	2.70
			Total	**30.00**	**75**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Average	**-**	**-**	**5.39**	**7.22**	**33.95**	**13544**	**19652**	**2.27**	**2.70**

* Crop failure due to heavy rainfall in Sirohi district.

Table 9.6 Performance of CFLDs on green gram organized during Kharif-2017-18 in Haryana

KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Dem	Yield (q/ha)		% increase	Net Returns (Rs./ha)		BCR	
					Check	Demo		Check	Demo	Check	Demo
Mahendergarh	5.50	MH-421	40.00	100	6.70	8.07	20.44	16600	21560	1.98	2.14
Bhiwani	5.70	MH-421	50.00	78	5.60	10.34	84.64	9411	28887	1.35	2.02
		Total	**90.00**	**178**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Average	**-**	**-**	**6.15**	**9.20**	**52.54**	**13005**	**25223**	**1.66**	**2.08**



Green gram variety-MH-421 at
KVK Hanumangarh (Rajasthan)



Green gram variety IPM-02-03
at KVK Tonk (Rajasthan)

Performance of CFLDs on Black gram during Kharif Season (2017):

Black gram is mainly cultivated in Indian subcontinent. In India Black gram is popular as "Urad" and it is highly prized pulse among all the pulses. Apart from India it is also cultivated in Pakistan, Afghanistan, Bangladesh and Myanmar. Most suitable climate to cultivate Black gram is 27-30º C under moderate to heavy rainfall zone. This annual crop prefers loamy soil which has high water holding capacity. Black gram also enriches the soil with nitrogen (60 kg/ha) due to its nitrogen haring ability. India is major producer and consumer country of black gram. Total 1006 demonstrations were conducted in 420.00 ha in Rajasthan to harness production potential of black gram under real farming situations. The highest average yield was observed in Humid south eastern plain (V) i.e., 10.48q/ha which involved Kota, Jhalawar, Baran, Bundi & Sawai Madhopur districts. In Rajasthan, maximum yield of 12.33q/ha was recorded by KVK, Jhalawar under black gram

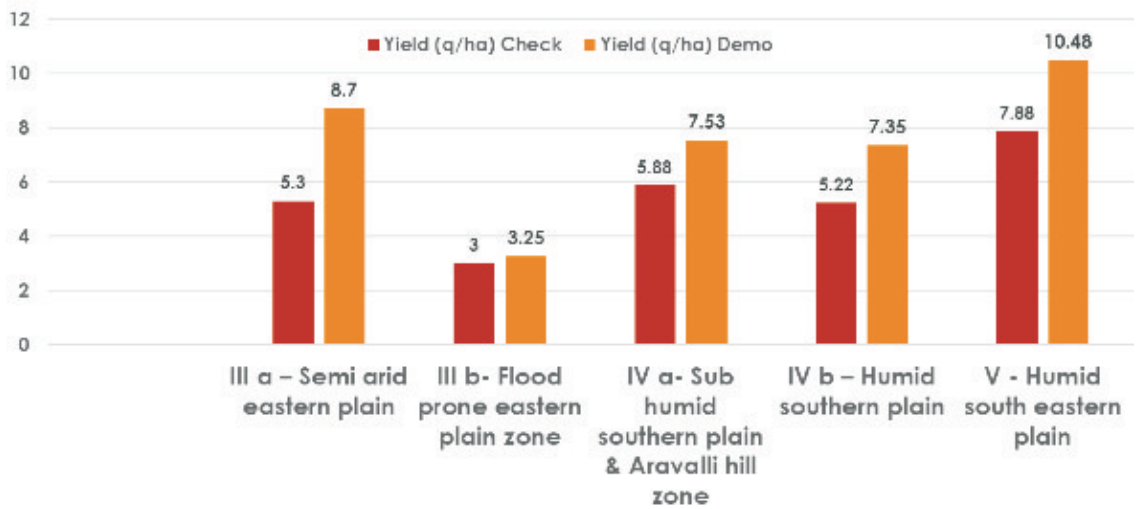


Fig. 3 Agro climatic zone wise performance of black gram in Rajasthan during Kharif-2017.

package demonstration including improved variety PU-31. All partner farmers applied 100 kg DAP/ha at time of sowing of back gram. Farmers stored 20-25 percent produce as seed for multiplication during Kharif 2018 and Farmer to Farmer exchange of seed for spreading up diffusion of blackgram cultivations.

Table 9.7 Performance of CFLDs on black gram organized during Kharif-2017-18 in Rajasthan

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Demo	Yield (q/ha)		% increase	Net Returns (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
III a – Semi-arid eastern plain	Tonk	5.55	PU-31	30.00	53	5.30	8.70	64.15	20350	28350	2.23	2.45
			Total	**30.00**	**53**	-	-	-	-	-	-	-
			Average	-	-	**5.30**	**8.70**	**64.15**	**20350**	**28350**	**2.23**	**2.45**
III b- Flood prone eastern plain zone	Alwar-I	6.06	PU-31	30.00	47	3.00	3.25	8.33	5300	8750	1.41	1.61
			Total	**30.00**	**47**	-	-	-	-	-	-	-
			Average	-	-	**3.00**	**3.25**	**8.33**	**5300**	**8750**	**1.41**	**1.61**
IV a- Sub humid southern plain & Aravalli hill zone	Bhilwara	4.95	PU-31	30.00	75	6.00	7.70	28.33	7800	15950	1.85	2.07
	Rajsamand	6.41	PU-31	30.00	75	7.43	9.45	27.19	13153	19998	1.79	2.12
	Chittorgarh	3.18	PU-31	30.00	75	5.83	7.29	25.04	15962	21866	2.03	2.25
	Partapgarh	8.68	PU-31	30.00	75	6.20	7.90	27.42	12465	18355	1.92	2.24
	Udaipur	4.13	PU-31	30.00	72	3.96	5.31	34.09	1874	7314	1.10	1.40
			Total	**150.00**	**372**	-	-	-	-	-	-	-
			Average	-	-	**5.88**	**7.53**	**28.41**	**10250**	**16696**	**1.73**	**2.01**
IV b – Humid southern plain	Banswara	6.97	PU-31	30.00	75	5.65	7.21	27.61	6858	10656	1.51	1.70
	Dungarpur	7.38	Azad-3	20.00	59	4.80	7.50	56.25	18380	37351	2.43	3.76
			Total	**50.00**	**134**	-	-	-	-	-	-	-
			Average	-	-	**5.22**	**7.35**	**41.93**	**12619**	**24003**	**1.96**	**2.72**
V - Humid south eastern plain	Kota	8.27	PU-31	30.00	75	7.25	10.35	42.76	12670	20725	1.78	2.00
	Jhalawar	6.88	PU-31	30.00	75	10.08	12.33	22.32	12039	20723	1.54	1.98
	Baran	7.64	PU-31	50.00	125	9.20	11.41	24.02	27160	50935	1.21	1.56
	Bundi	6.26	PU-31	30.00	75	7.14	9.90	38.66	20006	32209	1.93	2.25
	Sawai Madhopur	7.19	PU-31	20.00	50	5.77	8.45	46.45	16192	23332	2.49	2.95
			Total	**160.00**	**400**	-	-	-	-	-	-	-
			Average	-	-	**7.88**	**10.48**	**34.84**	**17613**	**29584**	**1.78**	**2.14**



Black gram variety PU-31 at KVK Banswara (Rajasthan)

Performance of CFLDs on Pigeon pea during Kharif Season (2017):

Pigeon pea Scientifically known as Cajanus Cajan, and it belongs to the widespread family of pulses. In India ,Pigeon pea is more popular as Arhar or red gram. On a normal basis flowering begins in 120 to 150 days and accordingly pigeon pea seeds mature in 250 days under rainfed situation. In fully irrigated farming situations, early Pigeon pea (140-145 days) is grown and farmers follow Pigeon pea-Wheat crop rotation. In Haryana, water is available and sowing of Pigeon pea was done in Ist fortnight of June17, 2017 under demonstration in Gurugram district and harvesting was completed in Ist fortnight of Nov, 2017. Early Pigeon pea demonstrations were laid out in 10 ha area at 25 farmer's field in Gurugram covering packages of demonstration.

Performance of CFLDs on Chickpea during Rabi Season (2017-18):

Chickpea is the most preferred pulse crop of Rabi season of Rajasthan state. Farmers are always eager to cultivate chickpea in almost all districts of Rajasthan. But terminal droughts affect area/coverage of chickpea. Technological packages were finalized in active participation of farmers to conduct CFLDs on chickpea during Rabi 2017-18. Farmers contributed 25 to 30 per cent cost of seeds of different varieties of

Table 9.8 Performance of pigeon pea CFLDs organized during Kharif-2017-18 in Haryana

KVKs	Variety demonstrated	Area (ha)	No. of Demo	Yield (q/ha)		% increase	Net Returns (Rs./ha)		BCR	
				Check	Demo		Check	Demo	Check	Demo
Gurugram	Pusa-991	10.00	25	15.60	17.35	11.21	57560	70798	3.17	3.72



Pigeon pea variety Pusa-991 at KVK Gurugram (Haryana)

chickpea. Maximum average yield (19.91q/ha) reported in Humid south eastern plain (V). Farmers have opined that they will continue applicatin of accepted technological packages in coming season. Yield of chickpea could be increased by simple use of quality seed of farmers preferred variety(s) in different agro-ecological zones of Rajasthan. Farmers viewed that GNG-1581 variety is compatible with existing farming situations. Farmers obtained net profit of Rs. 78814/- ha with B.C. ratio 3.77 in Sub humid southern plain & Aravalli hill zone in Chittorgarh district. It was observed that productivity of chickpea was quite satisfactory during rabi 2017-18 as there was less attack of pod borer in chickpea. Majority of farmers kept 20-25 percent produce as seed for next year multiplication and farmer to farmer exchange.

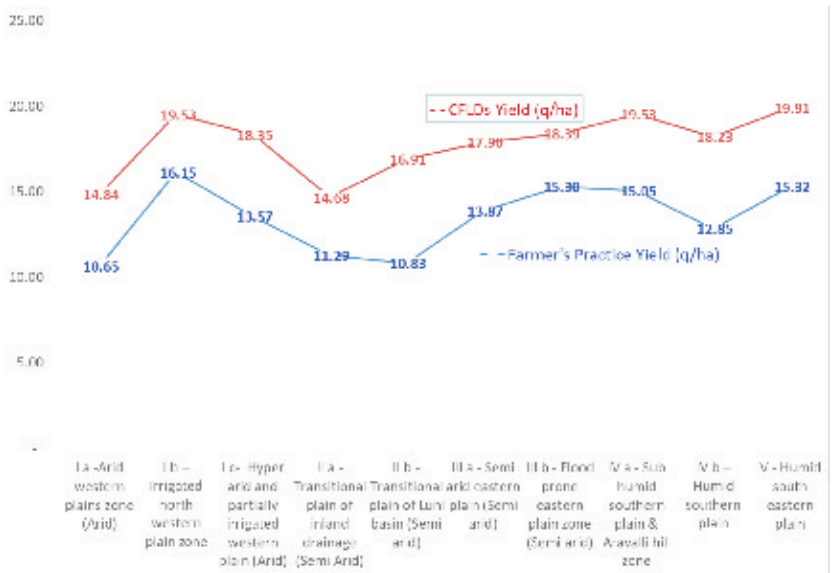


Fig. 4 Agro climatic zone wise performance of Chick pea in Rajasthan during Rabi 2017-18

Table 9.9 Performance of CFLDs on chickpea CFLDs during Rabi 2017-18 in Rajasthan

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Demo	Yield (q/ha)		% increase	Net Returns (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
I a -Arid western plains zone (Arid)	Barmer- I	9.11	GNG-1581	50.00	63	9.37	14.67	56.56	18350	38609	1.80	2.49
	Jodhpur-I	9.42	GNG-1581	20.00	50	11.93	15.01	25.82	9110	30355	1.34	1.52
			Total	**70.00**	**113**	-	-	-	-	-	-	-
			Average	-	-	**10.65**	**14.84**	**41.19**	**13730**	**34482**	**1.57**	**2.00**
I b – Irrigated north western plain zone	Hanumangarh-I	6.79	GNG-1581	30.00	75	16.79	19.99	19.06	49888	61129	2.94	3.23
	Sriganganagar	9.89	GNG-1958	60.00	150	15.50	19.06	22.97	41992	61964	2.69	3.36
			Total	**90.00**	**225**	-	-	-	-	-	-	-
			Average	-	-	**16.15**	**19.53**	**21.01**	**45940**	**61546**	**2.82**	**3.29**
I c- Hyper arid and partially irrigated western plain (Arid)	Bikaner- I	8.54	GNG-1581	30.00	75	15.66	19.58	25.03	25310	39030	1.86	2.32
	Churu- I	3.47	GNG-1581	50.00	125	11.48	17.12	49.13	27396	46819	2.40	3.00
			Total	**80.00**	**200**	-	-	-	-	-	-	-
			Average	-	-	**13.57**	**18.35**	**37.08**	**26353**	**42924**	**2.13**	**2.66**
II a - Transitional plain of inland drainage (Semi arid)	Jhunjhunu	12.52	GNG-1581	50.00	125	8.50	13.75	61.76	28309	17200	1.45	1.53
	Sikar	10.19	GNG-1581	50.00	125	14.92	17.86	19.71	58084	58084	2.86	2.86
	Nagaur-I	8.29	GNG-1581	50.00	125	10.44	12.44	19.16	30136	37699	2.23	2.56
			Total	**150.00**	**375**	-	-	-	-	-	-	-
			Average	-	-	**11.29**	**14.68**	**33.54**	**38843**	**37661**	**2.18**	**2.32**
II b - Transitional plain of Luni basin (Semi arid)	Pali	13.40	RSG-974	50.00	117	12.90	15.94	23.60	24318	41140	1.75	2.42
	Jalore	11.70	GNG-1581	30.00	75	12.6	16.00	26.98	28400	42986	2.29	2.77
	Sirohi	7.30	GNG-1581	40.00	100	7.00	18.80	168.57	17000	43418	1.68	2.74
			Total	**120.00**	**292**	-	-	-	-	-	-	-
			Average	-	-	**10.83**	**16.91**	**73.05**	**23239**	**42514**	**1.91**	**2.64**
III a - Semi arid eastern plain (Semi arid)	Ajmer	8.39	GNG-1581	50.00	100	10.59	13.81	30.40	27809	39517	2.48	2.86
	Jaipur-I	10.49	RSG-974	50.00	113	14.11	18.18	28.81	39729	55555	2.78	3.27
	Tonk	9.84	CSJ-515	30.00	60	14.00	19.41	38.64	43350	62654	3.29	3.67
	Dausa	14.89	GNG-1581	100.00	250	16.79	20.20	20.31	30550	43598	1.91	2.38
			Total	**230.00**	**523**	-	-	-	-	-	-	-
			Average	-	-	**13.87**	**17.90**	**29.54**	**35359**	**50331**	**2.61**	**3.05**
III b - Flood prone eastern plain zone (Semi arid)	Karauli	15.53	GNG-1958	40.00	100	16.00	19.64	22.75	38700	52160	2.78	3.27
	Alwar-I	14.74	CSJ-515	50.00	67	16.00	18.30	14.38	68742	68742	4.25	4.56
	Bharatpur	11.76	RSG-895	40.00	100	11.18	14.18	26.83	38000	49500	2.46	2.76
	Dholpur	9.10	GNG-1958	50.00	125	18.00	21.45	19.17	54300	67680	3.18	3.53
			Total	**180.00**	**392**	-	-	-	-	-	-	-
			Average	-	-	**15.30**	**18.39**	**20.78**	**49935**	**59520**	**3.17**	**3.53**
IV a - Sub humid southern plain & Aravalli hill zone	Rajsamand	9.10	GNG-1581	40.00	100	15.10	18.78	24.37	43440	57177	2.89	3.25
	Bhilwara	11.21	GNG-1581	40.00	100	15.18	20.06	32.15	41992	61964	2.69	3.36
	Chittorgarh	15.14	RSG-974	40.00	100	19.22	24.38	26.85	61010	78814	3.59	3.77
	Udaipur	13.68	GNG-1581	50.00	98	12.68	16.75	32.10	26723	39213	2.15	2.46
	Pratapgarh	14.74	GNG-1581	40.00	100	13.07	17.68	35.27	23963	37012	2.17	2.60
			Total	**210.00**	**498**	-	-	-	-	-	-	-

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Demo	Yield (q/ha)		% increase	Net Returns (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
			Average	**-**	**-**	**15.05**	**19.53**	**30.15**	**39425**	**54836**	**2.70**	**3.09**
IV b – Humid southern plain	Banswara	10.94	GNG-1581	30.00	75	11.80	17.96	52.20	20080	42456	1.70	2.36
	Dungarpur	11.65	GNG-1581	50.00	246	13.90	18.50	33.09	21770	40115	1.81	2.37
			Total	80.00	321	-	-	-	-	-	-	-
			Average	**-**	**-**	12.85	18.23	42.65	20925	41285.5	1.75	2.37
V - Humid south eastern plain	Sawai Madhopur	18.02	GNG-1958	50.00	125	12.50	19.77	58.16	49498	67819	3.06	3.70
	Kota	17.02	GNG-1958	40.00	100	15.48	19.06	23.13	45666	60414	2.80	3.17
	Bundi	15.09	GNG-1958	40.00	80	17.29	20.65	19.43	46276	59616	2.55	2.91
	Jhalawar	12.91	GNG-1581	40.00	100	15.48	21.24	37.17	28586	47423	2.39	3.17
	Baran	17.73	GNG-1958	50.00	125	15.84	18.84	18.94	46246	58828	1.97	2.44
			Total	**220.00**	**530**	-	-	-	-	-	-	-
			Average	**-**	**-**	**15.32**	**19.91**	**31.37**	**43254**	**58820**	**2.55**	**3.08**

Table 9.10 Performance of CFLDs on chickpea during Rabi 2017-18 in Haryana

KVKs	Variety	Area (ha)	No. of demo	Yield (q/ha)		% increase	Net Returns (Rs./ha)		BCR	
				Check	Demo		Check	Demo	Check	Demo
Gurugram	RSG-931	40.00	96	13.30	14.94	12.33	33552	45234	1.02	1.03
Mahendergarh	GNG-1581	40.00	100	12.50	17.80	42.40	34825	44735	2.45	2.69
Ambala	CSJ-515	20.00	44	14.00	17.65	26.05	47600	62359	3.88	4.50
Bhiwani	CSJ 515	50.00	50	8.90	18.00	102.25	9727	23706	1.21	1.48
Hisar	CSJ 515	30.00	75	13.83	18.16	31.30	31738	47519	2.72	3.58
Karnal	HC-5	20.00	57	14.82	20.00	34.95	41496	60882	2.60	3.01
	Total	**200.00**	**422**	-	-	-	-	-	-	-
	Average	**-**	**-**	**12.89**	**17.76**	**41.55**	**33156**	**47406**	**2.31**	**2.72**



Field day on Chickpea variety RSG:974: KVK- Pali (Rajasthan)



Chickpea variety GNG- 1581 KVK Tonk (Rajasthan)



Chickpea variety CSJ-515 under CFLD in Hisar (Haryana)

Performance of CFLDs on Lentil during Rabi Season (2017-18):

Lentil demonstrations were laid out by KVK Yamunanagar and Ambala of Haryana during 2017-18 in 30.00 ha at 58 farmers' field. LL931 variety along with technological packages was demonstrated at farmer's field. Demonstration average yield was 10.73 q/ha and there was 31.70 percent increase over local practice. Farmers obtained Rs. 27523/ha average net profit under demonstrated technologies of lentil



Lentil variety LL-931 at farmer's field in Yamunanagar (Haryana)

Table 9.11 Performance of CFLDs on lentil during Rabi 2017-18 in Haryana

KVKs	Variety	Area (ha)	No. of Demo	Yield (q/ha)		% increase	Net Returns (Rs./ha)		BCR	
				Check	Demo		Check	Demo	Check	Demo
Yamunanagar	LL-931	20.00	36	8.72	12.12	38.99	8175	20581	1.29	1.69
Ambala	LL-931	10.00	22	7.50	9.33	24.40	18375	34465	2.23	2.46
Total		**30.00**	**58**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Average		**-**	**-**	**8.11**	**10.73**	**31.70**	**13275**	**27523**	**1.76**	**2.08**

Table 9.12 Targets and achievement of CFLDs on oilseeds under NMOOP during 2017-18

State & Season	Sanctioned		Implemented	
	Demo	Area	Demo	Area
Rajasthan (Kharif 2017)	3400	1360	3071	1212
Haryana (Kharif 2017)	300	120	175	70
Rajasthan (Rabi 2017-18)	3650	1460	3228	1390
Haryana (Rabi 2017-18)	1325	530	992	410
Delhi (Rabi 2017-18)	50	20	50	20
Total	**8725**	**3490**	**7516**	**3102**

Table 9.13 State wise & crop wise yield gap between CFLDs, farmer practice & state average yields (2017-18).

Name of State	Name of Crop	Demo yield (q/ha)	Farmers practise (q/ha)	State average yield (q/ha)*	Yield gap between demo & farmers practise (q/ha)	Yield gap between demo & state average yield (q/ha)
(1)	(2)	(3)	(4)	(5)	(6)= (3)-(4)	(7)= (3)-(5)
Rajasthan	Sesame	5.78	4.38	3.47	1.4	2.31
Haryana	Sesame	5.52	4.35	3.82	1.17	1.7
Rajasthan	Groundnut	24.95	20.08	20.51	4.87	4.44
Haryana	Groundnut	21.3	17.5	10	3.8	11.3
Rajasthan	Soybean	15.34	12.65	10.72	2.69	4.62
Rajasthan	Mustard	19.06	14.93	15.21	4.13	3.85
Haryana	Mustard	20.61	18.08	15.94	2.53	4.67

*Source:- http://www.agriculture.rajasthan.gov.in/content/dam/agriculture/Agriculture%20Department/ecitizen/agriculture-statistics/area_kharif_rabi_crop_16-17.pdf (access on 28.07.2018)
Source : - Directorate of Economics & Statistics, DAC&FW
Source : - http://mospi.nic.in/statistical-year-book-india/2017/177 (access on 02.08.2018)

Performance of CFLDs during Kharif-2017-18

Performance of Sesame CFLDs in Rajasthan

During Kharif-2017-18, 973 CFLDs of Sesame on full packages were demonstrated in 416.80 ha area by KVK Bharatpur, Ajmer, Dholpur, Jalore, Sawai Madhopur, Karauli, Baran, Bhilwara, Rajsamand, Jaipur-I, Tonk, Jodhpur-I and Pali in Rajasthan. The performance of sesame was highest in Dholpur district where productivity under CFLDs was 8.90 q/ha.

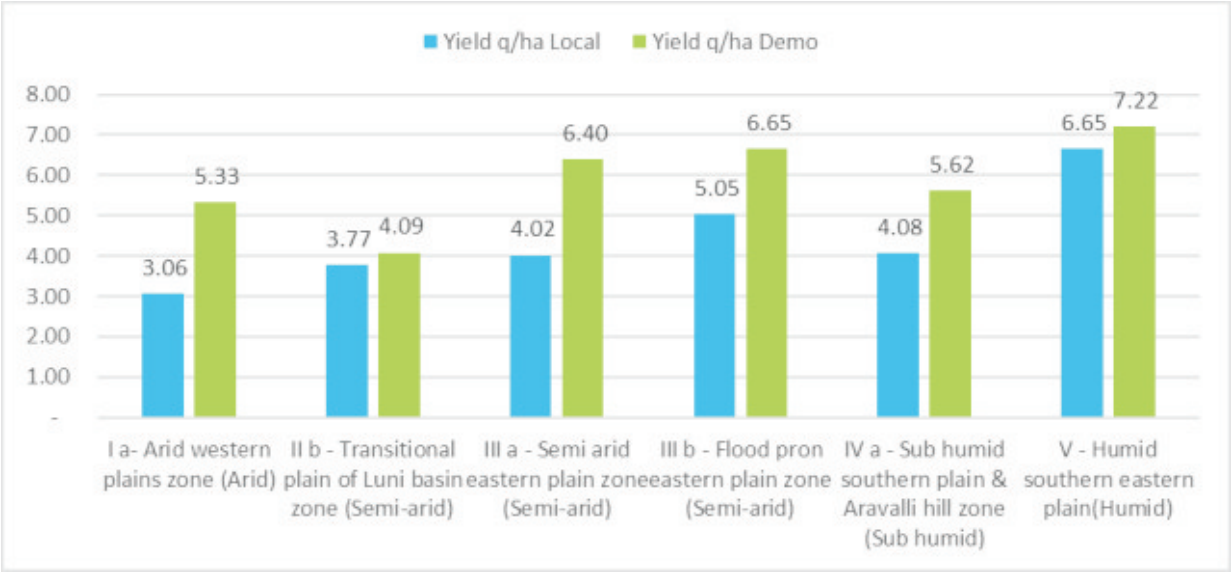


Fig-1 Agro climatic zone wise performance of Sesame in Rajasthan during Kharif-2017.

Table 9.14 Agro climatic zone wise performance of sesame in Rajasthan during Kharif-2017.

Agroclimatic Zone	KVK	Variety Demonstrated	Dist. Average	Area (ha)	No. of Demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
						Local	Demo		Local	Demo	Local	Demo
I a- Arid western plains zone (Arid)	Jodhpur-I	RT-351	3.54	30.00	75	3.06	5.33	74.18	16,430.00	34,030.00	3.04	4.95
II b - Transitional plain of Luni basin zone (Semi-arid)	Jalore	RT-351	2.67	18.00	36	4.34	3.47	-20.05	21,733.00	29,275.00	2.46	2.88
	Pali	RT 351	3.28	20.00	50	3.20	4.70	46.88	10,550.00	14,665.00	2.33	2.64
			Total	**38.00**	**86**	**3.77**	**4.09**	**8.36**	**16,141.50**	**21,970.00**	**2.39**	**2.76**
III a - Semi arid eastern plain zone (Semi-arid)	Jaipur-I	RT-351	3.29	20.00	50	3.56	4.16	17.02	6,434.50	7,985.00	1.52	1.57
	Ajmer	RT-351	5.05	40.00	80	5.00	8.24	64.70	22,640.00	33,974.65	2.38	2.74
	Tonk	RT-351	3.48	24.80	57	3.50	6.80	94.29	24,700.00	33,800.00	3.11	3.45
			Total	**84.80**	**187**	**4.02**	**6.40**	**59.23**	**17,924.83**	**25,253.22**	**2.34**	**2.59**

Agroclimatic Zone	KVK	Variety Demonstrated	Dist. Average	Area (ha)	No. of Demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
						Local	Demo		Local	Demo	Local	Demo
III b - Flood pron eastern plain zone (Semi-arid)	Bharatpur	RT-351	3.96	48.00	120	4.02	4.44	10.51	3,762.00	7,450.50	1.21	1.37
	Dholpur	RT-351	7.03	50.00	125	6.00	8.90	48.33	24,720.00	30,320.00	2.70	2.80
	Sawai madhopur	RT-355	4.65	50.00	125	4.66	6.45	38.40	18,926.00	31,194.80	1.59	2.71
	Karauli	RT-351	5.52	50.00	125	5.50	6.80	23.64	23,650.00	29,520.00	2.95	3.33
			Total	**198.00**	**495**	**5.05**	**6.65**	**31.77**	**17,764.50**	**24,621.33**	**2.11**	**2.55**
IV a - Sub humid southern plain & Aravalli hill zone (Sub humid)	Bhilwara	RT 351	2.76	30.00	75	4.30	5.81	35.12	29,200.00	10,932.00	4.07	4.59
	Rajsamand	RT-351	3.47	30.00	75	3.85	5.43	41.04	25,150.00	37,370.00	3.65	4.25
			Total	**60.00**	**150**	**4.08**	**5.62**	**37.91**	**27,175.00**	**24,151.00**	**3.86**	**4.42**
V - Humid southern eastern plain(Humid)	Baran	RT 351	2.48	30.00	40	6.65	7.22	8.50	7,221.00	20,257.50	0.31	0.83

Performance of Soybean CFLDs in Rajasthan

During Kharif-2017-18, 849 CFLDs of soybean along with packages were demonstrated in 312.20 ha area in Rajasthan by KVK Kota, Jhalawar, Baran, Banswara, Dungarpur, Chittorgarh and Pratapgarh. The productivity of soybean was highest in Jhalawar district where productivity under CFLDs was 17.48 q/ha.

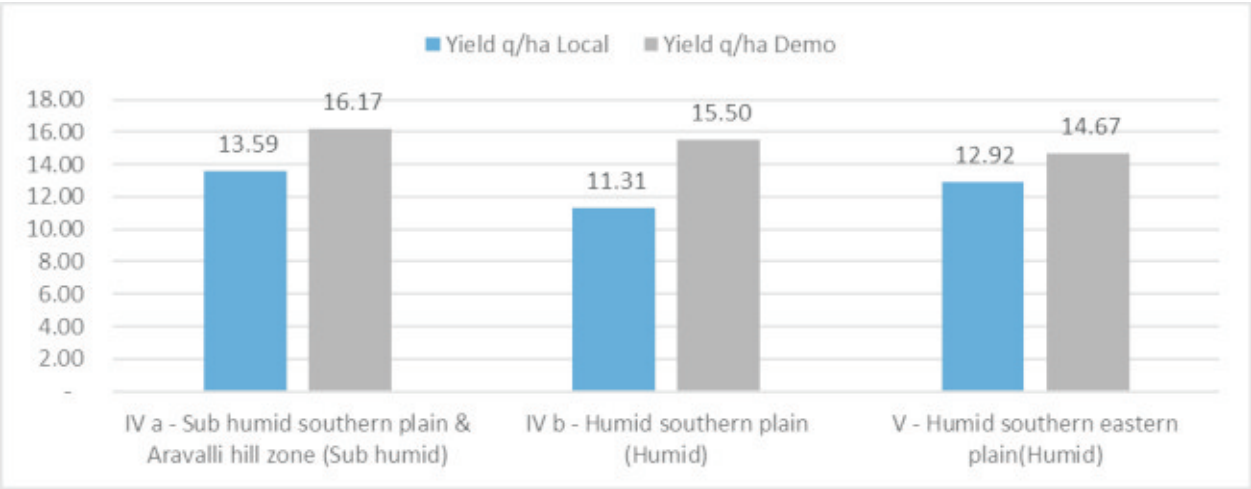


Fig-2 Agro climatic zone wise performance of soybean in Rajasthan during Kharif-2017.

Table 9.14 Agro climatic zone wise performance of soybean in Rajasthan during Kharif-2017.

Agroclimatic Zone	KVK	Variety Demonstrated	Dist. Average	Area (ha)	No. of Demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
						Local	Demo		Local	Demo	Local	Demo
IV a - Sub humid southern plain & Aravalli hill zone (Sub humid)	Chittorgarh	JS95-60	8.13	40.00	100	13.88	16.44	18.50	19,118.75	25,449.50	1.82	2.03
	Pratapgarh	JS-95 60	13.32	50.00	125	13.30	15.90	19.55	16,660.00	20,690.00	1.81	1.87
			Total	**90.00**	**225**	**13.59**	**16.17**	**19.02**	**17,889.38**	**23,069.75**	**1.82**	**1.95**
IV b - Humid southern plain (Humid)	Banswara	RKS- 24	13.68	50.00	125	14.02	16.79	19.76	16,750.00	24,293.00	1.73	2.04
	Dungarpur	RKS-24	12.22	31.20	124	8.60	14.20	65.12	11,300.00	24,150.00	1.94	2.68
			Total	**81.20**	**249**	**11.31**	**15.50**	**37.00**	**14,025.00**	**24,221.50**	**1.84**	**2.36**
V - Humid southern eastern plain(Humid)	Kota	JS.20-29	10.16	50.00	125	12.44	16.21	30.31	20,408.83	31,822.82	1.87	2.63
	Jhalawar	JS 20-29	10.40	50.00	125	13.38	17.48	30.67	2,719.03	20,523.00	1.42	1.75
	Baran	JS 95-60	10.43	50.00	125	12.94	15.99	23.54	13,167.50	26,423.67	0.54	1.04
			Total	**150.00**	**375**	**12.92**	**14.67**	**13.56**	**12,098.45**	**26,256.49**	**1.27**	**1.81**

Performance of Groundnut CFLDs in Rajasthan

During Kharif-2017-18, 550 CFLDs of Groundnut along with packages were demonstrated in 220.00 ha area in Rajasthan by KVK Bikaner-I, Sikar, Dausa, Jaipur-I and Jodhpur-I. The productivity of groundnut was highest in Bikaner district where productivity under CFLDs was 30.08 q/ha.

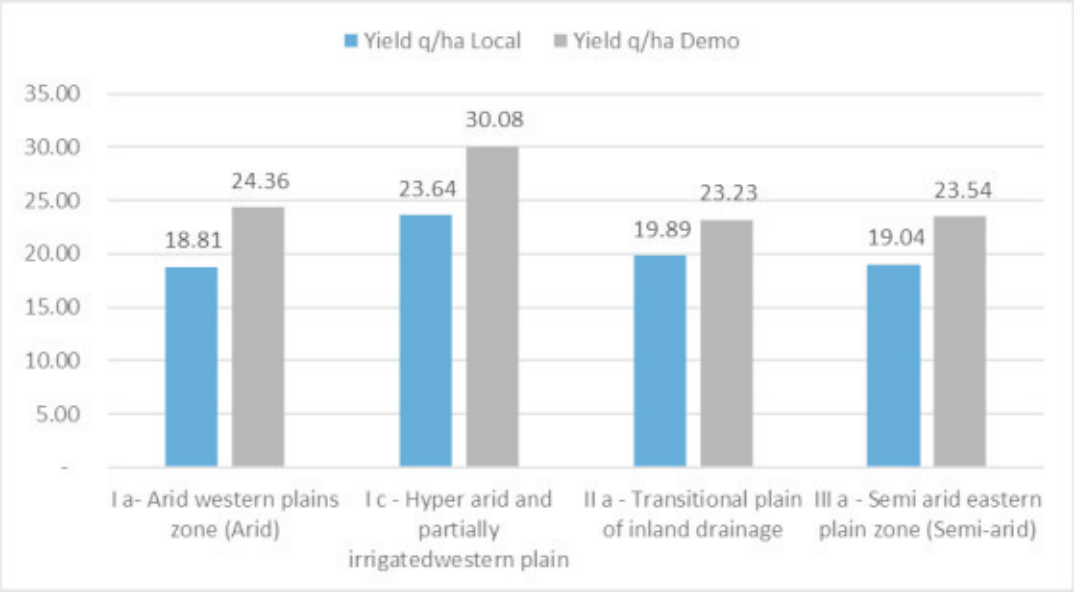


Fig-3 Agro climatic zone wise performance of groundnut in Rajasthan during Kharif-2017.

Table 9.15 Agro climatic zone wise performance of groundnut in Rajasthan during Kharif-2017.

Agro climatic Zone	KVK	Variety Demonstrated	Dist. Average	Area (ha)	No. of Demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
						Local	Demo		Local	Demo	Local	Demo
I a- Arid western plains zone (Arid)	Jodhpur-I	HNG-69	17.19	40.00	100	18.81	24.36	29.51	48,212.00	70,226.00	2.41	2.97
I c - Hyper arid and partially irrigated western plain	Bikaner I	HNG69	26.71	50.00	125	23.64	30.08	27.25	43,414.00	72,005.89	2.58	3.28
II a - Transitional plain of inland drainage	Sikar	HNG-69	22.45	50.00	125	19.89	23.23	16.79	36,784.00	46,426.33	1.99	2.16
III a - Semi arid eastern plain zone (Semi-arid)	Dausa	HNG 69	12.99	50.00	125	19.44	24.11	24.00	58,622.00	74,449.00	2.88	3.25
	Jaipur-I	HNG-69	18.17	30.00	75	18.64	22.97	23.23	47,707.33	64,348.00	2.35	2.70
			Total	**80.00**	**200**	**19.04**	**23.54**	**23.61**	**53,164.67**	**69,398.50**	**2.61**	**2.97**

Performance of Groundnut CFLDs in Haryana

During Kharif-2017-18, 15 CFLDs of Groundnut along with packages were demonstrated in 10 ha area in Haryana by KVK, Mahendergarh. The productivity of groundnut was 21.30 q/ha at Mahendergarh district.

Table 9.15 Performance of groundnut in Haryana

KVK	Variety Demonstrated	Dist. Average	Area (ha)	No. of Demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
					Local	Demo		Local	Demo	Local	Demo
Mahendergarh	Gajraj-1041	..	10.00	15	17.50	21.30	21.71	40,150.00	53,260.00	2.04	2.25

Performance of Sesame CFLDs in Haryana

During Kharif-2017-18, 120 CFLDs of Sesame along with packages were demonstrated in 48.40 ha area in Haryana by KVK Hisar, Mahendergarh and Rewari. The productivity of groundnut was highest in Mahendergarh district where productivity under CFLDs was 5.98 q/ha.

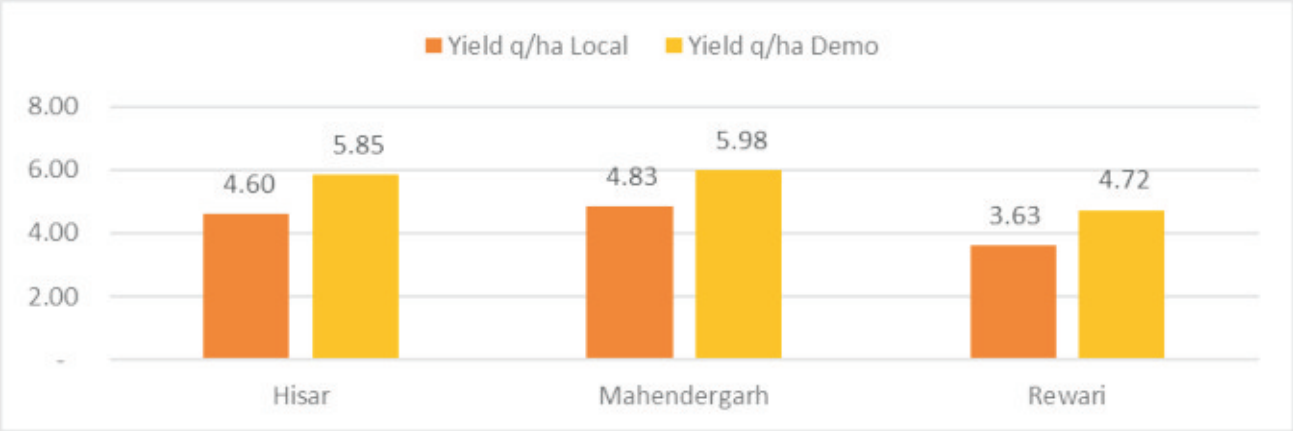


Fig-4 KVK wise performance of groundnut in Haryana during Kharif-2017.

Table-9.16 KVK wise performance of sesame in Haryana during Kharif-2017.

KVK	Variety Demonstrated	Dist. Average	Area (ha)	No. of Demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
					Local	Demo		Local	Demo	Local	Demo
Hisar	RT-346	12.00	12.40	20	4.60	5.85	27.07	13,232.00	22,569.50	1.62	2.06
Mahendargarh	RT-351	12.00	20.00	50	4.83	5.98	23.81	19,496.00	26,681.00	2.28	2.63
Rewari	RT-351	..	16.00	40	3.63	4.72	30.21	9,550.00	14,772.00	1.53	1.70

Performance of CFLDs during Rabi 2017-18

Rajasthan is the largest producer of Rapeseed-Mustard and area wise is first in the country. During Rabi 2017-18, a total of 4270 CFLDs on Mustard were laid out in 2000 ha area in which 3228 CFLDs where conducted in 1390 ha area in Rajasthan under different micro-environment, 992 CFLDs where conducted in 410 ha area in Haryana and 50 CFLDs where conducted in 20 ha area in Delhi.

Performance of CFLDs on Mustard during Rabi 2017-18 in Rajasthan

During Rabi 2017-18, mainly NRCDR-2, Giriraj, NRCHB-101, PM-28, DRMR-IJ-31 and RH-406 varieties along with other technological packages were demonstrated in all the agro-climatic zones of Rajasthan. The yield of Mustard was recorded highest in Dausa district where productivity under CFLDs was 24.66 q/ha.

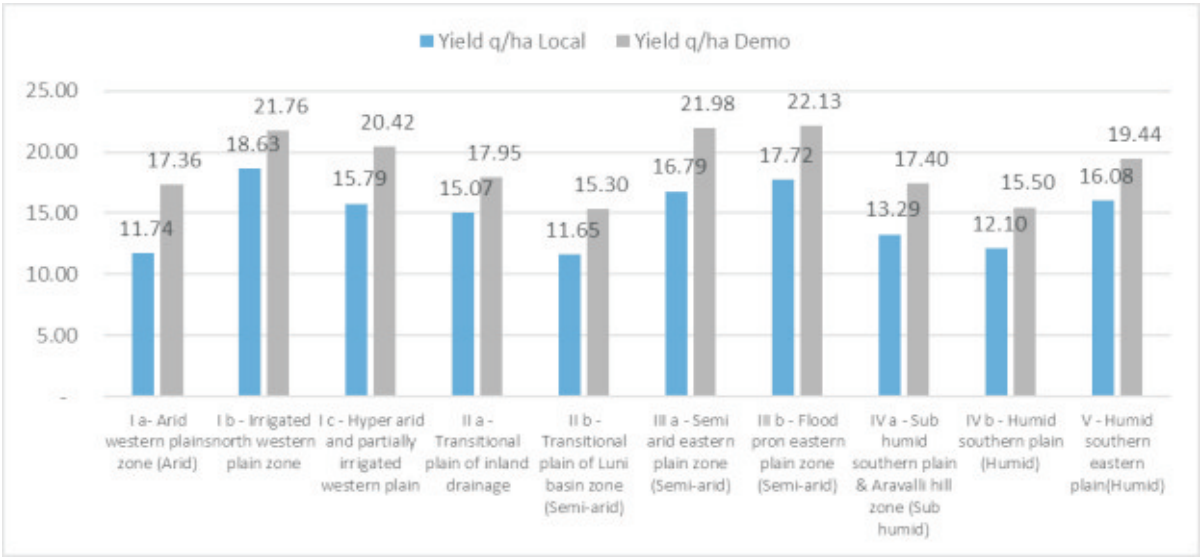


Fig-4 Agro climatic zone wise performance of mustard in Rajasthan during Kharif-2017.

Table 9.17 Agro climatic zone wise performance of mustard in Rajasthan during Kharif-2017

Agroclimatic Zone	KVK	Variety demonstrated	Dist. Average	Area (ha)	No. of demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
						Local	Demo		Local	Demo	Local	Demo
I a- Arid western plains zone (Arid)	Jodhpur-I	DRMRIJ-31	11.72	40.00	100	15.50	19.78	27.61	36,850.00	50,342.00	3.32	3.98
	Barmer-I	DRMRIJ-31	7.98	50.00	63	7.98	14.93	87.09	20,599.00	31,798.00	1.99	2.45
			Total	**90.00**	**163**	**11.74**	**17.36**	**57.35**	**28,724.50**	**41,070.00**	**2.66**	**3.21**
I b - Irrigated north western plain zone	Hanumangarh-I	RH 0749	13.98	50.00	125	18.63	21.76	16.80	42,771.00	53,517.00	2.91	3.36
I c - Hyper arid and partially irrigated western plain	Bikaner I	DRMRIJ-31	10.73	50.00	125	16.78	22.24	32.54	28,117.40	46,135.40	2.03	2.69
	Churu-1	NRCDR-02	10.13	50.00	125	11.96	17.26	44.31	25,999.00	42,905.00	2.06	2.96
			Total	**150.00**	**375**	**15.79**	**20.42**	**31.22**	**32,295.80**	**47,519.13**	**2.33**	**3.01**
II a - Transitional plain of inland drainage	Sikar	DRMRIJ-31	10.54	50.00	100	14.91	17.30	16.03	30,636.75	37,742.50	2.47	2.66
	Jhunjhunu	DRMRIJ-31	14.12	50.00	125	14.88	20.88	40.32	35,900.00	48,266.00	1.65	2.95
	Nagaur-I	PM-28	9.57	39.00	78	15.43	15.67	1.53	34,073.33	39,357.75	2.85	3.13
			Total	**139.00**	**303**	**15.07**	**17.95**	**19.30**	**33,536.69**	**41,788.75**	**2.32**	**2.91**
II b - Transitional	Pali	NRCDR-2	12.82	50.00	100	12.40	16.96	36.77	19,400.00	38,433.77	1.85	2.62
	Jalore	PM-26	11.08	40.00	100	10.56	13.99	32.48	25,900.00	31,890.00	2.17	2.32

Agroclimatic Zone	KVK	Variety demonstrated	Dist. Average	Area (ha)	No. of demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
						Local	Demo		Local	Demo	Local	Demo
plain of Luni basin zone (Semi-arid)	Sirohi	RGN-229	10.64	40.00	93	12.00	14.96	24.67	16,000.00	25,360.00	1.94	1.94
			Total	**130.00**	**293**	**11.65**	**15.30**	**31.31**	**20,433.33**	**31,894.59**	**1.99**	**2.29**
III a - Semi arid eastern plain zone (Semi-arid)	Ajmer	RH-749	13.51	50.00	100	16.25	21.07	29.66	41,475.00	60,168.00	2.76	3.49
	Jaipur-I	NRCDR-2	13.89	40.00	100	16.00	20.80	30.04	46,125.00	63,440.00	3.62	4.24
	Dausa	DRMRIJ-31	15.19	50.00	125	19.31	24.66	27.68	34,268.00	52,756.00	1.87	2.32
	Tonk	DRMRIJ-31	16.77	50.00	100	15.62	21.39	36.97	42,864.00	63,460.00	3.11	3.78
			Total	**190.00**	**425**	**16.79**	**21.98**	**31.09**	**41,183.00**	**59,956.00**	**2.84**	**3.46**
III b - Flood pron eastern plain zone (Semi-arid)	Alwar-I	NRCDR-2	19.46	50.00	73	18.00	22.61	25.61	65,516.67	72,232.24	4.24	4.95
	Bharatpur	DRMRIJ-31	19.39	50.00	125	19.46	22.85	17.38	56,605.00	65,390.00	3.67	3.62
	Dholpur	DRMRIJ-31	21.34	50.00	125	17.63	22.87	29.77	50,500.00	68,990.00	3.53	4.07
	Karauli	DRMRIJ-31	18.07	40.00	100	15.80	20.20	27.85	36,800.00	50,850.00	0.00	0.00
			Total	**190.00**	**423**	**17.72**	**22.13**	**25.15**	**52,355.42**	**64,365.56**	**2.86**	**3.16**
IV a - Sub humid southern plain & Aravalli hill zone (Sub humid)	Bhilwara	RH 406	12.44	25.60	64	11.65	17.60	51.07	33,100.00	47,100.00	2.45	3.08
	Chittorgarh	DRMRIJ-31	15.68	40.00	100	16.06	19.62	22.17	38,596.00	56,292.00	2.60	3.54
	Pratapgarh	RH-406	13.63	40.00	94	12.85	16.29	26.77	28,625.00	39,490.00	2.75	3.25
	Rajsamand	RH-0749	9.13	40.00	100	13.43	17.13	27.55	36,220.00	49,020.00	3.07	3.51
	Udaipur	NRCHB101	9.86	50.00	70	12.48	16.38	31.25	23,180.00	32,880.00	2.13	2.34
			Total	**195.60**	**428**	**13.29**	**17.40**	**31.76**	**31,944.20**	**44,956.40**	**2.60**	**3.14**
IV b - Humid southern plain (Humid)	Dungarpur	RH 406	15.21	40.00	106	12.10	15.50	28.10	15,950.00	28,750.00	1.78	2.12
V - Humid southern eastern plain(Humid)	Baran	NRCDR-2	18.21	50.00	125	18.34	21.75	18.59	36,937.00	46,946.50	1.94	2.42
	Bundi	DRMRIJ-31	14.05	40.00	100	15.57	17.95	15.29	35,480.00	43,540.00	2.32	2.54
	Jhalawar	NRCDR-2	14.94	40.00	100	13.94	18.05	29.48	24,707.02	41,209.03	2.09	2.96
	Kota	DRMRIJ-31	16.77	40.00	100	16.54	20.65	24.89	47,126.14	60,251.43	3.23	3.47
	Sawaimadhopur	DRMRIJ-31	18.07	50.00	125	16.00	18.82	17.63	46,630.00	61,173.00	3.80	4.38
			Total	**220.00**	**550**	**16.08**	**19.44**	**21.18**	**38,176.03**	**50,623.99**	**2.68**	**3.15**

Performance of CFLDs on Mustard during Rabi 2017-18 in Haryana

During Rabi 2017-18, mainly NRCDR-2, LL-931 and RH-749 varieties along with other technological intervention were demonstrated in eight districts of Haryana. The yield of Mustard was recorded highest in Jhajjar district where productivity under CFLDs was 24.66 q/ha.

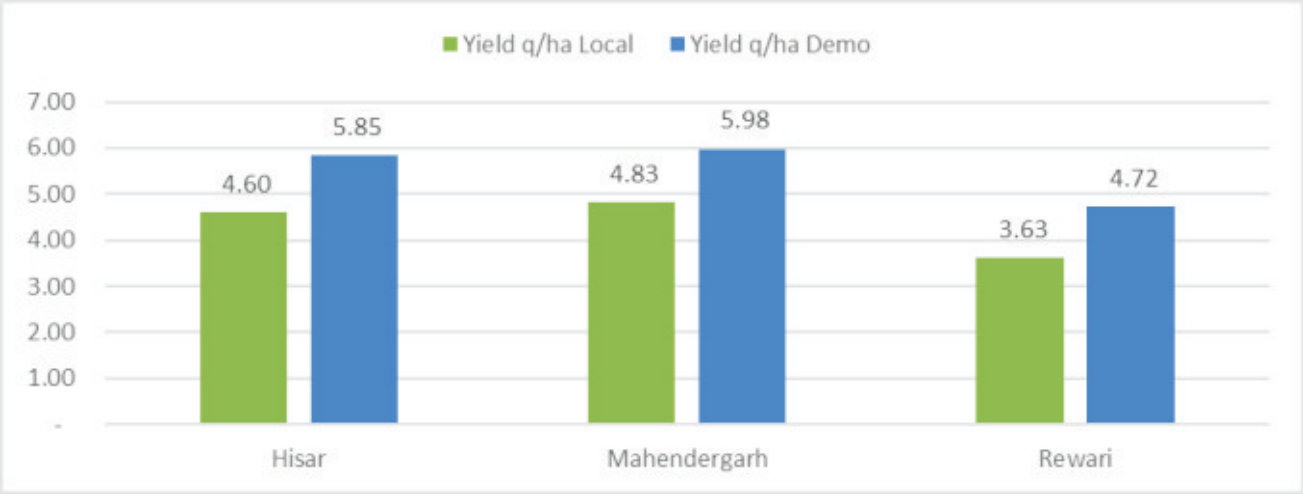


Fig-5 KVK wise performance of Mustard in Haryana during Kharif-2017.

Table 9.18 KVK wise performance of mustard in Haryana during Kharif-2017.

KVK	Variety Demonstrated	Dist. Average	Area (ha)	No. of Demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
					Local	Demo		Local	Demo	Local	Demo
Ambala	LL-931	16.69	30.00	44	12.00	14.20	18.33	39,603.41	39,603.50	3.12	3.51
Gurugram	RH-749	16.52	20.00	45	18.76	20.51	9.33	47,929.25	54,319.25	2.84	3.05
Hisar	RH 749	18.16	30.00	75	17.95	22.38	24.65	25,559.00	45,735.55	1.50	1.90
Jhajjar	RH-749	15.80	20.00	50	21.12	24.96	18.18	38,600.00	50,510.00	1.84	2.02
Kurukshetra	RH-749	16.69	40.20	100	15.62	17.86	14.36	32,500.00	46,033.33	2.26	2.88
Mahendergarh	NRCDR-2	15.73	40.00	100	21.00	23.10	10.00	61,065.00	68,050.00	3.49	3.53
Rohtak	RH 749	12.36	30.00	50	19.50	21.01	7.74	53,165.00	62,340.00	3.36	3.44
Fatehabad	RH-749	13.55	30.00	66	18.67	20.83	11.61	13,190.00	19,788.33	1.22	1.33
		Total	**240.20**	**530**	**18.08**	**20.61**	**14.28**	**38,951.46**	**48,297.50**	**2.45**	**2.71**

Source :- Statistical Abstract of Haryana (2016-17), P – 310

Performance of CFLDs on Mustard during Rabi 2017-18 in Delhi

During Rabi 2017-18, 50 CFLDs of mustard along with packages were demonstrated in 20 ha area in Delhi by KVK Delhi. The productivity of mustard was 26.55 q/ha.

Table 9.19 Performance of CFLDs on mustard during Rabi 2017-18 in Delhi

KVK	Variety Demonstrated	Dist. Average	Area (ha)	No. of Demo	Yield q/ha		% increase	Net Return (Rs./ha.)		B:C Ratio	
					Local	Demo		Local	Demo	Local	Demo
Delhi	RH 749		20.00	50	28.00	28.90	3.21	63,210.00	84,045.00	4.17	5.24

Front Line Demonstrations (other than NMOOP & NFSM)

Rajasthan (10) KVKs have been established during 2012-17 and financial assistance were not given under NMOOP & NFSM during 2017-18 for laying out FLDs on oilseeds and pulse crops.

In Rajasthan, demonstrations were conducted on 1020 farmers' field on oilseed crops. Crop wise information on FLDs is given in table 9.20.

Table 9.20 Performance of FLDs on oilseed crops in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Groundnut (1)	ICM	20	10	26.50	23.00	15.22	1:2.61	1:2.39
Mustard(16)	ICM	948	483.1	20.16	16.87	20.15	1:3.04	1:2.77
	Varietal evaluation	5	2	18.4	16.98	8.36	1:2.08	1:2.11
	Total	953	485.1	20.07	16.80	20.06	1:3.04	1:2.77
Sesame(1)	Varietal evaluation	12	5	5.31	3.92	35.46	1:4.16	1:3.71
Soybean (2)	ICM	25	10	20.65	16.70	23.65	1:3.41	1:2.81
	Varietal evaluation	10	4	15.48	13.19	17.36	1:1.96	1:1.73
	Total	35	14	19.17	15.70	21.86	1:2.94	1:2.46
	Grand Total	1020	514.1					

Groundnut: FLDs on groundnut were conducted by Bikaner-II KVK on Integrated Crop Management (ICM). Groundnut demonstrated at 20 farmers' field in 10 ha area. From total 20 demonstrations, the average yield was observed as 26.50q/ha as compared to local variety (23.0q/ha). ICM demonstrations' exhibited 15.22% higher yield with the B:C ratio of 2.61 as compared to local practice (2.39).

Sesame: Demonstrations on sesame were conducted by KVK Rajsamand at 12 farmers' fields on an area of 5 ha. The highest yield of 5.31q/ha was recorded under varietal component compared to local variety (3.92q/ha). The weighted mean yield of sesame was recorded 5.31q/ha with an increase of 35.46% yield. Hence, there is greater need to promote sesame production technology among farmers to increase the productivity at farmers' level.

Soybean: Total 2 KVKs (Kota and Baran) conducted demonstrations at 35 farmers' field over an area of 14 ha. The highest yield of 20.65q/ha was recorded under ICM followed by varietal evaluation (15.48 q/ha. The percentage increase in yield was 23.65 and 17.36 ICM and varietal evaluation respectively. Weighted mean yield of soybean was 19.17q/ha obtained under demonstration which was 21.86% higher over local check.

Mustard: FLDs on mustard crop were conducted by 16 KVKs (Alwar-II, Barmer-II, Bharatpur, Churu 2, Hanumangarh-II, Jaipur-I, Jaipur-II, Jodhpur-II, Kota, Udaipur, Barmer-I, Baran, Sawaimadhopur, Nagore-II, Karauli) under ICM and Varietal evaluation. The highest yield of 20.16q/ha was recorded under ICM followed by varietal component (18.4q/ha). The weighted mean yield of mustard was recorded 20.07q/ha with an increase of 20.06% yield. Hence, there is greater need to promote mustard production technology among farmers to increase the productivity at farmers' level.

FLDs organized by KVKs of Haryana and Delhi

In Haryana and Delhi, FLDs were conducted on castor during kharif 2017 and mustard during rabi season (table 9.21).

Table 9.21 Performance of FLDs on oilseed crops in Haryana.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Castor (1)	ICM	100	40	41.50	37.00	12.16	1:2.34	1:2.09
Mustard	Varietal evaluation	30	12	18.60	16.70	11.30	1:3.20	1:2.92
	ICM	15	6	27.40	23.10	18.61	1:4.98	1:4.17
	Total	45	18	21.53	18.83	13.74	1:3.68	1:3.26
	Grand Total	145	58					

Castor: Demonstrations on castor crops conducted by KVK Hisar on 100 farmers' fields in an area of 40 ha. The highest yield of 41.50q/ha was recorded under ICM whereas 37.0q/ha under local check. The yield of 41.50q/ha was obtained under FLDs which was 12.16% higher over local check.

Mustard: Demonstrations were undertaken by 2 KVKs i.e Faridabad and Ujjwa at 45 farmers' fields covering an area of 18 ha. The maximum yield of 27.4q/ha was recorded under ICM followed by varietal (18.60q/ha). The percentage increase yield was 23.10, and 16.70 respectively. The weighted mean yield of mustard was 21.53q/ha which is 13.74% higher than check.

FLDs on Pulse Crops other than NFSM

FLDs on pulse production technology were organized on an area of 578 ha involving 1405 farmers of Rajasthan, Haryana and Delhi. Under the pulses demonstrations, Rajasthan covered 384.8 ha area in the 922 farmers' fields while in Haryana and Delhi 193.2 ha are FLDs were laid out 483 farmers' fields. FLDs on blackgram, green gram, and mothbean were undertaken in kharif and production potential of chickpea was demonstrated in rabi season while green gram in summer season. (2017-18).

Details of FLDs organized by KVKs of Rajasthan

During 2017-18 demonstrations were conducted on 922 farmers' fields in an area of 384.8 ha in Rajasthan.

Black gram: FLDs on black gram were undertaken by 3 KVKs (Alwar-II, Jaipur-II and Pratapgarh) on 95 farmers' fields in 34.2 ha area. The highest yield of 10.07 q/ha was recorded

Table 9.22 Performance of FLDs on pulse crops in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Blackgram (3)	ICM	95	34.2	10.07	7.57	33.38	1:2.21	1:1.74
Green gram (10)	ICM	256	122.9	7.12	5.41	35.25	1:3.42	1:2.84
	Varietal Evaluation	20	10	6.51	5.45	19.45	1:2.15	1:1.91
	Total	276	132.9	6.90	5.26	34.14	1:3.16	1:2.63
Moth bean (2)	ICM	30	14	5.51	4.61	19.22	1:2.05	1:1.77
Chickpea (12)	ICM	349	144.2	17.91	14.77	22.16	1:2.63	1:2.27
	IDM	30	15	16.08	13.00	23.69	1:2.55	1:2.32
	IPM	67	26.2	14.24	11.12	27.86	1:1.80	1:1.45
	Total	446	185.4	17.25	14.11	23.09	1:2.52	1:2.18
	Grand Total	922	384.8					

under ICM whereas local check yield was 7.57 q/ha The percentage increase in demonstration yield was 33..38% over local checkwith B:C ratio of 2.21.

Green gram: Total 10 KVKs (Alwar-II, Churu 2, Hanumangarh-II, Jaisalmer-II, Baran, Jaisalmer-I, Sirohi, Bikaner-II and Jodhpur-II) conducted demonstrations on green gram at 276 farmers' fields covering an area of 132.9ha. The highest yield of 7.12q/ha was recorded under ICM followed by varietal evaluation (6.51q/ha). The percentage increase in yield was 35.25 and 19.45, respectively. Overall, average production of 6.90q/ha was recorded under demonstrations than local check (5.26q/ha) as depicted in table 9.22.

Moth bean: FLDs on moth bean were undertaken by KVK Hanumangarh-II and Bikaner-II on 30 farmers' fields in an area of 14 ha. Under ICM yield was 5.51q/ha while in local check yield was 4.61 q/ha.

Chick Pea (Gram): Demonstrations on chickpea were undertaken by 12 KVKs (Bharatpur, Dausa , Hanumangarh-I, Hanumangarh-II, Jaipur-II, Jodhpur-II, Kota, Jaisalmer-II, Jaisalmer-I, Udaipur, Bikaner-II and Jhalawar) on 446 farmers' fields over an area of 384.8 ha. The highest yield of 17.91q/ha was recorded under ICM followed by IDM 16.08q/ha and IPM component (14.24q/ha). The weighted mean yield of 17.25q/ha was obtained under demonstration which was 23.09% higher over local check.

Table 9.23 Performance of FLDs on cereal crops in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Maize (3)	ICM	175	68.6	45.99	38.57	24.92	1:2.70	1:2.51
	IDM	50	20	35.20	30.40	15.79	1:2.07	1:2.05
	INM	34	10	23.26	16.95	37.23	1:2.15	1:1.67
	Total	259	98.6	41.49	34.72	24.32	1:2.52	1:2.35
Paddy (2)	ICM	74	22.8	39.85	35.26	15.14	1:3.25	1:2.58
Barley (8)	ICM	230	87.3	46.08	38.18	20.81	1:2.46	1:2.14
	Varietal evaluative	11	3	30.50	24.60	23.98	1:2.16	1:1.68
	Total	241	90.3	45.56	37.73	20.92	1:2.45	1:2.13
Wheat (23)	ICM	1096	395.8	26.43	22.22	10.29	1:2.55	1:2.23
	IDM	8	4	23.45	21.62	8.46	1:1.90	1:1.79
	Total	1104	399.8	26.16	22.00	10.19	1:2.55	1:2.23
	Grand Total	1678	611.5					

Maize: Demonstrations on maize were undertaken by 3 KVKs (Pratapgarh, Rajsamand, and Dungarpur) on 259 farmers' fields covering an area of 98.6 ha. Farmers' field had remunerative returns and B:C. ratio is 2.70 in ICM demonstration.

Paddy: Demonstrations on paddy were conducted by 2 KVKs Bundi and Dungarpur on 74 farmers' fields covering an area of 22.8 ha. Average yield 39.85 q/ha was obtained under ICM component.

Barley: 8 KVKs (Bharatpur, Churu-II, Dholpur, Hanumangarh-II, Jaipur-I, Sikar, Rajsamand and Pali) conducted demonstrations on 241 farmers' field over an area of 90.30 ha. An average 20.92 percent yield increase was noticed.

Wheat: Demonstrations were conducted on 1104 farmers' fields covering an area of 399.8 ha land by 23 KVKs (Ajmer, Alwar-II, Bharatpur, Bundi, Chittorgarh, Churu 2, Dausa , Dholpur, Dungarpur, Hanumangarh-II, Jaipur-I, Jaipur-II, Jhalawar, Kota, Pali, Pratapgarh, Sikar, Baran, Rajsamand, Sirohi, Bikaner-I, Karauli and Bikaner-II). Farmers used seeds of recommended varieties, improved technologies and obtained 26.16q/ha productivity under normal situation.



FLD on wheat – Hanumangarh-II

FLDs organized by KVKs of Haryana and Delhi

The major crops on which FLDs were undertaken in Haryana and Delhi are paddy, barley and wheat. The area under FLDs was 551.6 ha. The FLDs were demonstrated on 1257 farmers' fields. Detailed information about FLDs on cereal crops are depicted in table 9.24.

Table 9.24 Performance of FLD on cereal crops in Haryana.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Paddy	ICM	213	85.2	52.20	49.42	6.39	1:2.41	1:2.24
	IDM	29	30	47.00	45.00	4.44	1:3.24	1:3.15
	INM	10	4	40.80	35.30	15.60	1:3.36	1:3.09
	IPM	10	4	41.00	37.00	10.81	1:2.79	1:2.45
	Varietal Evaluation	50	20	46.00	45.00	2.22	1:3.22	1:3.06
	Total	312	143.2	49.61	47.14	5.78	1:2.66	1:2.49
Barley (2)	ICM	14	5.4	58.78	53.44	10.74	1:3.58	1:3.25
	INM	8	3.6	48.75	45.00	8.33	1:1.80	1:1.75
	Total	22	9	54.77	50.07	9.78	1:2.68	1:2.50
Wheat(13)	ICM	861	369.2	51.91	48.07	8.45	1:2.20	1:2.10
	IDM	9	9	47.15	44.58	5.76	1:2.06	1:1.91
	INM	24	9.6	46.61	42.37	10.20	1:2.49	1:2.37
	IPM	10	4	45.00	42.80	5.14	1:1.52	1:1.49
	Varietal Evaluation	19	7.6	47.13	43.27	8.92	1:1.73	1:1.62
	Total	923	399.4	47.98	44.44	7.81	1:2.20	1:2.10
	Grand Total	1257	551.6					

Paddy: Demonstrations were undertaken by 9 KVKs (Ambala, Panipat, Yamunanagar, Kurukshetra, Kaithal, Sirsa, Faridabad Rohtak and Ujjwa) on 312 farmers' field over an area of 143.2 ha during kahrif 2017. Average yield 52.20 q/ha was obtained by majority of farmers under ICM component.

Barley: Demonstrations on barley crop were undertaken by KVK Gurgaon and Rewari on 22 farmers' field over an area of 9 ha during Rabi 2017-18. Farmers obtained highest yield of 58.78 q/ha under ICM component

Wheat: Demonstrations on wheat crop was undertaken by 13 KVKs (Ambala, Faridabad, Fatehabad, Gurgaon, Mahendergarh, Rohtak, Yamunanagar, Hisar, Sonipat, Kurukshetra, Kaithal, Ujwa and Sirsa) on 923 farmer's field covering an area of 399.4 ha during 2017-18. Average yield 51.91 q/ha was obtained by majority of farmers under ICM component. HD-2967 variety of wheat has coverage of 18-24 percent under rice-wheat cropping system.

FLDs on Millets

FLDs on millets were undertaken by KVKs of Rajasthan, Haryana and Delhi during 2017-18 are as under.

FLDs organized by KVKs of Rajasthan

In Rajasthan, 216 farmers' location were selected to conduct the FLDs at 89.5 ha area. The details are given in table 9.25.

Pearl Millet: Pearlmillet (Bajra) is most important crop of arid and semi-arid zones of Rajasthan. Technological packages in ICM mode were demonstrated in participatory mode. Demonstrations were undertaken by 08 KVKs Barmer-II, Hanumangarh-II, Jodhpur-I, Jodhpur-II, Pali, Barmer-I, Bikaner-II and Sikar) at 191 farmers' fields over an area of 79.5 ha. Farmers obtained 13.30 q/ha yield advantage in the existing resources and prevailing farming situation.

Sorghum: Demonstrations were undertaken by KVK Rajsamand at 25 farmers' field over an area of 10 ha. Yield advantage (18.92 q/ha) was reported by KVK and this need to be popularized in other parts of the district as well as sub-humid regions of Rajasthan.

FLDs organized by KVKs of Haryana and Delhi

In Haryana, 10 locations were chosen to conduct the FLDs at 4.00 ha. The details of FLDs undertaken are given in table 9.26.

Table 9.25 Performance of FLDs on millets in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Pearl millet (8)	ICM	166	67	14.14	11.34	33.05	1:1.95	1:1.69
	Varietal evaluation	25	12.5	8.80	7.50	17.33	1:1.43	1:1.32
	Total	191	79.5	13.30	10.74	30.58	1:1.82	1:1.60
Sorghum (1)	Varietal evaluation	25	10	18.92	14.16	33.62	1:1.92	1:1.57
	Grand Total	216	89.5					

Table 9.26 Performance of FLD on millets in Haryana.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Pearl millet(1)	IWM	10	4	22.75	19.00	19.74	1:1.26	1:1.17
	Total	10	4	22.75	19.00	19.74	1:1.26	1:1.17
	Grand Total	10	4					

Pearl Millet: Demonstrations were undertaken by KVK Rewari at 10 farmers' field over an area of 4 ha. Farmers obtained 22.75 q/ha yield advantage in the existing resources and prevailing farming situation.

FLDs on Commercial Crops

FLDs on commercial crops were conducted at 422 farmers' field in an area of 168.8 ha in 2017-18 land in Zone-II. In Rajasthan, 100 farmers' fields were covered under FLDs on commercial with an area of 40 ha. In Haryana and Delhi, 322 farmers' fields were covered under FLDs on commercial with an area of 128.8 ha. State-wise details are herein.

FLDs on commercial crops organized by KVKs of Rajasthan

The major crops of Rajasthan on which FLDs were undertaken is cotton. The detailed information about FLDs on commercial crop are depicted in table 9.27.

Cotton: FLDs on cotton were undertaken by KVK Sriganganar and Hanumangarh-I at 50 farmers' fields in 20 ha area. Out of 50 ICM demonstration the weighted mean yield of 24.50q/ha was recorded whereas IPM demonstrations yield was 20.51 q/ha.

FLDs on commercial crops organized by KVKs of Haryana and Delhi

In Haryana and Delhi, demonstrations were undertaken on Cluster bean, cotton and Sugarcane. FLDs were undertaken on 322 farmers' fields in an area of 128.8 ha land. The performance of demonstration is illustrated in Table 9.28.

Cotton: FLDs on cotton were undertaken by 4 KVKs (Jind, Hisar, Rohtak and Sirsa) on 305 farmers' fields in 122 ha area. The highest yield of 23.55 q/ha was recorded in ICM followed by INM (21.54 q/ha). Thematic area wise weighted mean yield was 23.22 q/ha was obtained under demonstration which was 17.89% higher over local check.

Sugarcane: FLDs on sugarcane were undertaken by 2 KVKs (Ambala and Kuruksetra) on 17 farmers' fields over an area of 6.8 ha. Farmers received very attractive remunerative price as well as benefit from sugarcane demonstrations. They have assured that demonstrated technology will be used in coming next season.

Table 9.27 Performance of FLD on commercial crops in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Cotton (2)	ICM	40	16	24.50	21.70	12.90	1:3.51	1:3.08
	IPM	10	4	20.51	16.59	23.63	1:1.77	1:1.52
	Total	50	20	23.70	20.68	15.05	1:3.04	1:2.70
	Grand Total	50	20					

Table 9.28 Performance of FLDs on commercial crops in Haryana and Delhi.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Cotton(4)	ICM	255	102	23.55	17.51	34.51	1:1.96	1:2.02
	INM	50	20	21.54	19.84	8.68	1:2.25	1:1.97
	Total	305	122	23.22	17.89	30.28	1:2.00	1:2.01
Sugarcane (2)	IPM	17	6.8	718.09	652.32	10.71	1:2.55	1:2.05
	Grand Total	322	128.8					

FLDs on Others Crops

FLDs on other crops were conducted at 332 farmers' fields in an area of 150.6 ha in 2017-18 land in Zone-II. In Rajasthan, 272 farmers' fields were covered under FLDs on cash crops with an area of 124.6 ha. In Haryana and Delhi, 60 farmers' fields were covered under FLDs on other crop with an area of 26 ha.

FLDs on Cluster bean and Quinnowa crops organized by KVKs of Rajasthan

The major crops of Rajasthan on which FLDs undertaken are cluster bean and quinnowa. The detailed information about FLDs on other crops are depicted in table 9.29.

Cluster bean: Twelve KVKs (Bharatpur, Churu 2, Dholpur, Hanumangarh-II, Sikar, Jaisalmer-II, Jaisalmer-I, Bikaner-II, Pali, Tonk, Alwar-II and Nagore-II) conducted demonstrations on 262 farmers' fields covering an area of 122.6 ha. The highest yield of 10.44q/ha was recorded under ICM followed by IDM (6.65 q/ha).

Quinnowa: Quinnowa is the high nutritive value crop and performs better in clay loam soils during rabi season. FLDs on quinnowa were undertaken by KVK Baran on 10 farmers' fields in 2 ha area. Out of 10 varietal demonstration the mean yield of 10.89q/ha was recorded whereas local practice yield was 9.18 q/ha.

Table 9.29 Performance of FLD on cluster bean and quinnowa crops in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Cluster bean (12)	ICM	252	118.6	10.44	7.24	58.97	1:2.74	1:2.22
	IDM	10	4	6.65	5.62	18.33	1:1.67	1:1.52
	Total	262	122.6	10.31	7.19	57.64	1:2.70	1:2.19
Quinnowa (1)	Varietal evaluation	10	2	10.89	9.18	18.63	1:8.38	1:7.65
	Grand Total	272	124.6					

FLDs on Other crops organized by KVKs of Haryana and Delhi

In Haryana and Delhi, demonstrations were undertaken on cluster bean and white button mushroom. FLDs were undertaken on 60 farmers' fields in an area of 26 ha land. The performance of demonstration is illustrated in Table 9.30.

Cluster bean: Demonstrations were undertaken by KVKs Sirsa and Rewari on 40 farmers' fields over an area of 16 ha. The weighted mean yield was recorded 11.03 q/ha with the B:C ratio of 2.0.

FLDs on Fodder Crops

Livestock sector plays important role to achieve nutritional, economical, social and livelihood security especially in arid and semi-arid parts of Rajasthan. Availability of green fodder round the year enhances milk yield, total intake of feeds, body weight, etc.

In Zone-II, FLDs on fodder crops were undertaken on 406 farmers' fields covering 76.42 ha area under different farming environments.

Details of FLDs organized in Rajasthan

In Rajasthan, FLDs were conducted at 352 locations in 62 ha. area. FLDs were laid out on berseem, sudan grass, napier, lucerne, pearlmillet, oat, and sorghum and the details are given in table 9.31.

Barseem: Demonstrations were undertaken by KVK Karauli on 25 farmers' fields in an area of 2.00 ha. under irrigated situation. Farmers harvested seven (7) cutting of berseem. In corporation of berseem as green fodder with wheat straw improved health of animals and increased milk per day of milch animal.

Lucern: Demonstration were undertaken by 5 KVK (Hanumangarh-II, Tonk, Barmer-I, Rajsamand and Karauli) on 60 farmers' fields over an area of 6.5 ha. Lucern is most suitable green fodder of Rajasthan. Majority of farmers are ready to cultivate lucern as green fodder in coming season.

Pearlmillet: Demonstrations were undertaken by 1 KVK Alwar-II on 8 farmers' fields in an area of 1 ha. pearlmillet has become popular among farming community.

Table 9.30 Performance of FLDs on commercial crops in Haryana and Delhi.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Cluster bean (2)	ICM	20	8	11.25	9.00	25.00	1:1.75	1:1.54
	INM	20	8	10.80	8.00	35.00	1:2.28	1:1.83
	Total	40	16	11.03	8.50	30.00	1:2.00	1:1.68

Table 9.31 Performance of FLDs on fodder crops in Rajasthan.

Crops KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha) Green Fodder	Local check (q/ha)	Increase in yield (%)	Demo	Check
Berseem (1)	Varietal Evaluation	25	2	501.00	437.00	14.65	1:2.99	1:2.77
Lucerne (5)	ICM	60	6.5	463.43	397.23	21.68	1:3.45	1:3.12
Pearlmillet (1)	ICM	8	1	295.00	240.00	22.92	1:1.90	1:1.62
Oat (10)	ICM	144	23.8	406.30	343.83	19.50	1:3.14	1:2.82
	INM	20	6.5	252.23	224.69	12.53	1:3.43	1:3.16
	Total	164	30.3	373.25	318.27	18.01	1:3.20	1:2.88
Napier (2)	ICM	20	5	382.00	298.00	28.19	1:2.52	1:1.96
	Varietal Evaluation	10	1	196.00	180.00	8.89	1:1.70	1:1.58
	Total	30	6	351.00	278.33	24.97	1:2.36	1:1.90
Sorghum fodder (1)	ICM	20	10	104.00	81.00	28.40	1:2.08	1:1.25
Sudan grass (2)	ICM	45	6.2	311.61	263.87	17.74	1:3.45	1:3.09
	Grand Total	352	62					

Oat: Demonstrations were undertaken by 10 KVKs (Alwar-II, Hanumangarh-II, Pali, Sikar, Sawaimadhopur, Jhunjhunu, Bikaner-I, Karauli, Kota and Churu-I) on 164 farmers' fields in an area of 30.3 ha. Two cutting of oat could be taken under partial irrigated condition.

Napier grass: Demonstrations were undertaken by KVKs Pali and Baran at 30 farmers' fields in an area of 6 ha. Establishment of napier grass provide four to five years green fodder in the same field.

Sorghum: Demonstrations were undertaken by KVK Pali at 20 farmers' fields over an area of 10 ha. during Kharif 2017. It was reported that 104.00 q/ha green fodder was produced.

Sudan grass: Demonstrations were undertaken by KVK Bharatpur and Dholpur at 45 farmers' fields over an area of 6.2 ha. during Kharif 2017. Two cuttings were done by farmers and highest yield was 311.61 q/ha.

FLDs organized by KVKs of Haryana and Delhi

In Haryana and Delhi, FLDs were conducted on 54 locations in 14.42 ha. area. FLDs were carried out on berseem, maize and sorghum (Table 9.32).

Barseem: Demonstrations were undertaken by KVK Karnal and Ambala on 34 farmers' fields in an area of 8.42 ha. under irrigated situation. Farmers harvested seven (7) cutting of berseem. Green fodder yield was very attractive under irrigated situation and 1256.80 q/ha green fodder was produced. Incorporation of berseem as green fodder with wheat straw improved health of animals and increased milk per day of milch animal.

Maize: FLDs on maize were undertaken by KVK Ambala on 10 farmers' fields in an area of 4 ha. during Kharif 2017. Farmers fetched good remuneration as well as quality fodder.

Sorghum: Demonstrations were undertaken by KVK Karnal at 10 farmers' fields over an area of 2 ha and green fodder yield was 655.00 q/ha.

FLDs on Horticultural Crops

Horticulture plays important role in providing nutritional security, income augmentation and sustainable land use system. Arid fruit crops have potential as suitable for different parts of Rajasthan, Haryana and Delhi.

FLDs on horticultural crops include fruit crops and vegetables. The description about FLDs on these three areas is given separately (table 9.33 to 9.36).

FLDs on Fruit crops

FLDs organized by KVKs of Rajasthan

KVKs of Rajasthan conducted FLDs on Citrus, Guava, Kinnow and Papaya. State covered i.e., 21.25 ha. area under FLDs on 101 farmers' fields. (Table 9.33).

Table 9.32 Performance of FLDs on fodder crops in Haryana and Delhi.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha) Green Fodder	Local check (q/ha)	Increase in yield (%)	Demo	Check
Berseem(2)	ICM	24	4.42	1256.80	920.00	36.61	1:4.46	1:3.40
	IDM	10	4	695.00	655.00	6.11	1:7.67	1:6.17
	Total	34	8.42	989.91	794.11	22.12	1:5.29	1:4.23
Maize (1)	Varietal Evaluation	10	4	163.10	151.00	8.01	1:4.72	1:4.41
Sorghum (1)	ICM	10	2	655.00	395.00	65.82	1:3.17	1:2.25
	Grand Total	54	14.42					

Table 9.33 Performance of FLDs on fruit crops in Rajasthan

Crops(KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Citrus (1)	IPM	30	7	113.00	78.00	44.87	1:2.90	1:1.55
Guava (1)	IPM	10	2	448.00	365.00	22.74	1:7.87	1:6.80
		10	2	448.00	365.00	22.74	1:7.87	1:6.80
Kinnow (2)	ICM	20	5	273.20	242.30	12.75	1:3.00	1:2.84
	IPM	21	5.25	232.00	183.00	26.78	1:12.61	1:11.44
	Total	41	10.25	252.10	211.93	19.94	1:5.64	1:5.07
Papaya (1)	Varietal evaluation	20	2	932.00	785.00	18.73	1:7.77	1:5.06
	Grand Total	101	21.25					

Citrus: FLDs were undertaken by KVK Udaipur at 30 locations over and area of 7 ha. area on IPM components. Management of insect-pest in citrus is an important aspect. Front line demonstration on management of insect-pests were laid out in 6-10 years old orchards and average yield obtained was 113.00 q/ha.

Guava: Guava is an important fruit crop of Sawaimadhopur District of Rajasthan. KVK organized FLDs on IPM component to reduce insect-pest infestation during 2017-18. Farmers obtained 448q/ha yield of guava fruits in 8-12 years old orchards.

Kinnow: FLDs on Kinnow were undertaken by 2 KVKs (Hanumangarh-I and Jhalawar) at 41 farmers field over an area of 5.25 ha in 7-15 years old orchards. The major aspect covered under FLDs were ICM and IPM during 2017-18 at Farmers fields. ICM recorded highest yield 273.20 q/ha.

Papaya: FLDs were undertaken by KVK Baran at 20 locations over and area of 2 ha. area on varietal evaluation components. An average yield 932 q/ha. was obtained in two years old orchards.

FLDs organized by KVKs of Haryana and Delhi

KVKs in Haryana and Delhi conducted FLDs on Guava and Kinnow. The state covered area i.e., 4 ha land under FLDs on 10 farmers' fields (Table 9.34).

Guava: Guava is important fruit crop of Kurukshetra district of Haryana. KVK organized FLDs on IPM component to reduce insect-pest intensity during 2017-18. farmers obtained 63.20 q/ha yield of guava in 4-6 years old orchards.

Table 9.34 Performance of FLDs on Fruit Crops in Haryana.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Guava (1)	IPM	5	2	63.20	58.00	8.90	1:3.74	1:3.51
Kinnow (1)	INM	5	2	240.00	220.00	9.09	1:2.14	1:2.06
	Grand Total	10	4					

Kinnow: FLDs on kinnow were undertaken by KVK Sirsa at 5 farmers' fields over an area of 2 ha. FLDs on INM component to increase yield during 2017-18. farmers obtained 240 q/ha yield of kinnow in 6-10 years old orchards.

FLDs on Vegetable Crops

FLDs organized by KVKs of Rajasthan

Vegetable cultivation provides additional benefit to farmers. In the present scenario of agricultural development, Majority of farmers are eager to cultivate Vegetables for augmentation of income. Inclusion of vegetables under different farming systems is the best example of intensification. The major vegetables Brinjal, Tomato, Bittergourd, Bottle Guard, Chilli, Longmelon, Okra, Onion and Potato were undertaken under front line demonstration during 2017-18 (Table 9.35).

Brinjal: Demonstrations on brinjal were undertaken by 4 KVKs (Banswara, Bharatpur, Udaipur and Jhalawar) at 134 farmers' fields over an area of 14.5 ha. farmers obtained 292.17 q/ha yield and remunerative price during summer season.

Tomato: Demonstrations were undertaken by 5 KVKs (Banswara, Bharatpur, Jhalawar, Dausa and Udaipur) at 161 farmers' fields in an area of 18.5 ha. Keeping quality of produced tomato is quite encouraging. Maximum yield was reported 385.91 q/ha under ICM component.

Bottle gourd: FLDs on bottle gourd were conducted by KVK Jhalawar at 100 farmers' field in 5 ha land. In ICM demonstrations, maximum yield was noticed (322.14 q/ha). An average 12.85% yield enhancement was reported over Farmers practice.

Bitter gourd: FLDs on bitter gourd were conducted by KVK Hanumangarh-I at 5 farmers' field in 0.25 ha land. In varietal demonstrations, maximum yield was noticed (213.30 q/ha). An average 14.19% yield enhancement was reported over Farmers practice.

Chilli: Demonstrations were undertaken by 3KVKs (Banswara, Jhalawar and Baran) at 130 farmers' fields over an area of 13 ha. 193.72 q/ha yield was areported in existing situations and available resources.

Long melon: Demonstrations were undertaken by KVK Banswara at 10 farmers' fields over an

Table 9.35 Performance of FLD on vegetable crops in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Brinjal (4)	ICM	34	4.5	412.89	338.47	21.33	1:2.76	1:2.36
	IPM	100	10	237.84	195.48	21.67	1:2.09	1:1.78
	Total	134	14.5	292.17	239.86	21.56	1:2.27	1:1.93
Tomato (5)	ICM	118	12.5	385.91	302.28	27.63	1:3.29	1:2.69
	IDM	25	3	291.29	268.33	8.32	1:7.23	1:6.67
	Varietal	18	3	209.70	178.12	17.73	1:1.92	1:1.88
	Total	161	18.5	341.99	276.64	22.89	1:3.61	1:3.11
Bittergourd (1)	Varietal	5	0.25	213.30	186.80	14.19	1:3.17	1:2.76
Bottle Gourd (1)	ICM	100	5	322.14	285.46	12.85	1:3.42	1:2.39
Chilli (3)	ICM	130	13	193.72	153.44	26.55	1:3.33	1:2.71
Longmelon (1)	Varietal	10	2	160.20	127.90	25.25	1:2.49	1:2.14
Okra (2)	ICM	25	4	141.20	94.50	51.19	1:3.55	1:3.10
	IPM	10	2	128.90	81.70	57.77	1:3.29	1:2.57
	Total	35	6	137.10	90.23	53.38	1:3.45	1:2.90
Onion (2)	ICM	253	40	244.26	193.71	26.03	1:4.67	1:3.25
Potato (1)	INM	10	4	280.00	255.00	9.80	1:2.49	1:2.29
	Grand Total	625	316.25					

area of 2 ha. An average yield 160.20 q/ha was noticed and farmers received good price by selling in the market.

Okra: Demonstrations on onion were undertaken by 2 KVKs (Bundi and Banswara) at 35 farmers' fields covering an area of 6.0 ha. Farmers obtained highest yield under ICM component 141.20 q/ha yield within existing resources and prevailing farming situation.

Onion: Demonstrations on onion were undertaken by 2 KVKs (Dungarpur and Banswara) at 253 farmers' fields covering an area of 40 ha. Farmers obtained 244.26 q/ha yield within existing resources.

Potato: Demonstrations on potato were undertaken by KVK Bharatpur at 10 farmers' fields covering an area of 4 ha. Farmers obtained 280 q/ha yield within existing resources



FLD on Tomato – KVK Bharatpur

FLDs organized by KVKs of Haryana and Delhi

KVKs located in Haryana and Delhi implemented FLDs on vegetable crops which covered 102 farmers' fields in 32.8 ha area. The major vegetables on which FLDs undertaken were

Brinjal, Tomato, Cauliflower, Chilli, Pea, Potato and Spinach (Table 9.36).

Brinjal: FLDs on brinjal were conducted by KVK Rohtak at 10 farmers' field in 2.0 ha. Brinjal demonstrations were laid out on IPM. Maximum yield was reported under IPM (295q/ha) Farmers obtained good price by adopting low cost management technologies of brinjal.

Tomato: Demonstrations were undertaken by KVK Ambala at 10 farmers' fields over an area of 4 ha. Maximum yield was reported 323.75 q/ha under ICM component. Farmers fetched good prices during Sept.-Nov. and Feb.-March months.

Cauliflower: FLDs on cauliflower were conducted by KVK Gurgaon at 10 farmers' field in 04 ha area. Cauliflower is important vegetable crop and its demand is increasing day by day in the daily food habit. In the existing environment, Farmers obtained 105.25q/ha yield of cauliflower.

Chilli: Demonstrations were undertaken by KVK Rewari at 20 farmers' fields over an area of 2 ha. FLDs on chilli were carried out on varietal evaluation at farmers' fields. Maximum yield was reported in varietal evaluation component 90 q/ha.

Vegetable Pea: Demonstrations were undertaken by KVK Panipat at 25 farmers' fields over an area of 10 ha. Farmers obtained 112 q/ha green pod of pea in their field.

Table 9.36 Performance of FLDs on vegetable crops in Haryana and Delhi.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Brinjal (1)	IPM	10	2	295.00	275.00	7.27	1:4.12	1:3.73
Tomato (1)	ICM	10	4	323.75	280.00	15.63	1:5.18	1:4.20
Cauliflower (1)	ICM	10	4	105.25	98.70	6.64	1:4.14	1:3.70
Chilli (1)	Varietal	20	2	90.00	75.00	20.00	1:2.70	1:2.25
Pea (1)	INM	25	10	112.00	105.00	6.67	1:2.93	1:2.80
Potato (2)	ICM	17	6.8	314.44	298.00	5.64	1:2.34	1:2.07
Spinach (1)	Varietal	10	4	137.25	105.00	30.71	1:4.99	1:3.00
	Grand Total	102	32.8					

Potato: Demonstrations on potato were undertaken by KVK Ambala at 17 farmers' fields covering an area of 6.8 ha. Farmers obtained 314.44 q/ha yield within existing resources and prevailing farming situations.

Spinach: Demonstrations were undertaken by KVK Ambala at 10 farmers' fields over an area of 4 ha. Now farmers realized the benefit of cultivation of spinach. Leaves of spinach are easily sold by farmers in nearby market. Maximum 137.25 q/ha spinach leaves reported with CBR of 1:4.99.

FLDs on Spice Crops

Overall, 835 FLDs on spice crops were undertaken covering 268.4 ha area in Rajasthan and Haryana during 2017-18. A total of 835 FLDs were undertaken by KVKs of Rajasthan farmers' fields were selected for demonstration. The area under demonstrations were 268.4 ha. The details about the FLDs are presented in table 9.37 (Rajasthan)

FLDs organized by KVKs of Rajasthan

Seed spices including cumin, fennel, fenugreek, coriander, etc. are important crops of

Table 9.37 Performance of FLD on spice crops in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Coriander (8)	ICM	133	43.5	16.08	12.53	30.67	1:3.74	1:3.16
	INM	29	10	14.50	12.70	14.17	1:3.32	1:2.88
	Varietal	105	30	13.10	12.37	6.10	1:2.68	1:2.63
	Total	267	83.5	14.82	12.49	19.87	1:3.28	1:2.92
Cumin (6)	ICM	140	55.9	8.32	6.84	23.26	1:4.00	1:3.61
	IDM	50	25	5.06	4.26	19.73	1:3.38	1:2.56
	Total	190	80.9	7.31	6.04	22.17	1:3.84	1:3.33
Fennel (1)	ICM	39	12.9	19.87	17.27	15.08	1:4.64	1:4.32
Fenugreek (7)	ICM	182	45	19.05	15.43	24.40	1:3.04	1:2.55
	Varietal	30	10	14.50	11.50	26.09	1:2.46	1:2.09
	Total	212	55	18.22	14.71	24.71	1:2.95	1:2.48
Garlic (3)	ICM	127	36.1	83.11	68.61	21.29	1:2.86	1:2.54
	Grand Total	835	268.4					

Rajasthan. In Rajasthan, FLDs on spice crops were undertaken on coriander, cumin, fennel, garlic and fenugreek crops (Table 9.37).

Coriander: Demonstrations on coriander were conducted by 8 KVKs (Kota, Ajmer, BUNDI, Dholpur, Jhalawar, Chittorgarh, Pratapgarh, Banswara and Baran) at 267 farmers' fields over an area of 83.5 ha. Coriander cultivation is remunerative and cost effective as majority of farmers obtained 14.82 q/ha yield during rabi 2017-18.



FLD on coriander –KVK Banswara

Cumin: FLDs on cumin were undertaken by 6 KVKs (Ajmer, Barmer-II, Jodhpur-I, Barmer-I, Jodhpur-II and Pali) at 190 farmers' field covering an area of 80.9 ha. Cumin is important seed spice crop of Rajasthan. Demonstrations on wilt resistant varieties are best option to minimize disease incidence and increase productivity as well as total production in Rajasthan.

Fennel: FLDs on fennel were undertaken by KVK Bharatpur at 39 farmers' fields covering an area of 12.9 ha during rabi 2017-18. This another seed spice crop mainly grown in sandy soils. Farmers obtained 19.87 q/ha yield.

Fenugreek: FLDs on fenugreek were conducted by 7 KVKs namely Chittorgarh, Jaipur-I, Jhalawar, Pratapgarh, Baran, Churu-I and Pali. Under fenugreek demonstrations, 212 farmers were covered with an area of 55 ha. farmers received 19.05 q/ha yield in ICM component followed by 14.50 q/ha in varietal component.



FLD on cumin – KVK Barmer-I



FLD on fennel – KVK Bharatpur

Garlic: FLDs on garlic were conducted by 3 KVKs namely Jhalawar, Kota and Baran. Under garlic demonstrations 127 farmers were covered with an area of 36.10 ha. Farmers received 83.11q/ha yield in ICM component.

FLDs on Medicinal Crops

Overall, 30 FLDs on Medicinal crops were undertaken covering an area of 12 ha land in Zone-II during 2017-18. A total of 30 FLDs were undertaken by KVKs of Rajasthan farmers' fields were selected for demonstration. The area under demonstrations were 12 ha. The details about the FLDs are presented in table 10.19 (Rajasthan)

FLDs organized by KVKs of Rajasthan

In Rajasthan, FLDs on medicinal crops were undertaken on isabgol crop (Table 9.38).

Isabgol: FLDs on isabgol were conducted by KVK Barmer-I. Under Isabgol demonstrations 30 farmers were covered with an area of 12 ha. Farmers received 8.23q/ha yield in ICM component



FLD on garlic – KVK Baran

Table 9.38 Performance of FLD on medicinal crops in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Isabgol (1)	ICM	30	12	8.23	6.58	25.08	1:3.49	1:3.23
	Total	30	12	8.23	6.58	25.08	1:3.49	1:3.23

FLDs on Hybrid Crops

The FLDs on hybrid crops were conducted by KVKs functioning in Zone-II on Brinjal, Tomato, Bittergourd, Bottle Guard, Chilli, Cotton, Long melon, Napier grass, Okra, Papaya, Pearl millet, Sudan grass, Castor, Cauliflower, Maize fodder and Sorghum fodder. The detail information about yield, area, BC ratio etc., are given in table 9.39 and 9.40.

FLDs organized by KVKs of Rajasthan

In Rajasthan, FLDs were conducted on Brinjal, Tomato, Bittergourd, Bottle Guard, Chilli, Cotton, Long melon, Napier, Okra, Papaya, Pearl millet and Sudan grass. Performances of FLDs in Rajasthan are presented in table 9.39.

Brinjal: Demonstrations on brinjal were conducted by 4 KVKs (Banswara, Bharatpur, Udaipur and Jhalawar) on 134 locations in 14.5 ha area. Average yield was 292.17 q/ha with BC ratio 1:2.27.

Tomato: Demonstrations on tomato were conducted by 5 KVKs i.e., Banswara, Bharatpur, Jhalawar, Dausa and Udaipur on 161 farmers' fields covering 18.5 ha land. Farmers viewed on quality of hybrid tomato is quite satisfactory and good remunerations were obtained by farmers.

Table 9.39 Performance of FLDs on hybrid crops (vegetables and fruits) in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Brinjal (4)	ICM	134	14.5	292.17	239.86	21.56	1:2.27	1:1.93
Tomato (5)	ICM	118	12.5	385.91	302.28	27.63	1:3.29	1:2.69
	IDM	25	3	291.29	268.33	8.32	1:7.23	1:6.67
	Varietal	18	3	209.70	178.12	17.73	1:1.92	1:1.88
	Total	161	18.5	341.99	276.64	22.89	1:3.61	1:3.11
Bittergourd (1)	Varietal	5	0.25	213.30	186.80	14.19	1:3.17	1:2.76
Bottle Guard (1)	ICM	100	5	322.14	285.46	12.85	1:3.42	1:2.39
Chilli (3)	ICM	130	13	193.72	153.44	26.55	1:3.33	1:2.71
Longmelon (1)	Varietal	10	2	160.20	127.90	25.25	1:2.49	1:2.14
Okra (2)	ICM	35	6	137.10	90.23	53.38	1:3.45	1:2.90
Papaya (1)	Varietal	20	2	932.00	785.00	18.73	1:7.77	1:5.06
	Grand Total	595	61.25					

Table 9.40 Performance of FLDs on hybrid crops (other crops) in Rajasthan.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Cotton (2)	ICM	40	16	24.50	21.70	12.90	1:3.51	1:3.08
	IPM	10	4	20.51	16.59	23.63	1:1.77	1:1.52
	Total	50	20	23.70	20.68	15.05	1:3.04	1:2.70
Napier grass (2)	ICM	20	5	382.00	298.00	28.19	1:2.52	1:1.96
	Varietal Evaluation	10	1	196.00	180.00	8.89	1:1.70	1:1.58
	Total	30	6	351.00	278.33	24.97	1:2.36	1:1.90
Pearl millet (8)	ICM	174	68	18.27	14.71	32.90	1:1.95	1:1.68
Sudan grass (2)	ICM	45	6.2	311.61	263.87	17.74	1:3.45	1:3.09
	Grand Total	299	100.2					

Bittergourd: Demonstrations on bittergourd were conducted by KVK Hanumangarh-I on 05 locations in 0.25 ha land. Average yield was 213.30 q/ha with BC ratio 1:3.17.

Bottlegourd: Demonstrations on bottlegourd were conducted by KVK Jhalawar on 100 locations in 5.0 ha land. Average yield was 322.14 q/ha with BC ratio 1:3.42.



FLD on Tomato – KVK Banswara



FLD on Okra – KVK Banswara

Chilli: Demonstrations on chilli hybrid were conducted by 3 KVKs i.e., Baran, Jhalawar and Banswara on 130 farmers' fields covering 13 ha land.

Long menlon: Demonstrations on long melon hybrid were conducted by KVK Banswara on 10 farmers' fields covering 2 ha land.

Okra: Demonstrations on okra hybrid were conducted by 2 KVKs i.e., Bundi and Banswara on 35 farmers' fields covering 6.00 ha land. Farmers fetched attractive price due to colour, size and keeping quality of hybrid okra.

Papaya: Demonstrations on Papaya were conducted by KVK Baran on 20 farmers' fields covering 2.00 ha land. Very good remuneration with BC ratio 1:7.77 reported.

Cotton: FLDs on hybrid cotton was conducted by 2 KVKs (Sriganganagar and Hanumangarh) 40 farmers locations in 16 ha area during 2017-18. Being a commercial crop, farmers received more profit and BC ratio was reported 1:3.04.

Napier grass: Demonstrations on hybrid napier grass were conducted by 2 KVKs Pali and Baran on 30 locations in 6 ha land.

Pearl millet: The FLDs on hybrid pearl millet were conducted by 8 KVKs i.e., Barmer-I, Barmer-II, Hanumangarh-II, Jodhpur-I, Jodhpur-II, Pali, Bikaner-II and Alwar-II on 174 farmers' fields in 68 ha area. Hybrid pearlmillet varieties are preffered by farmers as short duration, higher yield, disease resistant, draught tolerant features etc.

Sudan grass: Demonstrations on hybrid sudan grass were conducted by Bharatpur and Dholpur KVKs on 45 locations in 6.2 ha area.

FLDs organized by KVKs of Haryana and Delhi

In Haryana and delhi, FLDs were conducted on Brinjal, Tomato, Castor , Cauliflower, Chilli, Cotton, Maize fodder, Pearl millet and Sorghum fodder. Achievements of FLDs in Haryana and Delhi are presented in table 9.41.

Table 9.41 Performance of FLDs on hybrid crops (vegetables and fruits) in Haryana and Delhi.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Brinjal (1)	IPM	10	2	295.00	275.00	7.27	1:4.12	1:3.73
Tomato (1)	ICM	10	4	323.75	280.00	15.63	1:5.18	1:4.20
Cauliflower (1)	ICM	10	4	105.25	98.70	6.64	1:4.14	1:3.70
Chilli (1)	Varietal Evaluation	20	2	90.00	75.00	20.00	1:2.70	1:2.25
	Grand Total	50	12					

Table 9.42 Performance of FLDs on hybrid crops (other crops) in Haryana and Delhi.

Crops (KVKs)	Theme	No. of farmers	Area (ha)	Weighted Mean			BCR	
				Demo yield (q/ha)	Local check (q/ha)	Increase in yield (%)	Demo	Check
Castor (1)	ICM	100	40	41.50	37.00	12.16	1:2.34	1:2.09
Cotton (4)	ICM	255	102	23.55	17.51	34.51	1:1.96	1:2.02
	INM	50	20	21.54	19.84	8.68	1:2.25	1:1.97
	Total	305	122	23.22	17.89	30.28	1:2.00	1:2.01
Maize fodder (1)	Varietal Evaluation	10	4	163.10	151.00	8.01	1:4.72	1:4.41
Pearl millet (1)	IWM	10	4	22.75	19.00	19.74	1:1.26	1:1.17
Sorghum fodder (1)	ICM	10	2	655.00	395.00	65.82	1:3.17	1:2.25
	Grand Total	435	172					

Brinjal: Demonstrations on hybrid brinjal were conducted by 1 KVK (Rohtak) on 10 farmers' fields covering 2 ha. Farmers reported yield level of 295 q/ha with BC ratio 1:4.12.

Tomato: Demonstrations on hybrid tomato were conducted by KVK Ambala on 10 farmers' fields covering 4.00 ha. Farmers obtained 323.75q/ha tomato sold and more profit was also reported.

Cauliflower: Demonstrations on hybrid cauliflower were conducted by KVK Gurgaon on 10 farmers' fields covering 4.00 ha. Majority of farmers opined that cultivation of hybrid cauliflower is remunerative and more benefits are obtained.

Chilli: Demonstrations on chilli hybrid were conducted by KVK Rewari on 20 farmers' fields covering 02 ha land. Farmers fetched good remuneration from chilli.

Castor: Demonstrations on castor were conducted by KVK Hisar on 100 farmers' fields covering 40 ha.

Cotton: Demonstrations on cotton were conducted by 4 KVKs (Hisar, Jind, Rohtak and Sirsa) on 305 farmers' fields covering 122 ha. Farmers fetched better return under demonstrations.

Pearlmillet: Demonstrations on hybrid pearl millet were conducted by 1 KVK (Rewari) on 10 farmers' fields covering 4.00 ha. Use of hybrid seed of pearlmillet enhanced productivity and farmers obtained average yield of 22.75q/ha.

Maize fodder: FLDs on hybrid maize fodder were conducted by KVK Ambala on 10 farmers' fields covering 4.00 ha. Use of hybrid seed of maize enhanced fodder productivity and farmers obtained average yield of 163.10q/ha.

Sorghum fodder: Demonstrations on hybrid sorghum fodder were conducted by KVK Karnal on 10 farmers' fields covering 4.00 ha. Use of hybrid seed of sorghum enhanced fodder productivity and farmers obtained average yield of 655q/ha.

FLDs on Farm Implements

In the present scenario of agriculture, contribution of farm mechanization technology is well recognized. In the context of Rajasthan, Haryana and Delhi states, use of farm implements under different field operations and post harvest processing plays important role in enhancing efficiency and efficacy and reducing drudgery and saving time. There are situation and operation specific implements developed and promoted by research institute, public sectors and private agencies. Krishi vigyan Kendras are also actively involved in promotion of efficacy and suitability of different implements under various farming systems. State wise description of performance of FLDs on farm implements as follows ;

FLDs organized by KVKs of Rajasthan

In Rajasthan, KVK Churu-I, conducted 9 FLDs on the farm implements. The details are given in table 9.43.

FLDs organized by KVKs of Haryana

In Haryana, 127 FLDs were undertaken in 58 ha land on the farm implements. The KVKs were Ambala, Rohtak, Yamunanagar and Kaithal The details about FLDs on the farm implements are given in table 9.44.

FLD on Kitchen Garden

For ensuring nutritional security, KVKs of Rajasthan, Haryana and Delhi conducted FLDs on kitchen gardening covering 921farmers.

FLDs on Livestock

In Rajasthan, KVK Banswara, Hanumangarh-I, Hanumangarh-II and Jalore organized FLDs on Livestock on 508 units in 128 farmers fields (Table 9.45)

Table 9.43 Performance of FLD on farm implements

District	Name of the implement	Crop	Technology demonstrated	No. of Farmer	Area (ha)	Major parameters	Field observation (output/man hour)		% change in major parameter
Churu-I	Groundnut decorticator	Groundnut	Decortication technology	9	-	Decortication (kg/h)	30.2	8.8	260.97

Table 9.44 Performance of FLD on farm implements

District	Name of the implement	Crop	Technology demonstrated	No. of Farmer	Area (ha)	Major parameters	Filed observation (output/man hour)	Local check	% change in major parameter
Ambala	Zero tillage seed drill	Wheat	Sowing Implements	10	4	Saving of seed and uniform sowing	0.40	0.11	7%
Rohtak	Zero tillage seed drill	Wheat	Sowing Implements	20	8	Saving of seed and uniform sowing	0.41	0.11	8%
Yamunanagar	Happy seeder	Wheat	Timely sowing	57	30	Yield	55.51	52.41	5.09%
Kaithal	Happy seeder	Wheat	Timely sowing	20	8	Yield	55	51	7.84%
Kaithal	Zero tillage seed drill	Wheat	Timely sowing	20	8	Yield	52	49	6.12%
			Total	127	58				

Table 9.45 Performance of livestock in Rajasthan

Category	Thematic area	Name of the technology demonstrated	No. of Farmer	No. of Units (Animal/ Poultry/ Birds, etc)	Major parameters		% change in major parameter
					Demo	Check	
1.Banswara							
Poultry	Animal Breeding management	Pratapdhan	20	400	155 egg	42 eggs	369.04
Goat	Animal Breeding management	**Sirohi breeding buck**	18	18	48 kg body weight	40 kg body weight	32.20
2.Hanumangarh-I							
Cattle	Disease Management	Popularization of teat cup to reduce mastitis	10	10	Mastitis develop in 2 animals	Mastitis develop in 6 animals	66.67
Cattle	Feed management	Cattle silo bag (Silage Making)	10	10	13.66 Average milk production per day	12.66 Average milk production per day	5.53

Category	Thematic area	Name of the technology demonstrated	No. of Farmer	No. of Units (Animal/ Poultry/ Birds, etc)	Major parameters		% change in major parameter
					Demo	Check	
3.Hanumangarh-II							
Cattle	Animal Production Management	Modern Manger	10	10	20.5	19.5	**5.13**
Cattle	Animal Production Management	Cow mat	10	10	17.5	17	**2.94**
4.Jalore							
Sheep & Goat	Animal Nutrition Management	Effect of concentrate supplementation on growth of lambs.	50	50	44.67 g Average daily gain	12.08 Average daily gain	269.78
		Total	128	508			

Front Line Demonstrations on feeding & management components were organized on poultry, goat, sheep and cattles by different KVKs during 2017-18. Farmers played as contributor and facilitator role in demonstrations. Based on feeding and management demonstrations, observations on different parameters were calculated and same is presented in Table 9.45. More than 65 percent farmers accepted performance of demonstrations and same will be followed during current year.

CHAPTER 10

TRAINING ACHIEVEMENTS

The Krishi Vigyan Kendra (KVK) is an innovative science based Farmer Centric based Centre which actively involve in imparting need based training to farmers, farm women and providing gainful employment to rural youth by organization of vocational training courses of long duration (one month to six months). To provide latest technical know-how on regular basis indifferent areas related to agriculture and improve competencies, in-service training courses are organized for extension personnel/workers of the concerned district.

The KVKs of Rajasthan, Haryana and Delhi organized a total number of 4611 training courses in which 130904 farmers, rural youth and extension functionaries took part. Out of which 3947 courses were organized for 112618 practicing farmers/farm women. Participation of scheduled castes/tribes and farm women was reported as 29.63 per cent (38785) and 22.93 per cent (30013), respectively. The training courses conducted for the rural youth and extension functionaries were 434 and 230 through which 12981 rural youth 5305 extension functionaries, actively took part. These training programmes were conducted both 'on campus' and 'off campus' as per the convenience of participants and nature of training programmes. The state wise details of trainings on different thematic areas are given in Table 10.1 to 10.15.

Farmers and farm women

KVKs of this zone conducted a total number of 3947 training programmes in which 112618 farmers and farm women took part. The state wise training programmes for Rajasthan, Haryana and Delhi comprised 2203, 1701 & 43 courses and 64550, 47206 & 862 participants, respectively Table 10.1)



On campus training, KVK, Jhunjhunu

Crop Production

Under crop production, a total number of 1041 courses were organized by KVKs - Rajasthan (661), Haryana (380) and Delhi (13) benefiting 31562 participants. The state wise details are presented in Table 10.2.

Table 10.1. farmers and farm women training including sponsored

Area of Training	Rajasthan				Haryana				Delhi				Grand Total			
	C	M	F	T	C	M	F	T	C	M	F	T	C	M	F	T
Crop production	661	17343	3059	20402	380	10562	598	11160	0	0	0	0	1041	27905	3657	31562
Horticulture	338	8658	1387	10045	206	4920	283	5203	10	187	0	187	554	13765	1670	15435
Soil health & fertility management	113	3140	392	3532	164	4306	286	4592	11	181	41	222	288	7627	719	8346
Livestock production and management	333	7055	2496	9551	21	323	25	348	0	0	0	0	354	7378	2521	9899
Home science/ women empowerment	261	372	6595	6967	274	428	6430	6858	13	10	279	289	548	810	13304	14114
Agril. Engineering	26	607	77	684	76	1641	134	1775	0	0	0	0	102	2248	211	2459
Plant protection	276	6311	1064	7375	267	8066	213	8279	9	155	9	164	552	14532	1286	15818
Fisheries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Production of input at site	29	675	167	842	39	1229	61	1290	0	0	0	0	68	1904	228	2132
Capacity building & group dynamics	138	3601	595	4196	170	4323	440	4763	0	0	0	0	308	7924	1035	8959
Agro forestry	28	814	142	956	104	2858	80	2938	0	0	0	0	132	3672	222	3894
Total	2203	48576	15974	64550	1701	38656	8550	47206	43	533	329	862	3947	87765	24853	112618

C : No. of Course, M : Male, F : Female; T : Total

Table 10.2. Training on Crops Production including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
Weed Management	80	2314	50	1338	2	34
Resource Conservation Technologies	22	636	35	1314	0	0
Cropping Systems	37	975	17	563	3	53
Crop Diversification	19	544	40	1136	0	0
Integrated Farming	64	1979	19	645	0	0
Micro Irrigation/irrigation	25	728	4	118	0	0
Seed production	51	1968	10	279	1	19
Nursery management	1	40	4	95	0	0
Integrated Crop Management	274	8482	117	3335	2	37
Soil & water conservatioin	8	226	8	290	0	0
Integrated nutrient management	48	1296	35	987	1	23
Production of organic inputs	18	526	16	296	0	0
Others	14	688	25	764	4	87
Total	**661**	**20402**	**380**	**11160**	**13**	**253**

C-No of Courses; P-Participants



Training on crop production – KVK Bharatpur

Horticulture

KVKs of the zone organized 628 training programmes in which 19715 farmers / farm women took part. Various aspects were covered under the training programmes viz. vegetable crops (297), fruit production (215), ornamental plants (15), plantation crops (14), tuber crops (9), spices (69) and medicinal & aromatic plants (9), involving 8691, 6110, 393, 398, 319, 2595 and 439 participants, respectively. The state wise details of specific courses and participants are given in Table 10.3.

Soil Health and Fertility Management

A total number of 288 training programmes were organized by KVKs for 8346 farmers and farm women. The major areas on

Table 10.3. Training on Horticulture including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
a) Vegetable Crops						
Production of low value and high valume crops	42	1189	53	1360	5	88
Off-season vegetables	22	667	8	218	1	18
Nursery raising	27	774	16	454	0	0
Exotic vegetables	4	104	5	139	1	17
Export potential vegetables	3	88	2	58	0	0
Grading and standardization	6	156	5	140	2	42
Protective cultivation	15	390	7	170	0	0
Others (pl specify)	17	574	5	96	0	0
Total (a)	136	3942	101	2635	9	165
b) Fruits	0	0	0	0	0	0
Training and Pruning	17	515	9	231	0	0
Layout and Management of Orchards	39	1057	13	282	1	22
Cultivation of Fruit	33	920	18	379	0	0
Management of young plants/orchards	10	247	18	399	0	0
Rejuvenation of old orchards	4	97	1	41	0	0
Export potential fruits	1	25	0	0	0	0
Micro irrigation systems of orchards	8	359	4	108	0	0
Plant propagation techniques	4	92	3	61	0	0
Others (pl specify)	3	312	5	103	0	0
Total (b)	119	3624	71	1604	1	22

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
c) Ornamental Plants	0	0	0	0	0	0
Nursery Management	10	210	6	151	0	0
Management of potted plants	0	0	0	0	0	0
Export potential of ornamental plants	1	27	0	0	0	0
Propagation techniques of Ornamental Plants	3	81	0	0	0	0
Others (pl specify)	1	15	0	0	0	0
Total (c)	15	333	6	151	0	0
d) Plantation crops	0	0	0	0	0	0
Production and Management technology	1	13	7	150	0	0
Processing and value addition	0	0	14	477	0	0
Others (pl specify)	1	50	0	0	0	0
Total (d)	2	63	21	627	0	0
e) Tuber crops	0	0	0	0	0	0
Production and Management technology	6	165	2	41	0	0
Processing and value addition	0	0	3	86	0	0
Others (pl specify)	0	0	0	0	0	0
Total (e)	6	165	5	127	0	0
f) Spices	0	0	0	0	0	0
Production and Management technology	33	1182	1	29	0	0
Processing and value addition	7	246	0	0	0	0
Others (pl specify)	0	0	0	0	0	0
Total (f)	40	1428	1	29	0	0
g) Medicinal and Aromatic Plants	0	0	0	0	0	0
Nursery management	0	0	0	0	0	0
Production and management technology	18	426	1	30	0	0
Post harvest technology and value addition	2	64	0	0	0	0
Others (pl specify)	0	0	0	0	0	0
Total (g)	20	490	1	30	0	0
GT (a-g)	338	10045	206	5203	10	187

C-No of Courses; P-Participants

which training programmes conducted were soil fertility management (46), integrated water management (10), integrated nutrient management (53), production and use of organic inputs (30), management of problematic soils (21), micro nutrient deficiency in crops (14), nutrient use efficiency (19), balance use of fertilizers (19), soil and water testing (39) and others (7). The state wise details are given in Table 10.4.

Table 10.4. Training on soil health and fertility management including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
Soil fertility management	21	623	24	744	1	17
Integrated water management	4	170	5	157	1	18
Integrated Nutrient Management	23	739	28	762	2	36
Production and use of organic inputs	21	708	7	238	2	48
Management of Problematic soils	8	213	13	316	0	0
Micro nutrient deficiency in crops	3	76	11	366	0	0
Nutrient Use Efficiency	4	107	15	400	0	0
Balance use of fertilizers	3	81	15	412	1	20
Soil and Water Testing	25	775	40	1078	4	83
Others	1	40	6	119	0	0
Total	113	3532	164	4592	11	222

C-No of Courses; P-Participants

Livestock Production and Management

KVKs of Rajasthan, Haryana and Delhi organized a total number of 354 training programmes including 9899 farmers took active part. The specific training programmes were dairy management (99), poultry management (31), rabbit management (1), animal nutrition management (63), disease management (53), feed & fodder management (71), production of quality animal (20) and others (16). The state wise details are given in Table 10.5.

Table 10.5. Training on livestock production and management including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
Dairy Management	88	2538	11	196	0	0
Poultry Management	30	921	1	12	0	0
Rabbit Management	1	28	0	0	0	0
Animal Nutrition Management	58	1599	5	77	0	0
Disease Management	50	1485	3	50	0	0
Feed & fodder technology	70	1873	1	13	0	0
Production of quality animal products	20	663	0	0	0	0
Others (pl specify)	16	444	0	0	0	0
Total	333	9551	21	348	0	0

C-No of Courses; P-Participants



Training on Vermi-composting – KVK Yamunanagar



Training on WDRA – KVK Bhilwara

Home Science/women empowerment

KVKs of this zone organized a total number of 548 training programmes for 14114 beneficiaries. The major areas were Household food security by kitchen gardening and nutrition gardening (71), Design and development of low/minimum cost diet (34), Designing and development for high nutrient efficiency diet (11), Minimization of nutrient loss in processing (13), Processing and cooking (56), Gender mainstreaming through SHGs (17), Storage loss minimization techniques (17), Value addition (164), Women empowerment (45), Location specific drudgery reduction technologies (43), Rural Crafts (14), Women and child care (55), and Others (8)The state wise details are given in Table 10.6.

Table 10.6. Training on Home Science/women empowerment including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C		C	P
Household food security by kitchen gardening and nutrition gardening	40	1309	30	717	1	13
Design and development of low/minimum cost diet	16	414	17	431	1	20
Designing and development for high nutrient efficiency diet	4	101	7	188	0	0
Minimization of nutrient loss in processing	4	102	9	204	0	0
Processing and cooking	50	1223	4	94	2	48
Gender mainstreaming through SHGs	10	213	5	137	2	41
Storage loss minimization techniques	10	277	5	115	2	49
Value addition	77	2041	85	2187	2	50
Women empowerment	16	489	28	890	1	18
Location specific drudgery reduction technologies	16	338	27	614	0	0
Rural Crafts	4	67	9	223	1	28
Women and child care	12	333	42	959	1	22
Others (pl specify)	2	60	6	99	0	0
Total	261	6967	274	6858	13	289

C-No of Courses; P-Participants

Agricultural Engineering

A total number of 102 training programmes were organized by KVKs of this zone benefiting 2459 farmers. Major areas of trainings were repair and maintenance of Farm Machinary and its maintenance (35), Installation and maintenance of micro irrigation systems (15), Use of Plastics in farming practices (4), Repair and maintenance of farm machinery and implements (27), Small scale processing and value addition (2), Post Harvest Technology (8) and Others (11). The details are given in Table 10.7.

Plant Protection

Training programmes related to plant protection constituted 552 courses for 15818 farmers of Rajasthan, Haryana and Delhi. The various aspects like integrated pest management (290), integrated disease management (212), bio-control of pests and diseases (22), production of bio control agents and bio pesticides (14) and others (14). The state wise details are given in Table 10.8.



Training on Bio-fuel – KVK Banswara

Table 10.7. Training on agricultural engineering including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C		C	P
Farm Machinary and its maintenance	7	194	28	679	0	0
Installation and maintenance of micro irrigation systems	8	198	7	169	0	0
Use of Plastics in farming practices	0	0	4	66	0	0
Repair and maintenance of farm machinery and implements	4	84	23	509	0	0
Small scale processing and value addition	1	27	1	34	0	0
Post Harvest Technology	4	112	4	111	0	0
Others (pl specify)	2	69	9	207	0	0
Total	26	684	76	1775	0	0

C-No of Courses; P-Participants

Table 10.8. Training on plant protection including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C		C	P
Integrated Pest Management	169	4428	113	3662	8	147
Integrated Disease Management	79	2076	132	3926	1	17
Bio-control of pests and diseases	14	411	8	210	0	0
Production of bio control agents and bio pesticides	10	327	4	88	0	0
Others	4	133	10	393	0	0
Total	276	7375	267	8279	9	164

C-No of Courses; P-Participants

Production of Input at the site

Production of input at the site related 68 training programmes were conducted by KVKs to train 2132 farmers and farm women. The state wise details are given in Table 10.9.

Capacity Building and Group Dynamics

A total of 308 specialized training courses on capacity building and group dynamics were organized for 8959 participants. The state wise details are given in Table 10.10.

Agro Forestry

Agro forestry related 132 training programmes were organized by KVKs of Rajasthan for 3894 practicing farmers. The details of training programmes and participants are given in Table 10.11.

Table 10.9. Training on production of input at the site

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C		C	P
Seed Production	1	30	7	221	0	0
Bio-agents production	0	0	1	34	0	0
Bio-pesticides production	1	31	1	0	0	0
Vermi-compost production	13	359	14	616	0	0
Organic manures production	1	30	3	87	0	0
Production of Bee-colonies and wax sheets	0	0	4	101	0	0
Production of livestock feed and fodder	1	26	0	0	0	0
Mushroom Production	4	112	6	148	0	0
Apiculture	7	188	3	83	0	0
Others (pl specify)	1	66	0	0	0	0
Total	29	842	39	1290	0	0

C-No of Courses; P-Participants

Table 10.10. Training on Capacity Building and Group Dynamics

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
Leadership development	8	221	29	927	0	0
Group dynamics	24	936	33	1099	0	0
Formation and Management of SHGs	16	407	16	341	0	0
Mobilization of social capital	22	588	12	334	0	0
Entrepreneurial development of farmers/youths	49	1336	35	836	0	0
WTO and IPR issues	6	151	37	1039	0	0
Others	13	557	8	187	0	0
Total	138	4196	170	4763	0	0

C-No of Courses; P-Participants

Table 10.11. Training on Agro forestry

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C		C	P
Production technologies	15	428	42	1132	0	0
Nursery management	0	0	17	675	0	0
Integrated Farming Systems	3	115	27	573	0	0
Others (pl specify)	10	413	18	558	0	0
Total	28	956	104	2938	0	0

C-No of Courses; P-Participants

Vocational Training programmes

A total number of 172 vocational trainings conducted by KVKs in zone comprising 46 in Rajasthan and 126 in Haryana benefiting 4644 participants. The major areas were crop production and management (12), post harvest technology and value addition (36), livestock and fisheries (16), income generation activities (95) and agricultural extension (13). The state wise details are given in Table 10.12.

Rural youth

For the rural youth a total number of 434 training courses were organized in which 12981 rural youth including male and female acquired skill for gainful employment at their doorstep. The state wise details of training programmes and participants are given in Table 10.13.

Table 10.12. Vocational Training programmes

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
Crop production and management	5	81	7	186	2	45
Post harvest technology and value addition	8	183	28	685	0	0
Livestock and fisheries	7	179	9	302	0	0
Income generation activities	21	510	74	2206	4	80
Agricultural Extension	5	127	8	185	0	0
Grand Total	46	1080	126	3564	6	125

Table 10.13. Training for Rural youth including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C		C	P
Nursery Management of Horticulture crops	8	172	12	326	1	21
Training and pruning of orchards	1	23	3	114	0	0
Protected cultivation of vegetable crops	2	54	2	52	0	0
Commercial fruit production	4	93	1	180	0	0
Integrated farming	56	1346	6	174	0	0
Seed production	2	54	6	150	0	0
Production of organic inputs	2	64	3	144	0	0
Planting material production	5	130	1	30	0	0
Vermi-culture	7	225	15	334	1	18
Mushroom Production	6	161	21	665	1	18
Bee-keeping	9	249	17	524	1	20
Repair and maintenance of farm machinery and implements	3	78	3	74	0	0
Value addition	44	1108	32	821	1	20
Small scale processing	0	0	1	11	1	17
Post Harvest Technology	2	56	7	185	0	0
Tailoring and Stitching	4	99	21	564	0	0
Rural Crafts	1	22	3	99	0	0
Production of quality animal products	1	29	0	0	0	0
Dairying	16	433	25	1909	0	0
Sheep and goat rearing	11	364	1	77	0	0
Piggery	0	0	2	80	0	0

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C		C	P
Poultry production	1	25	1	28	0	0
Composite fish culture	2	49	6	249	0	0
Fry and fingerling rearing	0	10	0	0	0	0
Any other (pl.specify)	12	304	40	927	0	0
Total	199	5148	229	7719	6	114

C-No of Courses; P-Participants



Training on Animal Husbandry – KVK Jhunjhunu

Extension Personnel

A total number of 230 training courses were organized in which 5305 extension personnel took part. Out of which Rajasthan organized 101 training courses with 2481 participants whereas Haryana organized 128 courses with 2804 participants and in Delhi 1 training course with 20 participants. The state wise details of training programmes and participants are given in Table 10.14

Table 10.14. Training for extension personnel including sponsored

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
Productivity enhancement in field crops	36	925	34	758	0	0
Integrated Pest Management	17	360	22	512	0	0
Integrated Nutrient management	2	23	16	365	0	0
Rejuvenation of old orchards	0	0	3	48	0	0
Protected cultivation technology	2	72	8	135	0	0
Production and use of organic inputs	2	54	3	78	0	0
Care and maintenance of farm machinery and implements	3	105	5	91	0	0
Gender mainstreaming through SHGs	0	0	0	0	0	0

Area of Training	Rajasthan		Haryana		Delhi	
	C	P	C	P	C	P
Formation and Management of SHGs	4	19	1	10	0	0
Women and Child care	1	26	8	243	0	0
Low cost and nutrient efficient diet designing	2	48	5	110	1	20
Group Dynamics and farmers organization	3	92	2	28	0	0
Information networking among farmers	4	118	1	20	0	0
Capacity building for ICT application	2	43	2	33	0	0
Management in farm animals	2	19	0	0	0	0
Livestock feed and fodder production	3	66	1	10	0	0
Household food security	2	44	6	187	0	0
Any other	16	467	11	176	0	0
Total	101	2481	128	2804	1	20

C-No of Courses; P-Participants

CHAPTER 11

EXTENSION ACTIVITIES

KVKs have made all concerted efforts in conducting various extension activities to create awareness and mobilize on proven and acceptable technologies and also to accelerate the technology transfer process (Table 11.1). During 2017-18, KVKs of Zone-II organized Advisory Services (21858), Diagnostic visits (1509), Field Day (450), Group discussions (623), Kisan Ghosthi (499), Film Show (1135), Self -help groups (153), Kisan Mela (75), Exhibition (230), Scientists' visit to farmers field (4772), Plant/animal health camps (29), Farm Science Club (59), Ex-trainees Sammelan (29), Farmers' seminar/workshop (98), Method Demonstrations (791), Celebration of important days (305), Special day celebration (126), Exposure visits (278) and others (6957) with the participation of 1108243 farmers and 23012 extension personnel, input dealers, local traders, Hon'ble MP, MLA, etc. took part. Moreover, 102763 other extension activities viz. electronic media, newspaper coverage, radio talks, television talks, popular articles, animal health camps (number of animals treated), lecture

Table 11.1. Physical achievements of extension activities.

Activities	Rajasthan	Haryana	Delhi
Extension activities			
No. of programmes	31699	6860	410
No. of farmers	744429	357078	19025
No. of extension personnel	16378	6556	0
Total beneficiaries	760807	363634	19025
Other extension activities	101110	1599	501
Mobile advisory services			
No. of KVKs		61	
No. of text SMS sent		3194	
No. of farmers benefited		2316132	
No. of voice messages sent		8063	
No. of farmers benefited		8461	



Advisories provided through m-Kisan portal KVK-Hanumangarh-II



Exposure visit – Alwar-II

delivered as a resource person, extension literature, technical bulletin and technical reports were also performed by KVKs. In Zone-II, all the 61 KVKs were involved in mobile advisory services. A total of 3194 text messages were delivered on various aspects of agriculture for the benefit of 2316132 farmers. Out of 61 KVKs, 25 KVKs were delivered voice messages. A total of 8063 vSMS were also sent to 8461 farmers on scientific agro-techniques.

Extension activities organized by KVKs of Rajasthan

In the state, KVKs organized many activities like Advisory Services (20367), Diagnostic visits (532), Field Days (295), Group discussions (179), Kisan Ghosthi (270), Film Show (824), Self -help groups (70), Kisan Mela (46), Exhibition (167), Scientists' visit to farmers field (2431), Plant/animal health camps (23), Farm Science Club (25), Ex-trainees Sammelan (22), Farmers' seminar/workshop (71), Method Demonstrations (220), Celebration of important days (173), Special day celebration (72), Exposure visits (179) and Others (5733). In these activities, Hon'ble MP, MLA, farmers, farm women, rural youth, officials of department of Agriculture, Line Departments, Input Dealers, Local Traders, NGOs, etc. took active part.

Under other extension activities like Electronic Media (CD./DVD), Extension Literature, News paper coverage, Popular articles, Radio Talks, TV Talks, Animal health amps (Number of animals treated) and other activities were performed for mass contact 101110 programmes were organised. The details are given in Table 11.2 and Table 11.3.

Extension activities organized by KVKs of Haryana

KVKs of Haryana state organized various extension activities viz., Advisory Services (1070), Diagnostic visits (846), Field Day (152), Group discussions (442), Kisan Ghosthi (227), Film Show (268), Self -help groups (43), Kisan Mela (29), Exhibition (59), Scientists' visit to farmers field (2136), Plant/animal health camps (6), Farm Science Club (32), Ex-trainees Sammelan (7), Farmers' seminar/workshop (26), Method Demonstrations (561), Celebration of

Table 11.2 Extension activities organized by KVKs of Rajasthan

Activities	No. of programmes	No. of farmers	No. of Extension Personnel	Total
Advisory Services	20367	124541	1076	125617
Diagnostic visits	532	7218	411	7629
Field Day	295	18176	790	18966
Group discussions	179	5800	249	6049
Kisan Ghosthi	270	27029	826	27855
Film Show	824	40590	884	41474
Self -help groups	70	980	60	1040
Kisan Mela	46	57112	1344	58456
Exhibition	167	353668	6069	359737
Scientists' visit to farmers field	2431	30448	1405	31853
Plant/animal health camps	23	2504	67	2571
Farm Science Club	25	617	63	680
Ex-trainees Sammelan	22	1110	65	1175
Farmers' seminar/workshop	71	3961	134	4095
Method Demonstrations	220	3841	228	4069
Celebration of important days	173	21680	908	22588
Special day celebration	72	16996	674	17670
Exposure visits	179	9430	529	9959
Others (pl. specify)	5733	18728	596	19324
Total	**31699**	**744429**	**16378**	**760807**

Table 11.3. Other extension activities organized by KVKs of Rajasthan

Particulars	Number	No. of KVKs
Electronic Media (CD./DVD)	54	14
Extension Literature	91925	37
News paper coverage	1458	39
Popular articles	180	29
Radio Talks	320	30
TV Talks	145	22
Animal health amps (Number of animals treated)	5660	14
Others (pl. specify)	1368	10
Total	**101110**	

important days (120), Special day celebration (53), Exposure visits (78) and Others (705) through which different technologies of agricultural and allied sectors transferred to 357078 farmers and 6556 extension personnel. The details are given in Table 11.4. A total of 1599 other extension activities were also performed by KVKs functioning in Haryana state (Table 11.5).



Field day – KVK Rewari

Table 11.4. Extension activities organized by KVKs of Haryana.

Activities	No. of programmes	No. of farmers	No. of extension personnel	Total
Advisory Services	1070	141161	485	141646
Diagnostic visits	846	7001	179	7180
Field Day	152	5959	256	6215
Group discussions	442	8762	300	9062
Kisan Ghosthi	227	8578	273	8851
Film Show	268	11965	262	12227
Self -help groups	43	849	11	860
Kisan Mela	29	20735	578	21313
Exhibition	59	31750	901	32651
Scientists' visit to farmers field	2136	24570	534	25104
Plant/animal health camps	6	608	8	616
Farm Science Club	32	1317	62	1379
Ex-trainees Sammelan	7	932	23	955
Farmers' seminar/workshop	26	2211	116	2327
Method Demonstrations	561	8307	437	8744
Celebration of important days	120	20119	779	20898
Special day celebration	53	5622	173	5795
Exposure visits	78	3890	88	3978
Others (pl. specify)	705	52742	1091	53833
Total	**6860**	**357078**	**6556**	**363634**

Table 11.5. Other Extension Activities organized by KVKs of Haryana

Particulars	No.	No. of KVKs
Electronic Media (CD./DVD)	21	6
Extension Literature	139	17
News paper coverage	712	16
Popular articles	121	15
Radio Talks	40	11
TV Talks	72	10
Animal health amps (Number of animals treated)	473	3
Others (pl. specify)	21	3
Total	**1599**	

Activities	No. of programmes	No. of farmers	No. of extension personnel	Total
Advisory Services				0
Diagnostic visits				0
Field Day	19	1095	0	1095
Group discussions	25	358	0	358
Kisan Ghosthi	6	1108	0	1108
Film Show	0	0	0	0
Self -help groups	3	30	0	30
Kisan Mela	0	0	0	0
Exhibition	1	272	0	272
Scientists' visit to farmers field	166	2915	0	2915
Plant/animal health camps	4	470	0	470
Farm Science Club	0	0	0	0
Ex-trainees Sammelan	0	0	0	0
Farmers' seminar/workshop	1	325	0	325
Method Demonstrations	100	203	0	203
Celebration of important days	9	1008	0	1008
Special day celebration	1	302	0	302
Exposure visits	0	0	0	0
Others (pl. specify)	75	10939	0	10939
Total	**410**	**19025**	**0**	**19025**

Particulars	No.
Electronic Media (CD./DVD)	2
Extension Literature	4
News paper coverage	3
Popular articles	1
Radio Talks	2
TV Talks	19
Animal health amps (Number of animals treated)	470
Others (pl. specify)	0
Total	**501**

Technology Week Celebration

KVKs had implemented technology week to show the available agricultural and allied technologies for extension functionaries & farmers. Farmers could directly interact with KVK experts, technology generator and extension personnel to adopt new technologies during technology week. A total 40 KVKs from Zone-VI (16 KVKs from Rajasthan & 24 from Gujarat) celebrated the technology week. Various activities have been conducted like gosthies, lectures, exhibitions, film shows, fairs, farm visits, diagnostic practicals, distribution of literatures, seeds, planting materials, bio-products, etc., during technology week. From Zone-VI, 33626 farmers and farm women participated (16468 in Rajasthan and 17158 in Gujarat) to get the benefits from the technology week. Details are given in table 11.6.

Extension Activities organized by KVK Delhi

The details of extension activities literature, mass media exposure organized by KVK, Delhi are as under :

The details of other extension activities organized by KVK Delhi are as under :

A total number of 35 technology weeks were celebrated by KVKs of Rajasthan, Haryana and Delhi The details of activities are given in table 11.6.

Table 11.6. Activities conducted under technology week celebration in Rajasthan, Haryana and Delhi.

Type of activities	No. of activities	Number of participants
Gosthies	89	6037
Lectures organised	292	10401
Exhibition	22	9598

Type of activities	No. of activities	Number of participants
Film show	33	5487
Fair	6	7720
Farm Visit	211	4402
Diagnostic Practicals	32	500
Distribution of Literature (No.)	1272	9488
Distribution of Seed (q)	7	260
Distribution of Planting materials (No.)	137	32
Bio Product distribution (Kg)	11	12
Bio Fertilizers (q)	4	49
Distribution of fingerlings	0	0
Distribution of Livestock specimen (No.)	54	33
Total number of farmers visited the technology week	16228	54019

CHAPTER 12

SEED AND PLANTING MATERIAL PRODUCTION

Seed Production

Majority of the KVKs are producing seeds of different crops at their instructional farms to make available the quality seeds of newly released varieties to the farmers and to increase the revolving fund. The information related to seed production, planting material, bio-products and livestock progeny are given in Table-12.1 to 12.16.

During the year 2017-18, KVKs of this zone produced 19824.37 q seed valued at Rs. 75544946. Out of the total seed production contribution of pulses was more (9534.08 q) followed by cereals (7962.65 q), oilseeds (1119.34 q), fodder (521.56 q), spices (227.41 q), others (193.89 q), commercial (149.95 q), millets (112.54 q) and medicinal (2.95 q). The seeds produced were distributed to 34330 farmers in respective district. The state wise crop-wise are given in Table 12.1.

Table 12.1. Physical achievement of seed production

Enterprise	Rajasthan			Haryana And Delhi			Total		
	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers
Oilseeds	989.34	4865197	4322	130	740844	5140	1119.34	5606041	9462
Pulses	8234.53	39195164	11869	1299.55	6662797	1121	9534.08	45857961	12990
cereals	3721.33	10124595	3870	4241.32	10529755	4204	7962.65	20654350	8074
Millets	112.54	199347	440	0	0	0	112.54	199347	440
spices	227.41	1607600	666	0	0	0	227.41	1607600	666
fodder	515.88	496857	556	5.68	129000	94	521.56	625857	650
Commercial	0	0	0	149.95	49484	1	149.95	49484	1
Medicinal	2.95	38350	81	0	0	0	2.95	38350	81
Others	193.89	905956	1966	0	0	0	193.89	905956	1966
Total	13997.87	57433066	23770	5826.5	18111880	10560	19824.37	75544946	34330

Oilseeds

KVKs of this zone produced a total of 1119.34 q which valued Rs. 5606041. Among oilseeds seeds of mustard (659.64 q), soybean (228.17 q), groundnut (173.3 q), sesame (42.06 q), taramira (14.17q), and linseed (2.0 q) which worth Rs. 4865197. These seeds produced were provided to 4322 farmers. The major varieties used for seed production were as UG-5, J.L.501 and HNG-69(groundnut), RH-406, NRCDR-02, RH-749, Laxmi and DRMRIJ-31 (mustard), Pratap Alsi-2 (linseed),RT-351 and RT-346, (sesame) JS-20-29, RKS-24 and JS 95-60 (soyabean) RTM-314, RTM 1355 (Taramira) . The state wise details are given in Table 12.2

Pulses

KVKs of this zone produced 9534.08 q pulse seeds which comprised mainly chickpea (5600.08 q) greengram (1802.79 q), blackgram (1325.17 q), lentil (32.38 q) mothbean (312.45 q), cowpea (407.61 q), pea (53.3 q) , and pigeon pea(0.30 q). These seeds produced were made available to 12990 farmers valued Rs. 45857961. The seeds of important varieties of different pulses produced viz. blackgram (Pratap Urd-1, PU-1, MASH 479, PU-31, Mukundra urd 2) cowpea (RC-19, RC – 101), gram (Pratap Channa-1, RSG 895, GNG-1958, GNG-1581, GNG-2144, GNG2171, CSJ-515), green gram (IPM 02-3, GAM-5, GM-4, MH-421 and RMG-975), lentil (KM 2, Kota Masur 1, RLG-5, H.M.-1) pea (Vikas and Sakata), Moth bean (RMO-257)pigeon pea (Pusa-2002). The state wise details are given in Table 12.3.

Cereals

The seeds of important varieties of different cereal crops were produced viz. barley (RD-2715 , RD-2849, RD-2794, RD-2668, RD-2786, RD-2035, PL-426, RD 2660 and RD-2552), paddy (Pusa 5, PS 5, Pusa 4, PB-1121, P.R.124, CSR 30, Pusa-44, CSR-30 and Pusa-1509), wheat (Raj- 4083, Raj-4238 , Raj-4120, HD-3086, Raj-4079, Raj-3765, HD-2967, WH-1105, Raj. 4037 , HD 2932, WH711 and DBW-

Table 12.2. Seed production of different oilseed crops.

Oilseeds	Rajasthan			Haryana and Delhi			Total		
	Quantity (q)	Value (Rs.)	No. of farmers	Quantity (q)	Value (Rs.)	No. of farmers	Quantity (q)	Value (Rs.)	No. of farmers
Mustard	579.64	2563819	3486	80	354241	3340	659.64	2918060	6826
Soybean	228.17	1246509	370	0	0	0	228.17	1246509	370
Ground Nut	163.3	884380	188	10	54256	20	173.3	938636	208
Sesame	12.06	132939	138	30	332347	1500	42.06	465286	1638
Taramira	4.17	21550	114	10	0	280	14.17	21550	394
Linseed	2	16000	26	0	0	0	2	16000	26
Total	989.34	4865197	4322	130	740844	5140	1119.34	5606041	9462

Table 12.3. Seed production of different pulse crops.

Pulses	Rajasthan			Haryana and Delhi			Total		
	Quantity (q)	Value (Rs.)	No. of farmers	Quantity (q)	Value (Rs.)	No. of farmers	Quantity (q)	Value (Rs.)	No. of farmers
Chickpea	4550.08	9159419	2424	1050	6476357	595	5600.08	15635776	3019
Green gram	1555.29	11377965	5423	247.5	177840	525	1802.79	11555805	5948
Black gram	1325.17	13021493	2895	0	0	0	1325.17	13021493	2895
Lentil	30.33	194320	558	2.05	8600	1	32.38	202920	559
Mothbean	312.45	2187150	295	0	0	0	312.45	2187150	295
Cowpea	407.61	2825417	154	0	0	0	407.61	2825417	154
Pea	53.3	426400	114	0	0	0	53.3	426400	114
Pigeon pea	0.3	3000	6	0	0	0	0.3	3000	6
Total	8234.53	39195164	11869	1299.55	6662797	1121	9534.08	45857961	12990

88). A total of 7962.65 q seeds produced were provided to 8074 farmers valued Rs. 20654350. The state wise details are given in Table 12.4.

Spices

The seeds of important varieties of different spice crops were produced viz. coriander (ACr-1 and RKD-18), fenugreak (RMT-1, RMT-305, AFG 3, and Ajmer Methi 3), cumin (GC-4), Garlic (G-282). A total of 227.41 q seeds produced were made available to 666 farmers with value Rs. 1607600. The state wise details are given in Table 12.5.

Fodder

The seeds of important varieties of different fodder crops were produced viz. Barseem (Bundel BL-42), lucern (Anand-2), oat

Table 12.4. Seed production of different cereal crops.

Cereals	Rajasthan			Haryana and Delhi			Total		
	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers
Wheat	2601.48	7152736	2246	3030.66	6637855	2368	5632.14	13790591	4614
Barley	745.3	1836541	1063	0	0	0	745.3	1836541	1063
Paddy	370.05	1128568	551	1210.66	3891900	1836	1580.71	5020468	2387
Maize	4.50	6750	10	0	0	0	4.5	6750	10
Total	3721.33	10124595	3870	4241.32	10529755	4204	7962.65	20654350	8074

Table 12.5. Seed production of different spices crops.

Spices	Rajasthan			Haryana and Delhi			Total		
	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers
Garlic	135	680000	217	0	0	0	135	680000	217
Fenugreek	37.34	218100	188	0	0	0	37.34	218100	188
Coriander	36.5	240000	163	0	0	0	36.5	240000	163
Cumin	18.57	469500	98	0	0	0	18.57	469500	98
Total	227.41	1607600	666	0	0	0	227.41	1607600	666

(JHO-822), Dhaman (CC-358), mustard (Chinese cabbage), Chicory, and Makhan grass. A total of 521.55q seeds produced were provided to 650 farmers valued Rs. 625857. The state wise details are given in Table 12.6.

Commercial

The seeds of important varieties of cotton and sugarcane were produced during 2017-18. Details are given in Table 12.7

Others

Besides above KVKs of Zone-II have produced 124.565 q of other seeds including millets, clusterbean, quinoa, dhanicha, and medicinal. Planting Material Production

Production of vegetables seedlings

KVKs of this zone produced large number of vegetable seedlings (576310) viz. Bitter

Table 12.6. Seed production of different fodder crops.

Fodder	Rajasthan			Haryana and Delhi			Total		
	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers
Napier grass	405.00	27338	158	0	0	0	405	27338	158
Oat	88.28	324344	224	0	0	0	88.28	324344	224
Chicory	10	65000	98	0	0	0	10	65000	98
Makkhan Grass	10	2350	25	0	0	0	10	2350	25
Berseem	2.3	69000	23	3.88	116,400	33	6.18	185400	56
Lucerne	0.15	3750	10	0	0	0	0.15	3750	10
Dhaman	0.145	5075	18	0	0	0	0.145	5075	18
Mustard	0	0	0	1.8	12,600	61	1.8	12600	61
Total	515.875	496857	556	5.68	129000	94	521.555	625857	650

Table 12.7. Seed production of different commercial crops.

Commercial	Rajasthan			Haryana and Delhi			Total		
	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers	Quantity (q)	Value (Rs.)	Provided to no. of farmers
Sugarcane	0	0	0	149.95	49484	1	149.95	49484	1
Total	0	0	0	149.95	49484	1	149.95	49484	1

gourd, Bottle gourd, Brinjal, Broccoli, Cabbage, Cauliflower, Capsicum, Chilli, Cucumber, Drum stick , long melon, Knol khol, Onion, Pumpkin, Ridge gourd, round gourd, sponge gourd, tomato and watermelon. A total of 576310 seedlings were produced and provided to 9489 farmers (Rs. 1140343). The state wise details are given in Table 12.8.

Fruits

KVKs of Rajasthan and Haryana and Delhi produced large number of fruits saplings (257713) viz. Aonla, Bael, ber, Blackberry, Custard apple, Fig, Grape, Guava, Jack Fruit, Jamun, Karonda, Lasoda, Lime, Mandarin, Mango, Mausambi, Mull berry, Orange, Papaya, Pear, Phalsa, Pomegranate and Sapota. Saplings produced were provided to 9525 farmers (Rs. 4590190). The state wise details are given in Table 12.9.

Ornamental (Flower) crops

Large numbers of saplings of ornamental crops produced by KVKs of this zone (47454) during the year were provided to 2039 farmers (Rs. 226485). The state wise details of crops, number of saplings, value and procured by farmers are given in Table 12.10.

Table 12.8. Seedlings production of different vegetable crops.

Vegetables	Rajasthan			Haryana and Delhi			Total		
	Number	Value (Rs.)	Provided to no. of farmers	Number	Value (Rs.)	Provided to no. of farmers	Number	Value (Rs.)	Provided to no. of farmers
Bitter gourd	277	1939	54	0	0	0	277	1939	54
Bottle gourd	60847	35929	382	500	500	51	61347	36429	433
Brinjal	99385	79946	1508	1000	1350	43	100385	81296	1551
Broccoli	5000	5000	10	0	0	0	5000	5000	10
Cabbage	1400	5600	25	900	1250	32	2300	6850	57
Cauliflower	44611	23490	143	31300	31550	76	75911	55040	219
Capsicum	0	0	0	3280	6560	198	3280	6560	198
Chilli	155026	670181	3678	1390	1890	135	156416	672071	3813

Vegetables	Rajasthan			Haryana and Delhi			Total		
	Number	Value (Rs.)	Provided to no. of farmers	Number	Value (Rs.)	Provided to no. of farmers	Number	Value (Rs.)	Provided to no. of farmers
Cucumber	1309	19471	131	0	0	0	1309	19471	131
Drum stick	2464	24570	373	0	0	0	2464	24570	373
long melon	223	1561	45	0	0	0	223	1561	45
Knol khol	0	0	0	475	475	28	475	475	28
Onion	6000	4000	19	1000	1000	7	7000	5000	26
Pumpkin	474	3318	122	0	0	0	474	3318	122
Ridge gourd	605	4256	144	0	0	0	605	4256	144
Round gourd	308	2121	37	0	0	0	308	2121	37
Sponge gourd	0	0	0	500	500	75	500	500	75
Tomato	143006	204546	1763	15025	9305	409	158031	213851	2172
Water melon	5	35	1	0	0	0	5	35	1
Total	520940	1085963	8435	55370	54380	1054	576310	1140343	9489

Table 12.9. Saplings production of different fruits crops.

Fruits	Rajasthan			Haryana and Delhi			Total		
	Number	Value (Rs.)	No. of farmers	Number	Value (Rs.)	No. of farmers	Number	Value (Rs.)	No. of farmers
Aonla	413	8025	73	0	0	0	413	8025	73
Bael	747	11370	141	0	0	0	747	11370	141
Ber	14995	376095	447	0	0	0	14995	376095	447
Blackberry	7	140	3	0	0	0	7	140	3
Custard apple	1644	64880	39	0	0	0	1644	64880	39
Fig	233	8140	44	0	0	0	233	8140	44
Grape	191	3795	69	0	0	0	191	3795	69
Guava	1994	66305	323	790	26270	203	2784	92575	526
Jack Fruit	444	9565	167	0	0	0	444	9565	167
Jamun	1191	20345	254	0	0	0	1191	20345	254
Karonda	4585	62805	511	0	0	0	4585	62805	511
Lasoda	2040	28130	108	0	0	0	2040	28130	108
Lime	69616	1085655	3018	405	13150	10	70021	1098805	3028
Mandarin	21450	725500	357	0	0	0	21450	725500	357

Fruits	Rajasthan			Haryana and Delhi			Total		
	Number	Value (Rs.)	No. of farmers	Number	Value (Rs.)	No. of farmers	Number	Value (Rs.)	No. of farmers
Mango	589	25460	154	210	21000	1	799	46460	155
mausambi	30	1200	13	0	0	0	30	1200	13
Mull berry	8	120	3	0	0	0	8	120	3
Orange	48	1840	28	0	0	0	48	1840	28
Papaya	128001	1811265	3081	500	2000	25	128501	1813265	3106
Pear	8	155	4	0	0	0	8	155	4
Phalsa	21	320	12	0	0	0	21	320	12
Pomegranate	7452	208840	400	0	0	0	7452	208840	400
Sapota	101	7820	37	0	0	0	101	7820	37
Total	255808	4527770	9286	1905	62420	239	257713	4590190	9525

Table 12.10. Sapling production of different ornamental crops.

Ornamental	Rajasthan			Haryana and Delhi			Total		
	Number	Value (Rs.)	No. of farmers	Number	Value (Rs.)	No. of farmers	Number	Value (Rs.)	No. of farmers
Alihar	118	1285	10	0	0	0	118	1285	10
Boganviliya	39	555	10	0	0	0	39	555	10
Carpet grass	10	500	2	0	0	0	10	500	2
Chandani	62	700	27	0	0	0	62	700	27
Chrysanthemum	3	30	1	1000	2000	264	1003	2030	265
Duranta	527	5350	44	0	0	0	527	5350	44
Gudhal	20030	40310	161	0	0	0	20030	40310	161
Har-Shringar	18	180	11	0	0	0	18	180	11
Kachnar	41	410	24	0	0	0	41	410	24
kaner	4694	106740	298	0	0	0	4694	106740	298
Kesar	4	50	3	0	0	0	4	50	3
Marigold	14412	8190	58	1000	2000	335	15412	10190	393
Mogra	1524	16990	230	0	0	0	1524	16990	230
morpankhi	3	35	3	0	0	0	3	35	3
Rose	3960	41090	524	0	0	0	3960	41090	524
Sadabhar	3	10	30	0	0	0	3	10	30
Tikoma	6	60	4	0	0	0	6	60	4
Total	45454	222485	1440	2000	4000	599	47454	226485	2039

Fodder crops

Majority of KVKs produced Napier grass (Co-4) variety and the details are given in Table 12.11.

Forest crops

Plants of different forest crops produced by KVKs of Rajasthan and Haryana and Delhi (1928) during the year (2017-18) were provided to 277 farmers (Rs. 39462).

The state wise details of crops, number of plants, value and procurement by farmers are given in table 12.12.

Medicinal crops

Saplings of different medicinal crops produced by KVKs of this zone (63660) during the year were made available to 81 farmers (Rs. 185523). Production of saplings of medicinal crops were reported only in Rajasthan, details of crops, number of saplings, value and procurement by farmers are given in Table 12.13.

Production of Bio-products

In this zone, 21 KVKs produced a total of 149555.95kg of bio-products of Rs. 2284539

Table 12.11. Planting material production of different fodder crop.

Fodder	Rajasthan			Haryana and Delhi			Total		
	Number	Value (Rs.)	No. of farmers	Number	Value (Rs.)	No. of farmers	Number	Value (Rs.)	No. of farmers
Napier	2951	88600	312	0	0	0	2951	88600	312
Total	2951	88600	312	0	0	0	2951	88600	312

Table 12.12. Saplings production of different forest crops.

Forest	Rajasthan			Haryana and Delhi			Total		
	Number	Value (Rs.)	Provided to no. of farmers	Number	Value (Rs.)	Provided to no. of farmers	Number	Value (Rs.)	Provided to no. of farmers
Aadu	5	100	2				5	100	2
Ficus	1	100	1				1	100	1
Gulmohar	129	850	14				129	850	14
Karanj	895	24875	133				895	24875	133
Khejadi	40	600	7				40	600	7
Neem	258	8895	88				258	8895	88
Sagon				88	880	29	88	880	29
Poplar				512	3162	3	512	3162	3
Total	1328	35420	245	600	4042	32	1928	39462	277

Table 12.13. Saplings production of different medicinal crops.

Medicinal	Rajasthan			Haryana and Delhi			Total		
	Number	Value (Rs.)	Provided to no. of farmers	Number	Value (Rs.)	Provided to no. of farmers	Number	Value (Rs.)	Provided to no. of farmers
Satavri	48610	109983	69	Nil	Nil	Nil	48610	109983	69
Aloe vera	15046	75500	9	Nil	Nil	Nil	15046	75500	9
Tulsi	4	40	3	Nil	Nil	Nil	4	40	3
Total	63660	185523	81	Nil	Nil	Nil	63660	185523	81

and same were distributed amongst 4266 farmers. Time to time, it included mainly bio-agents viz. Mushroom (106) Trichoderma (1106.5 kg) and vermiculture (8233.3). Beside these KVKs also produced bio-fertilizers viz. Azolla (1883.1 kg), Azotobactor (42 kg), PSB (118.4kg), Rhizobium (61kg) Vermicompost (138005.65 kg). The details of zone are given in Table 12.14.

Livestock production

KVKs of Rajasthan and Haryana and Delhi produced 30631 bull, heifer, buffaloe males & females, goat bucks, goat doe, sheep rams, poultry chicks, poultry cocks, poultry hens, and poultry eggs, pigs and rabbits of improved breeds. Besides of these KVKs produced 680682 fishes of IMC and ornamental. A total of 1511 farmers procured from KVKs during 2017-18. The details of zone are given in Table 12.15.

Table 12.14. Bio-products produced by KVKs

Bio Products	Name of the bio-product	Quantity (No.)	Quantity Kg	Value (Rs.)	No. of Farmers
Bio Agents	Mushroom		106	8528	18
	Trichoderma		1106.5	140312	665
	Vermiculture		8233.3	943506	1096
	Total		9445.8	1092346	1779
Bio-fertilizer	Azolla		1883.1	120555	455
	Azotobactor		42	4020	77
	PSB		118.4	14950	256
	Rhizobium		61	6100	145
	Vermi compost		138005.65	1046568	1554
	Total		140110.15	1192193	2487
	Grand Total		149555.95	2284539	4266

Table 12.15. Production of livestock materials

Particulars of Live stock	Name of the breed	Number	Value (Rs.)	No. of Farmers
Dairy animals				
Cattle				
Cow	Gir	2	80000	1
Heifer	HF Cross	22	151096	15
Goat				
Buck	Sirohi	45	370000	45
Doe	Sirohi	115	271000	32
Sheep				
Ram	Kendrapada	6	18000	3
Doe	Kendrapada	2	10000	2
Poultry				
Poultry Chicks	Pratapdhan, kurolier	28706	2732230	1303
Poultry Cock	Pratapdhan	8	4000	5
Poultry Eggs	Pratapdhan, Kadaknath	1199	11664	44
Poultry Hean	Pratapdhan, Chhabro	397	25860	12
Pig				
Pig	Large white yorkshire	121	264800	7
Rabbit				
Rabbit	Grey giant	8	3200	2
Total		30631	3941850	1471
Fishery	IMC, Koi, Moli	680682	118239	40

CHAPTER 13

SUCCESS STORIES

Intercropping pays dividend to Sh Teekam Chand Kahar

KVK-Ajmer, Rajasthan

Introduction

Ajmer is known for vegetable, flower and seed spice cultivation. The farmers of Ajmer, Pushkar Kekri and Pisangan blocks, in particular prefer to grow Marigold, Chrysenthimum and Rose as flower crops and tomato, chilli, cauliflower, cabbage, onion and coriander as vegetable crops. The micro farming situation of Ajmer is conducive for vegetable and flower cultivation as soils of the district is sandy loam and loam. Land holding size is small and marginal. Farmers of these area prefer sole or mono crop production. With the passage of time the productivity and profitability of these crops consistently decreasing due to problems of pests and diseases particularly, nematode and borers.

Sh. Teekam Chand Kahar resident of Nadi II village of PS Pisangan have 40 acres of land. Sh. Teekam used to take production of flower and vegetables as sole crop but he was not gaining much more production and profit due to increasing pests and nematode incidence.

KVK intervention

Sh. Teekam Chand came into contact with KVK, Ajmer and discussed with KVK scientists about his problem of low productivity and profitability of flowers and vegetable crops. Scientists advised him to use space in between the sole crop of flower / vegetables. Growing vegetables as winter crop in between flower crop may utilize inter-space and efficient water use which would ultimately enhance productivity and profitability of the crop. He mainly grows sole crop of flower specially marigold. So intercropping with vegetables in marigold was advised. He decided to take intercropping of cauliflower, cabbage, tomato, chilly, coriander in marigold. This system of intercropping utilized inter space and irrigation water which gave him increased production and profit.

Result

Sole crop of vegetable (cabbage, cauliflower, coriander, tomato, chiili) gave average net return of Rs. 1,22,550/- per acre with BC ratio of 3.33. while in case of marigold as sole crop provided net return of Rs. 1,91,250/- per acre and BC ratio of 5.13. innovative technology of inter cropping of vegetable (cabbage, cauliflower, coriander, tomato, chiili) with marigold gave net return of Rs. 2,72,250/- per acre and BC ratio of 6.16. looking the outcome of intercropping technology in flower crop, the farmers of nearby

Practice	Area (acre)	Gross income (Rs.)	Total expenditure (Rs.)	Net return (Rs.)	BC ratio
1. Sole vegetable production (cabbage, cauliflower, coriander, tomato, chiili)	1.0	1,75,000	52,500	1,22,500	3.33
2. Sole marigold production	1.0	2,37,500	46,250	1,91,250	5.13
3. Intercropping (marigold + vegetables)	1.0	3,25,000	52,750	2,72,250	6.16

villages such as Amba Msiniya, Nadi I and Tabiji are adopting the technology to improve their own profit and production.

Outcome / impact

Sh. Teekam Chand Kahar adopted marigold + coriander, marigold + cabbage, marigold + cauliflower (1:1), marigold + tomato (1:1), marigold + chilli practice in comparison with sole crop of flowers and vegetables. Sh. Teekam Chand sale his produce in cities such as Udaipur, Jodhpur, Agra etc. or elsewhere from where he gets more return. These cities are well connected with road for faster transportation facilities. His family members are also engaged in his farming. He also searches online price and accordingly sale produce from where he gets more return.

Intercropping of vegetables and spices with marigold increased profitability per unit area with assured production. This has also been found effective to keep root nematode population away besides this, marigold serves as trap crop for borers. Using inter-space between marigold keeps weeds also under control as no space is available for weed development.





Enhancement of farmer income through Innovative Low Cost Storage Structure of Garlic

KVK-Baran

Garlic (*Allium sativum* L.) is the second most important bulb crop after onion and used as a spice or a condiment throughout India. In Rajasthan, it is largely grown in Baran, Jhalawar, Kota, Bundi (Haroti region) ,Chittorgarh, Jodhpur and Pratapgarh districts especially along the irrigated tracts. The production made in these areas has its fragrance familiarity in many gulf countries too. The average area of garlic since 2011-12 was 15364 ha with average production of 66580 q and the productivity of 4336 kg/ha. The area of garlic in the district is drastically increased to 40670 ha with the production of 283999 q and productivity of 6983 kg/ha during the year 2015-16. The increased area of garlic was due to the high market price in local as well as national market. In current year 2017-18 total area of garlic sown in the district is 45000 ha.

Importance

Garlic forms principal ingredients in spicy foods especially non-vegetarian cuisines. Spicy preparations, preparations based on meat, instant food, chips, papad, etc. draw heavily on garlic or its derivatives. Nowadays pastes, powder, flakes, garlic capsules are catching fast in the market. Many players in the form of cottage processors are in the field of garlic processed products. Processed products quality is depend on the bulb quality of garlic and there are some techniques to improve or maintain the quality parameter of bulb.

Garlic storage structure

Storage of garlic after the harvesting of crop is the major issue in Haroti region of Rajasthan. The farmers of this region were stored his produced in room after harvesting of whole plants and faced the problem of rotting and pumping of bulb. In this district 30-35 percent garlic is damaged or lossed during storage of garlic bulb. However, a low cost garlic storage structure was constructed at Krishi Vigyan Kendra, Anta of 15X30 feet (450sqf) size from bamboo stick with the expenditure of Rs. 1.0 lakh. This structure was inaugurated by Hon able Agriculture Minister, Dr. Prabhu Lal Saini on 4th March 2017. The storage capacity of the storage was 100q. This is the model unit for the other garlic growers in local area.



Standardization of Garlic Heap in Storage:

Garlic is stored in the storage as whole plant and requires aeration for longer shelf life. However, an experiment was conducted to standardize the suitable height of garlic heap for

Table : Assessment of different height of heap in garlic storage.

Garlic heap height in storage (Feet)	% of rotted bulb	Wt. of whole plants at the harvesting	Wt. of whole plants after 200 DAS*	% of wt. loss
Farmer practice	34.5	33.45	26.01	22.24
3	3.4	41.57	39.89	4.04
4	5.3	38.21	35.76	6.41
5	7.2	36.34	31.21	16.43

*Day after storage

the storage of garlic. Storage of garlic up to 3 feet height was found suitable for the storage life of bulb (Table-1). The weight losses in farmer storage practices was found 22.24 percent and lowest weight losses were recorded in 3 feet height heap in low cost storage structure.

Introduction of Farmer

Ibne Hasan s/o Ali Haider constructed a garlic storage structure in his farm at Ranibarod village during the year 2017 with the technical guideline of Krishi Vigyan Kendra, Anta, Baran. It is the first low cost garlic storage structure in Haroti region of Rajasthan at farmer field constructed under Rastriya Krishi Vikas Yojana scheme with the financial support of 50% subsidy. He has total 13.7 ha land is situated on NH-76 of Kota Shivpuri road along the river basin Parviti .He is a senior passed youth involved in the cultivation of garlic since 2010-11 and cultivated garlic in 2.0 ha land in every year. He irrigated the crops by the lifting of water from solar pump or from the pond (100 feet x 150 feet x10 feet size). The produce of some garlic is sold immediately after harvest in market and rest amount is stored in room. Market price at the time of harvesting is low and storage of garlic bulb in room enhances the storage losses up to 50%. Besides the cultivation of garlic he also cultivated vegetable for domestic purpose, cereal and pulses for commercial production.

Construction of garlic storage:

After the construction of model garlic storage structure at Krishi Vigyan Kendra, Anta the same type of 15X30 feet (450sqf) size of bamboo stick based storage structure of garlic was constructed by Ibne Hasan at Ranibarod. He got profit immediately from the garlic by the storage of garlic in his manufactured structure.

Garlic storage structure

He earned Rs.1050/- per month out of the storage of 100 quintals of garlic. More than 10 storage structure have been constructed in nearby villages for garlic storage.



Livelihood security by starting Small Scale Enterprises through condiment processing and packaging

KVK Churu-I, Rajsthan

Name of Farmer	:	Mrs. Raju Khati
Husband Name	:	Mr. Suresh Kumar Jangid
Age	:	23 Years
Education	:	Senior Secondary
Address	:	Rangaisar, Sardarshahr
Mobile No	:	7568170454



Introduction

Mrs. Raju Khati is an active and innovative farm woman of village Rangaisar, Tehsil Sardarshahar. It is a place where mostly saline water and sandy soils are available, due to which people mostly concentrate to grow moong bean, moth bean, mustard, cluster bean in different seasons. Although she has experience of almost 4 year in the field of agriculture thus; she wanted to start small scale enterprises other than agriculture at her own village. Instead of applying all her efforts like labour experience and time, she has also been facing the problem of low production of agricultural crops in her field.

Since, her family livelihood was only dependent on crop production; she had always in search of option to overcome her problem of low productivity. To get solution of her problem she turned her face towards KVK Sardarshahar. She came in contact with KVK scientists and attended some valuable training programs on value addition and processing through SHGs and took suggestions from KVK team. Raju Khati stated her own enterprise with the help of Shayamji SHG in Rangaisar village. For the purpose of buying raw condiments she choosed Bikaner city having more varieties and purity in ware house mandi condiments. Drying, grinding and packaging of all condiments were done with the help of all SHG groups and family members. She started her own shop named 'Shri Vishvakarma Masala LaghuUdhyog' in her village. For marketing of products she purchased jeep to sell products in nearby villages (Kanwalasar, Kikasar, Sonpalsar, Punusar, Baila, Karansar).

KVK intervention

- Provided Training on processing
- Motivation for opening an enterprise on processing and packaging of condiments
- Regular visit or follow-up by KVK scientists





Out Put

Condiments processing and packaging may be an another option for livelihood security of farm women

Enterprise Description

Shri Vishvakarma Masala Laghu Udhyog

Outcomes

Processing equipments	Starting date	Total expenses (Rs)	Produced Product	Gross Income /year(Rs)	Net Income/year (Rs)
Condiments grinding machine, Packaging machine & Weighing machine	12/11/2016	50250.00	Red chilli powder, Coriander powder, Cucumber powder, Cumin powder	110567.00	60317.00

Impact

It is amazing that income through condiments processing and packaging has been increased by the efforts of innovative farm woman. Other farm women of the village are motivated by the efforts of Mrs. Raju Khati and they are also willing to start new small-scale enterprises at their own level.

Paravet training: An option of timely treatment of animals and sustainable income generation

KVK-Sardarshahar, Rajasthan

Name of Farmer	:	Mr. Vikaram
Father's Name	:	Mr. Sukhram
Age	:	24 Years
Education	:	Graduate
Address	:	Hardesar, Bhanipura, Sardarshahar
Cropping System	:	Rainfed
Mobile No	:	8824955010



Introduction

Ms. Vikram is a college dropout and belongs to farmer family of village Hardesar, Tehsil Sardarshahar of Churu district, Rajasthan. In his village mostly farmers are only dependent on rainfed cultivation of crops and animal husbandry. Because of low productivity of crops, animal husbandry is a viable source for income generation and livelihood security of the most of farm families.Since, his family livelihood was only dependent on crop production; he had always in search of option to get an employment opportunity.

To get solution of his problem he contacted to KVK Sardarshahar and successfully completed one monthtraining from (16/1/17 to 14/2/17) of paravet. In training, he has developed skills on management, diagnosis and treatment on important Indigenous and exotic dairy breeds of cattle and buffaloes, common contagious and infectious diseases of cows and buffaloes- symptoms and their treatment, vaccines and their administration to dairy animals, symptoms of estrous cycle in animals, Infertility of dairy animals, cleaning and sterilization of equipments, preparation of balance ration, azolla cultivation.

After getting training, he practiced under the supervision of Veterinary Doctor and started primary treatment of animals in nearby villages. After practicing of ten months he joined as a 'PashudhanSahyogee' in Rajasthan Grameen Aajeevika Vikas Parishad, cluster-Sardarshahar on 28/17/2017. Since then he is working on animal health care and feeding management with 360 families of eight villages and also creating awareness in rural families through different programmess.

KVK intervention

- Provided training on Paravet
- Motivation for becoming self dependent Pashudhan Sahyogee
- Regular visit or follow-up by KVK personnel

Out Put

Paravet training has become gainful employment and income generation to him

Impact

Other villagers have been motivated by the efforts of Mr. Vikram and other dropout youths are also contacting to KVK willing to get training Paravet under the guidance of KVK Scientists.



Outcomes

Working Area	Date of joining	Income per month (Rs)	Working pattern
Rajasthan Grameen Aajeevika Vikas Parishad, cluster – Sardarshahar	28/17/2017 to continuing	12000/- to 14000/-	Pashudhan Sahyogee





Income generation thorough custom hiring of farm implements and machinery

KVK-Sardarshahar, Rajasthan

Name of Farmer	:	Mr. Pokar Ram
Father's Name	:	Shri Moti Ram
Age	:	35 Years
Education	:	10th
Address	:	Bhadasar, Sardarshahar
Cropping System	:	Irrigated
Mobile No	:	8619903231



Introduction

Mr. Pokar Ram, a resident of village Bhadasar in Sardarshahar tehsil, Churu district. He has 15.6 acres of land in village. He has been in searching how to increase his income by allied enterprises than agriculture. He came to know that KVK is imparting training on custom hiring of agricultural implements. He also started to attend various trainings programmes conducted by KVK. Through these training he acquired the knowledge of availability, selection and maintenance of agricultural implements and farm machinery. As a result of intervention like training and advisory services, he has purchased a Tractor, Disc Harrow, Disc Plough and M. B.plough in first year and started custom hiring services of farm implements. Later in the next year he also purchased Thresher, Seed cum Fertilizer Drill and Power Sprayer (tractor operated)

KVK intervention

- Motivation for establishment of custom hiring services

Details of custom hiring services of farm implements and machinery :

Items	Services provided (no of farmers)	Area (Ha/Hour)	Rate (Rs)	Amount (Rs)
Disc harrowing	50	100	1200	120000
Disc ploughing	25	50	1600	80000
M.B ploughing	20	30	1600	48000
Sowing by seed-cum-fertilizer drill	20	30	1400	42000
Threshing	25	100	800	80000
Spraying	20	50	800	40000





- Practical training on custom hiring of agricultural implements
- Practical training on maintenance
- Demo on groundnut decorticator

Critical input provided by KVK

- Wide V shape furrow opener in seed-cum-fertiliser-drill

Output

These services have motivated to farmers to adopt large scale entrepreneurship for timely completion of sowing, interculture, sparying and other operations

Impact

Other villagers were motivated by the efforts done by Mr. Pokar Ram on timely operation of agricultural implements in their field and they are also willing to start custom hiring of these implements as a small scale entrepreneurship.

Outcomes

Gross income in (Rs). (2 years)	Diesel & repairing charges (Rs.)	Net income in (Rs.) (2 years)
410000	150000	260000

SELF EMPLOYMENT THROUGH VOCATIONAL TRAINING

KVK-Chomu (Jaipur)

Introduction: Keeping in view the urgent need to fill-up the gap on the availability of trained man power in the horticulture sector, a scheme under National Horticulture Mission on Human Resource Development in horticulture was launched by the Rajasthan Horticulture Development Society, Jaipur. The scheme mainly aims at promoting the rapid growth of horticulture by bridging gap of knowledge and skill, both managerial and technical by imparting training to rural youth to become entrepreneur or self-employed in the horticulture sector and to create skill for employability in the horticulture units/farms

KVK intervention: KVK has organized vocational training programme of one year duration in the field of horticulture and 14 training programmes have been completed successfully. The methodology of training programme as Practical & Theory (80:20) of all aspects covering fruit cultivation, nursery management, landscaping and ornamental gardening, vegetable cultivation and seed roduction, hi-tech horticulture and value addition etc., class room teaching with A.V.Aids, field practical visit teaching by experts and progressive farmers, visit of trainees within state and intra state agricultural institutes, group discussion and survey work and bi-monthly evaluation are being followed to assess training utility and applicability.

Output

Upto the month of March,-218, total 351 rural youth have been trained by conducting overall 15 batches for self-employment and providing horticultural services to the rural as well as urban areas and earning enhanced their livelihood.

Outcome

After the successful completion of the training programmes, the participants have been engaged with different categories of entrepreneurship, details of which are given below :-

Training Years	No. of Participants	No. of Participants engaged in different categories of entrepreneurship				Total
		Entrepreneur / Farm Supervisor	Self Farm Business	Working in Govt.	Private companies	
2002-03 To March -2018	351	33	48	13	70	164
Income / Year		1,50,000 – 2,00,000/-	1,00,000 – 2,50,000/-	90,000/- 96,000/-	60,000 – 1,50,000/-	









Impact

It was observed that there is vast potentiality as job entrepreneurship in the field of horticulture. Trained youths are required by the private companies as well as farm houses. The trained youths are adopting the self-employment by providing services in the field of horticulture. In the year 2017, four participants have been selected as a Gardener at Mughal Garden in Rashtrapati Bhawan, New Delhi. The name and details of the candidates are as under:-

S. No.	Name and address	Mobile No.	Training Year
1.	Shri Anil Kumar Meena, S/o Shri Bhagirath Mal Meena, Village Bagro-ka-bas, Via Badhal, Tehsil Chomu, Post Kishanmanpura, Panchayat Samiti Goindgarh, District Jaipur	9468870847	2016-17
2.	Shri Gyanendra Singh, S/o Shri Jagdish Prasad, VPO Pathena, Tehsil Busawar, District Bharatpur (Rajasthan)	8058134083	2016-17
3.	Shri Chhote Lal Gurjar, S/o Shri Hari Ram Gurjar, Village Bamanwas, Tehsil Kotputli, Post Chaturbhuj, District Jaipur (Rajasthan)	9001654275	2014-15 (second)
4.	Shri Devki Nandan Saini, S/o Shri Hanuman Sahay Saini, Chomu, District Jaipur (Rajasthan)	8432558123	2013-14

Self employment through paravet vocational training

KVK-Chomu (Jaipur)

Introduction: Dairy farming as supplementary source of income and play important role in sustainable agriculture development, improper diagnosis of disease at right time, unawareness about animal health, care and maintenance, faulty practices at village level to care the disease, unavailability of veterinary doctors at critical stages etc. are the factors leading to low population and less earning in dairy sector by enhancing skill of youth so that problem of dairy farmers at their doorsteps could be solved.

KVK intervention

Keeping this view, KVK-Chomu planned to organize training programme for rural youth on the title "Paravet cum Artificial Insemination". In this programme, KVK successfully conducted 10 training programmes from the year 2007-08 to 2017-18 and overall 260 rural youth (in 10 years) selected from Jaipur District as well as adjoining districts of viz. Sikar, Dausa, Tonk, Jodhpur & Alwar have been trained for self-employment. The major methodology of training progeramme are as under:

1. Breed improvement of low genetic potential animals through A. I.,
2. To provide first-aid to the sick animals at farmers' door step,
3. Conducting vaccination programme to improving animals health,
4. Castration of scrub bull to check the uncontrolled breeding and
5. Self employment generation in the field of animal husbandry.

Output

The activities taken by the trained Paravets at different areas of dairy sector, are summarized as under

Activity	No. of animals
No. of Animal Inseminated (A.I.)	28540
Vaccination	23630
No. of animal to which provide first-aid	14310
Technical know-how to dairymen	4115
Provide feed supplement to dairymen	2270

Outcome: Details of engagement and income gained by Paravets.

Activities	Trainees engaged	Income Per Month (Rs.)
Working with BAIF	5	18,000 - 20,000
A. I. and First-Aid	118	10,000 – 25,000
Semen & LN2 supply center	6	10,000-18,000
Veterinary medical store	12	10,000 – 20,000
Milk Collection Center	24	5500 - 9000
Self Dairy	36	8,000 – 15,000









Impact

The trained paravet unemployed rural youth of the nearby villages of the district are getting self-employment and providing services as a Consultant to the villagers and involvement in breed improvement by Artificial Insemination services to the animal rearer at nominal charges.

Livestock farmers are getting veterinary aid/help at right time and at doorstep. Large number of dairy farmers boost up productivity of milch animals and income by getting proper and timely treatement and advice from these trained youths.

IFS- Boon for sustainable income generation

KVK-Dungarpur, Rajasthan

Nagpur Mandarin (Citrus reticulata Blanco.) is presently grown in more than 30000 hectare area of Jhalawar district and is popularly known as name of 'Mini Nagpur'. There are many problems associated with mandarin cultivation in Jhalawar district. Farmers were mainly lacking technological know-how for planting of mandarin orchards like digging of pits, nutrient management, stress management, plant protection measures and training - pruning practices. The Krishi Vigyan Kendra, Jhalawar did the survey of mandarin cultivators of the adopted villages. Assessed their needs and organized 'On and Off-campus training' programmes accordingly for farmers to make enable them for harvesting good yield and quality of mandarin fruits. Among participants', one farmer Mr. Poonam Chand Patidar, village - Dityakhedi, P.S. Jhalrapatan started to establish mandarin orchard in 6.0 ha area. Scientist provided technological support on mandarin in 2006-07. After participating in trainings, he adopted scientific management practices in his field. Previously, he faced the problems like irregular bearing, fruit drop due to fruit fly infestation and citrus black fly. Among various insect-pests, Citrus black fly (Aleurocanthus woglumi) is a devastating pest of Mandarin causing formation sooty mould (Capnodium citri) on leaves surface as well as covering on fruits, which affected photosynthesis activity and ultimately the quality and quantity goes down. Earlier dimethoate and quilanphos insecticides were recommended for the management of citrus black fly and fruit fly. These insecticides were alone not effective to the farmers from the last 7-8 years; it may be due to continuous use of these insecticides and change in agro environmental conditions. Therefore, there was a need for suitable management over adoption of recommended package of practices related to horticultural operations, nutrient management, stress management, management of citrus black fly and fruit fly.



Fig. 1. Fully bear mandarin plantv



Fig. 2. Installation of fruit fly trap

Technological Interventions

Keeping in mind all these perspectives of the farmer, KVK Scientists provided technology support on mandarin in 2006-07. KVK used mandarin package and practices recommended for effective management of above said problems. The recommended dose of fertilizers and three time application of plant protection measures like: - 4:8:12 i.e., April, August and December months. The details of treatment like- FYM 40 kg with RDF (Urea - 1300 gm, SSP - 1200 gm & MOP – 180 gm) /plant , 200 gm Zinc Sulphate /plant before fruiting i.e. June + Spray of Imidacloprid 0.5 ml/liter and / or Diamethoate @ 2.0 ml/lit with copper Oxycloride 2gm/lit (April, August and December). Three applications of these insecticides were suggested; first spray applied in April, second in August and third in December month. On the recommendation of KVK, Jhalawar, spraying of these insecticides by the farmers were not only managing the incidence of citrus black fly & fruit fly but also doubled the productivity of mandarin along with quality fruits.

Impact of technology

The productivity of mandarin increased from 16.00 to 36.67 mt/ha doubling income of mandarin growers. The visible impact has been observed due to adoption of technological intervention on management of water, nutrients, citrus black fly and fruit fly at Dityakhedi village on 5000 mandarin trees during August-September, 2013 completely changed the mindset of neighboring farmers. This technological intervention are being adopted in more than 50000 mandarin trees of the district. Mr. Poonam Chand Patidar is practicing these technologies in 6.0 ha area (mandarin trees) harvesting 220.02 MT fruits and selling @ Rs. 27.25 per kg in the year of 2017-18. Total earning of the farmer is Rs. 59,95,545/- from 6.0 ha area for current year. He has been recognized with Zonal Jagjivan Ram Abhinav Innovative Farmer Award on the eve of Foundation Day (16th July, 2017) of Indian Council of Agricultural Research, New Delhi by Hon'ble Minister of Agriculture and Farmer Welfare, Government of India, Sh. Radhamohan Singh ji.



Fig. 3. A view of Mandarin Orchard.



Fig. 4. Ready to sale mandarin fruits.

Earning of more remunerative through organic farming

KVK-Pali, Rajasthan

Introduction

Sh. Chain Singh a farmer of Balara village on getting mobilized by KVK, Pali formed a farmer producer group "Shri Balaji Farmers Producer Company, Balara." which has 150 registered members during 2012-13. The group of farmers produces organic crops of cumin, fennel, moong, chickpea, sesame, wheat, ber, pomegranate, etc. and the produce is sold to different companies from all over district. He is a good manager of dairy animals at their farm and a successful bio-plant established at their farm and used in lighting, cooking food etc. he establishes a good unit of vermicompost and NADEP compost at their farm. This farmer producer organization is now expanding both area wise and number of farmers is also increasing in every year. Last year this organization sold organic fennel seed worth Rs. 1.4 lacs and many other seeds of different crops. Sh. Chain Singh is himself a very progressive farmer and always follow package and practices recommended by State Agriculture Department and uses latest varieties of crops. Now Sh. Chain Singh also taking new variety of fennel from NRCSS, Tabiji Ajmer and production of 45% more yield of organic seed as new initiatives under water stress and salt affected soils. He has also adopted fully mechanized practices from sowing to harvesting and own seed grading unit also. He is one of the selected farmers as organic seed producer by DOA, GOR, Jaipur under Organic Cultivation of Seed Spices Project NRCSS, Tabiji Ajmer.

KVK intervention

Training on organic farming at KVK, Pali

Output

The farmer is earning more than Rs. five lacs per year by adopting latest agriculture technologies and through organic seed production and organic products. Moreover resource conservation and mechanization of limited resources have reduced the labour cost and further added to effectiveness of inputs and reduction in cost.

Outcome

As the result of Sh. Chain Singh more than 40 farmers in nearby villages have started organic agriculture and the horizontal spread is increasing in number and area day by day.

Impact

Inspired by Sh. Chain Singh's farming models many farmers have started their own seed production programme by linking with State Seed Corporation and SAU. 150 farmers are actively involved in production of oganic seed spices, pulse, oilseed and cereals crops on large scale.

Self employment through Pig Farming: A success story of Mr Ranjod Singh

KVK - Ambala

Name of Farmer : Mr. Ranjod Singh

Address : Lohgarh, Ambala (Haryana)

Mobile No : 7988003657



Introduction

India posses 10.29 million pig population which share 7% of the total meat production in the country. The total number of pig in Haryana state as per census 2012 is 0.13 million number. Pig production is an important secondary occupation for livelihood and nutritional security of the rural people. In India, potential for piggery as business opportunity has not yet been fully realized. With the increasing pressure on land, pig rearing could offer economic, food and social security to the resource poor families. Piggery is the most potential source of meat production and more efficient feed converter after the broiler. Apart from providing meat, pig is also a source of bristles and manure.

Background and problems

Mr Ranjod Singh, 28 years old, graduates in B. Tech. from Lauhgarh village of district Ambala, Haryana. After graduation he took up a job in a private sector and simultaneously studied for competitive exams, only to struggle for the next two years without any success. He then decided to start his own business. Mr Ranjod Singh rightly contracted to KVK Ambala for training on commercial pig farming in 2016. After training he constructed a pig farm in 2400 square feet area in Lauhgarh village. KVK scientists fully supported during construction of house, purchase and selection of animals and KVK Ambala provided 10 pure Large White Yorkshire piglets for his farm. Presently, he is maintaining 25 sows, 20 gilts and 2 boars along with piglets at his farm. He also developed a IFS unit Pig-cum fish farming at his farm. The cost of fish feed reduced by the use of pig dung in the pond. Due to high cost of feed, the pigs are being maintained on kitchen waste, vegetable (cauliflower, carrot, potato etc.) and sugarcane press mud (Maili/jugary) during the seasons.

Output

The out puts of entrepreneur are the production of piglets, gilts, boars and manure along with fish from IFS unit.

Outcome

He earned a rich dividend from sale of piglets and gilts as a record; he earned a net profit of Rs 5.15 lakhs in a year 2016-17 and Rs 45,000 and Rs 5,000 from sale fish and pig

manure, respectively. This success achieved distinctly over a short period of time. Mr. Singh has also developed and loaded a video of his farm on you tube.

Impact

The development of the pig farming system model by Mr. Ranjod Singh has not only been beneficial to him in terms of productivity but it has also influenced other unemployed rural youths of the neighboring areas to to establish such venture. His ventures promoted economic stability and sustainability and are an example for locals to emulate. "By starting his own business he is not only earning for him but gave employment to other poor family. In fact this will also keep them away from anti-social activities and help in creating a stable society and ultimately contribute to the development of the state.

Details of farm and profit in 2016-17

Particulars	Number
Sow	25
Gilt	20
Boar	2
Piglets	60
Income (Rs)	
Expenditure on feed, vaccine, medicine etc. (Rs.)	2,92,000
Sale of piglets (323) @Rs 2500	8,07,500
Sale of manure (Rs.)	5,000
Sale of fish (Rs.)	45,000
Total income (Rs.)	8,57,500
Net Income (Rs.)	5,65,500



Inner view of the pig farm



IFS (Pig cum fish farming)

Bee keeping has changed future of farmers

KVK, Fatehabad

Sh. Om Parkash s/o Sh. Himmat Lal is a dynamic and progressive farmer having 8 acres of available land. He was not satisfied by his farm income by traditional farming of wheat and cotton. Fortunately, he came into the contact with KVK, Fatehabad in 2007. Under the technical guidance of KVK Scientists, he has adopted latest technology like laser land leveling, zero tillage and green manuring. He has also established several enterprises at his farm viz. Bee keeping, Dairy farming, bio gas, vermin compost, Organic farming, Kinnow orchard etc.

Bee Keeping as Entrepreneurship

Bee keeping started in 2007 with 50 boxes which he purchased from Kata Keri Village worth Rs. 2200/- each box along with bees. But later he came in to the contact with KVK Scientists. He actively participated in training on been keeping at KVK Fatehabad. Now he has 700 boxes along with honey bees. Now he has established himself as a honey bees grower with the trade name 'Ekta Honey Bee Farm'. He is well known in the Fatehabad district as a honey bee Entrepreneur. He also extract honey from different flora i.e. Shisham, Mustard, Eucalyptus, Jandi, Ber etc. by his own machines. Now he is earning Rs. 15,00,000 per annum from the sale of honey with different flora as given above.

Year	No. of Boxes	Income (Rs.)
2007	50	40000
2008	150	80000
2009	190	100000
2010	220	120000
2011	250	200000
2012	280	400000
2013	300	700000
2014	350	800000
2015	400	1050000
2016	600	1300000
2017	700	1500000












WORLD HONEY

Protected Cultivation (Flowers Nursery) provides self employment round the year

KVK, Gurugaon

Name of Farmer : Mr. Vipin Yadav

Father's Name : Sh. Rajbir Yadav

Address : Saidpur, Gurgaon, Haryana

KVK Intervention

Sh. Vipin yadav is a progressive and youngest (20 years old) farmer of village Saidpur. He has 4.00 acre of land in the village and is having 03 animals. He takes very keen interest to adopt modern techniques of Agriculture. He came to KVK, Shikohpur Gurgaon to know for establishment of protected cultivation (Flowers Nursery) unit. Sh. Vipin Yadav took practical knowledge on a scientific flowers nursery unit like development of flowers beds, filling seedling trays by vermiculite, Perlite and coco peat then dibbling flowers seed for raising the seedling and its sale them nearby Gurgaon Sectors, malls, colonies, IMT companies and farm houses for the beautification of its houses lawn, parks and offices etc. He is regularly in touch with KVK and KVK is providing technical guidance to Sh. Vipin Yadav about properly management of Flowers Nursery unit.



Output

Sh. Vipin yadav has developed a protected cultivation (Flowers Nursery) unit in 50'x18' area in his village. The KVK provided to him 100 Sq.m. of each Insect proof net, Agri net shed and polythene sheet and he started the work on raising of annual/perennial flowers sapling in seedling tray, plastic and earthen pots.

Outcome

With in a period 06 months now he is fully trained and maintaining the protected cultivation (Flowers Nursery) unit. Now Sh. Vipin Yadav has a viable and economically profitable Flowers Nursery unit and he is earning Rs. 1 lakhs to 1.25 lakhs per annum. Its Flowers Nursery unit is a model to other farmers in the village and nearby areas. The farmers of his areas have been motivated for the training of Protected cultivation (Flowers/Vegetables seedling production) at KVK Sikohpur in Gurgram district.

Impact

He shared his experiences with the Department of Agriculture, Horticulture, other officers and visitors as he is taking benefits by raising of flowers seedling under protected environment and saving the money up to Rs. 60-65 thousand in half yearly basis.



Hi-Tech Vermi Compost Unit - A profitable venture

KVK, Kurukshetra

Introduction

Sh. Karan Singh s/o Sh. Ashwani Sikri village-Dhangali, Shahbad Markanda is a progressive, enthusiastic farmer of District Kuruskhetra working with the mission of improving soil health and saving water with missionary spirit. He is MBA and has 6 ha cultivable land at his farm.

KVK intervention

Due to motivation, technical support, guidance and active collaboration of KVK scientists, he has achieved a mile stone in establishing automatic vermicompost plant with the total investment of 3.65 crore firstever automatic vermi composting packing unit with annual capacity of 10000 MT. in northern India.

Output

Mrs. Yashika w/o Karan Sikri was earlier employed as Manager in Axis Bank left her job and accompanied with her husband to fulfill his dream of transforming the declining trend of soil productivity and increasing trend to secure 7 F'S(Food, Fodder, Fish, Fruits, Fuel, Fibre and flower) and livelihoods to billions of hungry stomach in rural India. Realizing the ill impacts of chemical based agriculture, Karan Sikri is inclined towards organic farming. He has converted his entire farm as organic and mechanized farm. He has established vermicompost unit in 5 acres and developed an automatic mechanized unit of vermicompost of processing and packing. Besides that 10 acres area is under agroforestry and 1 acre under horticultural and vegetable crops for seasonal vegetables and fruits. Dairy farm (21 cattles) and apiry unit (250 boxes) are other ventures which are adding new wing to the sustainable and diversified agriculture. During the span of five years his production level of vermicompost has been remarkably increased from 3530 q. to 50025 q. in his unit and making huge contribution to Swach Bharat as well by converting 100-150 TPD of waste into compost.

During the course of experimentation at his farm, he has made number of MOU, innovations and interventions in making beds for production of vermicompost, processing of cow dung before feeding to earth worms, using of HDPE double laminated bags for vermicompost packing, supplementation of raw earthworms @ 2.75 and 5.5 gram per bird per day daily reduce the feed in take and improved feed conversion ratio in boiler chicken; signed MOU with Agriculture Skill Council of India (ASCI) for providing knowledge and skill to the young entrepreneurs and also signed MOU with IVRI for technology transfer for breeding of earthworm strain Perionyx ceylanesis at his farm. Due to his entrepreneurship skill and thoughtful ideas of saving soil health, saving

water and saving the health of mankind by minimizing the use of chemical fertilizers and pesticides, he has been felicitated and awarded by various NGOs, State Governments and Universities. He is providing employment to rural folks round the year at his farm and selling his products under brand name registered with SGS India Pvt. Ltd. (ISO 9001; 2008). Since then he followed the organic farming, no. of fellow farmers and visiting farmers from nooks and corners of the state are also motivated for vermicompost and integrated farming and the steps forwarded by him will certainly pave a new way for diversification and sustainable agriculture in Haryana as well as India.

Outcome

Due to his innovative approaches and ideas, he has established automatic vermi compost unit. Self fabricated units not only reduced the cost of production but also reduced the time taken for final packing. He has also modified the beds making methods for vermi composting instead of concrete based. Beds at the base are kept absolutely natural for proper climate and congenial environment for earth worms due to which survival rate is comparatively higher and production is more as compared to concrete base.

Impact

Sh. Karan Sikri has been awarded with National award of Jag Jivan Ram Abhinav Kisan Puraskar-2016 from ICAR for establishing a Hi-Tech Vermi Compost Plant unique in the country. He has an example for fellow farmers who had adopted holistic system of farming for sustainable agriculture. Sh. Karan Sikri has also been awarded outlook agriculture Innovation award and many more awards from the district and state government Haryana for his unique achievement in saving and management of Natural Resoures (Soil and Water).

Promotion of pulses through cluster frontline demonstrations.

KVK, Mahendergarh

Introduction: Government of India is investing huge amount on import of pulses to meet the demand of pulses of vegetarian population. Government has planned to reduce the import expenses by increasing the production and productivity of pulse crops. India has the potential of increasing the production of Pulse crops. Adoption of improved practices is therefore required to increase the productivity. Conducting cluster frontline demonstrations at farmers fields is effective mean of demonstrating the impact of improved technologies. Krishi Vigyan Kendras have been assigned the task of conducting cluster frontline demonstrations on pulses under NFSM project for promotion and enhancing the productivity of pulse crops. KVK, Mahendergarh has been conducting CFLDs on pulse crops since last three (2015) years. CFLDs on Greengram in kharif season and on chickpea in rabi season are being conducted to achieve the objectives of the project. The results of CFLDs conducted indicate the success of demonstrations.

KVK intervention

KVK, Mahendergarh organized a number of training programmes and other extension programmes for promotion of technological packages to enhance productivity of pulse crops. Brief descriptions of the programme organized is as follows.

S. No.	Activity	Number	No. of participants
1	Farmers' training	6	350
2	CFLDs	300	300
3	Field visits	23	345
4	Field Days	7	740

Output

CFLDs on Greengram crop were conducted in 20.0 ha in kharif-2016 and in 40.0 ha in kharif-2017. Improved practices in the form of improved variety (MH-421), Seed treatment, recommended dose of fertilizers, weed management, timely irrigation and plant protection practices were demonstrated in the demonstration plots. In case of Chickpea, CFLDs were conducted in 20.0 ha in Rabi-2015-16 and in 40.0 ha in rabi- 2016-17. Improved practices in the form of improved

variety (GNG-1581), Seed treatment, recommended dose of fertilizers, weed management, timely irrigation and plant protection practices were demonstrated in the demonstration plots. The yield and returns of demonstration plots with improved practices were compared with that of local check plots of farmers practices.

Outcome

Average yield of Greengram crop in demonstration plots for two years of 150 locations was 7.43 q/ha. Highest yield obtained was 11.2 q/ha. Average net returns obtained with cultivation of Greengram crop in demonstration Rs. 18625/ ha. On the other hand cultivation of pearlmillet, the most prevalent kharif season crop provided average net returns Rs. 13490/ha. Thus additional net returns of Rs. 5135 were obtained by cultivation of Greengram crop.

Average yield of chickpea crop in demonstration for two years of 200 locations was 17.2 q/ ha. Highest yield obtained was 25.0 q/ha. Average net returns obtained with cultivation of chickpea were Rs. 66150 / ha. However, cultivation of mustard the most prevalent crop provided net returns Rs. 45400 / ha. Thus additional return of Rs. 20750 / ha were obtained by cultivation of chickpea crop.

Impact

Cluster frontline demonstrations conducted on Greengram and Chickpea crop provided better results in terms of better income and productivity sustainability. Additional net returns obtained with cultivation of pulse crop over those obtained with cultivation of prevalent crops resulted into better economic condition of farmers. The area under demonstration crop has shown increased trend due to large scale demonstrations. The horizontal expansion of area under these crops clearly reflects the impact the CFLDs conducted.

Coverage of pulse crops in adopted villages

S.No.	Crop	Area (ha)	
		Before Intervention	After Intervention
1.	Greengram	252.00 ha	375.00 ha
2.	Chickpea	3864.00 ha	10350.00 ha

Action Photos of CFLDs Activities



मूंग (एम.एच.-421)



चना खेत दिवस



Gram Field Day

Resource conservation through zero-till sowing of wheat under paddy-wheat rotation

KVK, Rohtak

Introduction

This new method is used under Rice-Wheat cropping system where showing of wheat is delayed beyond 25 November. Sowing is delayed due to multiple reasons, viz. preparation of field, uncertain rainfall and rice harvesting with traditional method. Out of these, the field preparation is one of the most important reasons, which causes delay in wheat sowing. Puddling in transplanted rice creates a hard pan in the field. After harvesting of rice crop, field requires at least 6-8 tillage operations in ploughing and harrowing for sowing of wheat, in which generally 10-15 days are required for proper field preparation. Moreover, Yield of wheat decreases due to delayed sowing.

KVK intervention

A cluster of villages comprising Bainsi, Kharak Jatan, Gugaheri, Khrainti, Ajaib, Nindana and Lahan Majra etc. of district Rohtak used to sow wheat crop over on area of about 15000 acres by conventional method after paddy. The sowing of wheat normally got delayed and crop germination was also poor particularly in salt affected soils. KVK, Rohtak conducted demonstrations on zero till sowing of wheat in village Bainsi and organized field day. Since the technology is simple and provided glaring advantages, the farmers of Bainsi and cluster villages were highly impressed to accept this technology. To wide spread this technology, the KVK continued its efforts by conducting demonstrations, field days, Kisan Gosthis, Kisan Melas etc The KVK Rohtak has been constantly monitoring this technology by conducting demonstrations at permanent locations to witness the positive and negative impact of this technology.

Output

The sowing of wheat with zero till technology made it possible to advance the sowing at least by 7-10 days as compared to conventional method. Based on observations recorded from 100 farmers, there was an increase of about 8-10 per cent in yield of wheat. Moreover, The results of demonstrations conducted by KVK, Rohtak indicates that Zero Tillage sown fields either yielded at par or upto 5% higher as compared to conventional sowing with same date of sowing.

Outcome

The zero till sowing of wheat has led to total saving of expenditure incurred on preparatory tillage. There is also saving of water at the time of first irrigation. There is less problem of weeds particularly Phalaris minor.

Estimation of Savings due to Zero Till Sowing of Wheat per year in Cluster Villages (6000 ha)

S. No.	Agricultural practice / operation	Saving	
		Rs./ha	Rs. in crores over an area of 6000 ha
1.	Five ploughings (preparatory tillage)	6250.00	3.75
2.	40 - 50% saving of Irrigation water	1250.00	0.75
	Total	7500.00	4.50

Other benefits

1. Timely sowing of wheat crop.
2. Better crop germination particularly in salt affected soils.
3. Reduction in pollution particularly due to avoidance of preparatory tillage. Majority of the farmers in the area go for manual harvesting of paddy, so the problem of residue burning of paddy fields is automatically avoided.
4. The crop residues of previous crop helps in maintenance of moisture in the field and help the wheat crop in mitigating terminal heat stress.
5. Overall reduction in population of Phalaris minor.

Impact

Due to constant effort of KVK and glaring advantages of technology, the entire cluster area of about 6000 ha has been converted into zero till sown area. Many dignitaries from India and abroad including Sh. Jai Ram Ramesh, State Minister for Commerce, Govt. of India; Sh. P.K. Mishra, Secretary Agriculture, Govt. of India; Delegates of Milinda Bill Gates Foundation, USA; Mexican Scientist Dr. K.N. Sahare (CIMMYT) and delegates of International Science Congress have witnessed the impact of this technology in the area.

Every year, the area under ZT sown wheat is increasing in the other villages of Rohtak district at a fast pace. At present, this technology has spread in 38 villages over an area of about 11000 ha.

Residue Management through turbo Happy Seeder - Farmer Perspective

KVK, Yamunanagar

Introduction

Shri Suresh Kumar of Dhouli village in Yamunanagar is an innovative farmer always looking for ways to make his farming business more profitable and sustainable. He grows wheat and paddy, sugarcane, fodder crops and berseem and sorghum in the sandy loam soil. He was impressed with the gains of zero-tillage technology being adopted by fellow farmers and couldn't effectively implement in his own field due to clogging of machine as there were high stubble load of hybrid paddy residues.

KVK intervention

During Kisan Mela 2016 organised by KVK, Yamunanagar and State Agriculture department, he came to know to about turbo Happy Seeder. Being innovative as he always inquired about all ins and outs of technical details of machine from the KVK team. He became so much interested that, he purchased Happy Seeder in the same season (Rabi 2016-17) and sown his remaining wheat crop in the standing rice stubbles without waiting for any financial assistance (subsidy) from the state government. That was turning point in his life. His crop was bumper that year and he could save huge initial investment used every year for field preparation. The machine he purchased was fitted with two boxes, one each for fertilizer and seed. Fertilizer is placed below the seed. The tines are fixed at 21 cm with knife points. Before adopting zero tillage, he had to plough the field 8-10 times.

Output

His field served as an example to fellow farmers who inquired about Happy Seeder. From the next rabi season of 2017-18, he not only converted his whole farm under conservation agriculture but also has sown wheat using Happy Seeder in standing rice stubble of nearby farmers on custom hiring basis, which earned him additional income. He covered more than 100 acres with a net profit of around INR 700/- on per acre basis for sowing of wheat using Happy Seeder.

Impact

Besides, rice stubbles, sugarcane is other important crop of Yamunanagar district, in which disposal of stubble is a huge problem. Being energized from the success of Happy Seeder in managing rice stubbles, he tried his hand at sowing of wheat in sugarcane trash too. Filled with courage along with calculated risk and experience, he was able to harvest good

wheat crop in sugarcane trash too along with saving of precious time and resources (diesel, energy etc.). It is being said that seeing is believing and farmers usually follow this route for adoption of new technology. Progressive farmer Sh. Suresh served as that example by leading the change. As a result of which many new Happy Seeder have been purchased in the Yamunanagar district and many famers have started custom hiring business to add subsidiary income. Zonal Monitoring team headed by Dr. Varshney also visited his field and were very much impressed by the hard work he had put to find better solutions to rice burning problem after getting technical knowhow from the KVK Yamunanagar. Still there is lot of scope for Happy Seeder in the district and other farmers are following suit, being encouraged by the assistance provided by the state government in the form of subsidy for the purchase of this machine as well as for using this machine in the field. In the coming years, this technology is bound to increase further and will provide a sustainable solution to the rice and sugarcane stubble burning problem along with saving of precious natural resources.

High density pomegranate plantation enhances profit under harsh conditions

KVK, Barmer-I

1. Thematic area: Horticulture

2. Profile of innovator:

Sh. Babulal Soni
Junameetha Kheda Teh.: Sindhari
Dist.: Barmer (Raj.)
Mobile No.: 9413028811
Age: 51 yrs
Education: 8th
Land holding: 07 ha



3. Problem/ challenge addressed: The average rainfall of the district is 277 mm and the soil is sandy to sandy loam type with high pH and EC. Erratic rainfall with long dry spell are major causes for low production of crops.

4. Description of innovative practice/technology: Babu Lal Soni previously was a gold merchant, as he came into touch with KVK, he turned in to a farmer. He purchased a piece of land which was full of sand dunes having height of 30-50 feet. Then he made contours for cultivation of pomegranate, farmer achieved success in producing two major varieties of pomegranate viz. Bhagwa and super bhagwa in 5ha of land. For getting higher yield farmer practiced good management tactics. He precisely made strategies for high density pomegranate plantation 3X3 m, use of Integrated Nutrient Management and Integrated Pest Management which drastically reduced the cost of cultivation and fetched the good returns.



High density orchard with contour

5. Practical utility: Farmers are using crop geometry of 5X5 m which covers less no. of plants but high density planting covers more no. of plants which provides more yield and much returns

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Parameter	High density pomegrnate cultivation
Av. Yield	55550 kg
Av. Selling price	42
Cost of cultivation	740667
Av. Income	2333100
Net profit	159243
B:C Ratio	3.15

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: On observing the current status, farmers of same and nearby villages have opted with high density planting technology. Six farmers have planned to establish pomegranate orchard in 60 ha area in the adjoining villages.





Packaging and Branding

CHAPTER 14

Publications, Seminars, Symposiums, Workshops

Research Papers

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Meena, M.S; Kale, R.B; Singh and S.K (2017). Effectiveness of Farmer to Farmer (F2F) Extension Model to enhance the technology uptake in Rajasthan state, Technical Bulletin, 1/2017, published by ICAR-Agricultural Technology Application Research Institute, Zone-II, Jodhpur, India:1-12.

Kale RB, Meena MS, Rohilla PP and Singh SK. (2017). कृष्क के अधिकारः पौध किस्म और कृषक अधिकार संरक्षण अधिनियम 2001. Published by Director ICAR-ATARI, Zone-II, Jodhpur. Pp: 1-6.

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Kale, R. B., M. S. Meena, P. P. Rohilla & S. K. Singh (2017). Safalata ki Kahani – Kisan ki Jubani – published by ICAR-ATARI, Jodhpur. pp : 1-74.

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Chavan SM, Pandya CD and Rohilla PP. (2018). System of Rice Intensification: Boon for Increasing Productivity and Ecological Security. In: System of Rice Intensification, Editors: KN Bhatt and Pradeep Bhargava. Published by Studium Press (India) Pvt. Ltd. ISBN: 978-93-85046-06-3. Pp: 131-146.

Srinivas Rao Ch, Prasad, JVNS, Osman, M, Prabhakar, M, Kumara BH, Singh AK, ATARI Directors and Nodal Officer (2017). Farm Innovations in Climate Resilient Agriculture - Technical Bulletin. Published by Director, CRIDA, Hyderabad. Pp: 1-123.

Presentations in Conferences/Symposia/ seminars/ other fora:

Meena, M.S. and Singh, S.K (2017) Accelerating Technology Dissemination through Effective Linkages with KVKs and Farmer to Farmer Extension Model, presented during 24th Annual Group Meeting of Rapeseed-Mustard Research Workers from 3-5th August 2017 held at Rajasthan Agricultural Research Institute, SKNAU, Jaipur (Rajasthan).

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Annexure-I

Summary of technologies assessed under various crops by KVKs

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Rajasthan				
Drudgery Reduction	Implements	Assessment of different types of sickles for drudgery reduction	15	1
Farm machineries	Chickpea	Sowing of chickpea by wide V shape furrow opner in seed cum fertilizer drill	9	1
Integrated Crop Management	Tomato	Production maximization of tomato under drip irrigation with mulch	1	1
Integrated Crop Management	Cauliflower	Assessment of plant spacing on growth and yield of cauliflower	5	1
Integrated Crop Management	Wheat	Assessment of seed rate in wheat	5	1
Integrated Crop Management	Coriander	Assessment of date of sowing in coriander	5	1
Integrated Crop Management	Barley	Assessment of variety(s) of barley in salt affected Som Kamla Amba Dam command areas	9	1
Integrated Crop Management	Groundnut	Assessment of date of sowing	6	1
Integrated Crop Management	Mustard	Frost Management in mustard	9	1
Integrated Crop Management	Cauliflower	Evaluation of spacing in cauliflower	5	1
Integrated Crop Management	Onion	Effect of date of transplanting in quality and yield of onion	10	1
Integrated Crop Management	Round gourd	Assessment of crop geometry on growth & yield of Round Gourd under rain-fed condition	5	1
Integrated Crop Management	Chickpea	Assessment of row spacing	8	1
Integrated Crop Management	Groundnut	Assessment of sowing times, Optimum seed rate	6	1
Integrated Disease Management	Cumin	Management of wilt in cumin	3	1
Integrated Disease Management	Chilli	Leaf curl virus disease management in chillies	10	1
Integrated Disease Management	Cumin	Disease Managedment in Cumin	10	1
Integrated Disease Management	Chickpea	Management of wilt & root rot in chickpea	10	1
Integrated Disease	Tomato	Management of blight disease	10	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Management				
Integrated Disease Management	Potato	Management of diseases in potato	8	1
Integrated Disease Management	Guava	Nemotode management in newly guava orchard	10	1
Integrated Disease Management	Clusterbean	Management of Bacterial blight in cluster bean	3	1
Integrated Disease Management	Wheat	Management of yellow rust in wheat	3	1
Integrated Disease Management	Groundnut	Management of root rot in ground nut	3	1
Integrated Disease Management	Brinjal	Management of shoot and fruit borer in brinjal	6	1
Integrated Disease Management	Chickpea	Management of wilt in chickpea	3	1
Integrated Disease Management	Garlic	Management of rootrot in garlic	5	1
Integrated Disease Management	Cotton	Management of bacterial blight /angular leaf spot of cotton	5	1
Integrated Disease Management	Cumin	Management of Blight in Cumin	5	1
Integrated Disease Management	Wheat	Yellow and Brown rust management in wheat	8	1
Integrated Disease Management	Mustard	management of white-rust in Mustard	5	1
Integrated Disease Management	Clusterbean	Management of root-rot disease	5	1
Integrated Disease Management	Ginger	Assessment of insecticides/biopesticides against rhizome rot disease	20	1
Integrated Nutrient Management	Pearl Millet	Assessment of INM in Bajra	3	1
Integrated Nutrient Management	Cumin	Evaluation of spray of ferrous sulphate and citric acid on cumin in western Rajasthan	3	1
Integrated Nutrient Management	Ber	Fertiliser Management in Ber	5	1
Integrated Nutrient Management	Mustard	Integrated nutrient management in mustard	5	1
Integrated Nutrient Management	Bottle Gourd	Assessment of boron on growth and yield of bottle gourd	5	1
Integrated Nutrient Management	Onion	Enhancement of Onion yield through use of balance fertilization	5	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Integrated Nutrient Management	Tomato	Management of fertilizers and micro nutrients in Alwar district	5	1
Integrated Nutrient Management	Wheat	Management of INM in wheat	10	1
Integrated Nutrient Management	Barley	Management of INM in Barley	10	1
Integrated Nutrient Management	Tomato	Management of INM in tomato	10	1
Integrated Nutrient Management	Potato	Management of micro-nutrients in potato	16	1
Integrated Nutrient Management	Pomegranate	Management of micro nutrients in pomegranate	5	1
Integrated Nutrient Management	Onion	Management of fertilizers in onion	5	1
Integrated Nutrient Management	Ber	Management of INM in ber	5	1
Integrated Nutrient Management	Wheat	Assessment of IARI liquid bio fertilizer for seed treatment in wheat.	5	1
Integrated Nutrient Management	Wheat	Management of liquid bio fertilizer	5	1
Integrated Nutrient Management	Tomato	Management of INM in tomato	1	1
Integrated Nutrient Management	Maize	Management of INM in Maize	5	1
Integrated Nutrient Management	Maize	Management of INM in maize	5	1
Integrated Nutrient Management	Pomegranate	Management of fruit cracking and hardening in pomegranate	5	1
Integrated Nutrient Management	Groundnut	Assessment of effect of ferrous sulphate + citric acid to manage chlorosis in groundnut	9	1
Integrated Nutrient Management	Cotton	Efficient use of fertilizer in cotton crop	6	1
Integrated Nutrient Management	Cauliflower	Effect of balance use of fertilizer (as per STV) with bio-fertilizer on curd quality and production	5	1
Integrated Nutrient Management	Chickpea	Effect of INM on yield of chickpea	5	1
Integrated Nutrient Management	Chilli	Management of INM in chilli	6	1
Integrated Nutrient Management	Wheat	Management of zinc in wheat	4	1
Integrated Pest	Green gram	Management of sucking insect pests in moong bean	3	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Management				
Integrated Pest Management	Mustard	Insect pest management in mustard	3	1
Integrated Pest Management	Tomato	Management of fruit borer in tomato	3	1
Integrated Pest Management	Cotton	IPM in Cotton	7	1
Integrated Pest Management	Cauliflower	Integrated pest management in early cauliflower	20	1
Integrated Pest Management	Guava	Fruit fly Management in Guava Orchard	5	1
Integrated Pest Management	Chickpea	Pod borer management in gram	3	1
Integrated Pest Management	Green gram	Pod borer management in mungbean	3	1
Integrated Pest Management	Soybean	Assessment of IPM organic modules for management of insect pest in soybean	5	1
Integrated Pest Management	Kinnow	Management of black fly (Kali Massi) in mandarin	5	1
Integrated Pest Management	Soybean	Management of girdle beetle in soybean	3	1
Integrated Pest Management	Mustard	Eco-friendly management of aphids through Yellow Sticky Trap in mustard	9	1
Integrated Pest Management	Kinnow	Citrus psylla management in Kinnow orchard	8	1
Integrated Pest Management	Wheat	Assessment of seed treatment by new insecticides on germination, termite damage and yield in wheat	5	1
Integrated Pest Management	Soybean	Effect of pesticides in management of foliage feeding pest in soybean	3	1
Integrated Pest Management	Chickpea	Bio-intensive pest management in gram pod borer	10	1
Integrated Pest Management	Wheat	Nematodes Management in wheat	6	1
Integrated Pest Management	Chickpea	Pod Borer Management	5	1
Integrated Weed Management	Mustard	Weed management in mustard	5	1
Integrated Weed Management	Fenugreek	Weed management in fenugreek	5	1
Integrated Weed Management	Mustard	Management of Oronbanche in mustard	5	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Integrated Weed Management	Mustard	Management of Orobanche in mustard	5	1
Integrated Weed Management	Wheat	Weed Management in Wheat	5	1
Integrated Weed Management	Potato	Weed management in potato	6	1
Integrated Weed Management	Mustard	Orobanche management in mustard	3	1
Others	Wheat	Temperature stress management in wheat crop	10	1
Post Harvest Technology / Value addition	Fruits and vegetables	Assessment of income of farm woman involved in value addition of fruits and vegetables	20	1
Resource conservation technology	Mustard	Irrigation management in mustard	5	1
Resource conservation technology	RCT	Assessment of Rural Composting method	5	1
Resource conservation technology	Groundnut	Assessment of effect of sprinkler irrigation inwheat	9	1
Seed / Plant production	Mustard	Assessment of mustard	5	1
Value addition	Aonla	Improvement in preparation of instant Amla candy for enhancing its shelf life	15	1
Varietal Evaluation	Onion	Assessment of variety in onion	3	1
Varietal Evaluation	Onion	Evaluation of varietal and mulching in production of onion bulb	3	1
Varietal Evaluation	Wheat	Assessment of wheat under saline soil	5	1
Varietal Evaluation	Mustard	Low productivity of mustard	5	1
Varietal Evaluation	Barley	Assessment of variety of barley RD-2794	10	1
Varietal Evaluation	Datepalm	Barhee, Khuneji and Medjool	5	1
Varietal Evaluation	Wheat	Assessment of Wheat Variety	8	1
Varietal Evaluation	Mustard	Introduced New Hybrid(varietal assessed)	8	1
Varietal Evaluation	Fenugreek	Assessment of newly released variety of fenugreek	5	1
Varietal Evaluation	Fennel	Assessment of fennel Varieties	10	1
Varietal Evaluation	Onion	Varietal assessment of Rabi onion	10	1
Varietal Evaluation	Soybean	Assessment of varieties of soybean	1	1
Varietal Evaluation	Mustard	Assessment of varieties of mustard in Jhalawar district	1	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Varietal Evaluation	Coriander	Assessment of new varieties of coriander in Jhalawar district	1	1
Varietal Evaluation	Mustard	Varietal evaluation of mustard	6	1
Varietal Evaluation	Mustard	Newly released varieties	5	1
Varietal Evaluation	Fenugreek	Newly released varieties	4	1
Varietal Evaluation	Fenugreek	Varietal evaluation of fenugreek	5	1
Varietal Evaluation	Onion	Pre-mature initiation of flower stock in onion	9	1
Varietal Evaluation	Chilli	Evaluation of Chilli Varieties	5	1
Varietal Evaluation	Maize	Performance evaluation of maize varieties	10	1
Varietal Evaluation	Mustard	Performance evaluation of mustard varieties	10	1
Varietal Evaluation	Chilli	Performance evaluation of chili varieties	10	1
Varietal Evaluation	Onion	Performance evaluation of onion varieties	16	1
Varietal Evaluation	Mustard	Varieties Giriraj (DRMR IJ 31), NRCHB 101, NRCDR 2, RH 749	8	1
Rajasthan Total (116)			**747**	
Haryana				
Drudgery Reduction	Protective clothing	Effectiveness of protective clothing while spraying pesticides	1	1
Drudgery Reduction	Wheat	Field testing of Capron on farmwomen involved in various farm activities, Field testing of Pick bag on farmwomen involved in various farm activities	4	1
Drudgery Reduction	Wheat	Field testing of Capron on farmwomen involved in wheat harvesting/threshing	30	1
Farm machineries	Paddy	Mechanical transplanting of paddy	3	1
Farm machineries	Paddy	Mechanical Transplanting of Rice	5	1
Integrated Crop Management	Castor	Assessment of intercropping of castor with Moong and Guar	10	1
Integrated Crop Management	Sugarcane	Assessment of performance of different crops cultivated as an intercrop in autumn sugarcane was assessed to find out the optimum cropping system.	10	1
Integrated Crop Management	Wheat	Assessment of performance of Wheat sown with different methods	3	1
Integrated Crop Management	Marigold	Assessment of marigold - proper time of sowing	3	1
Integrated Crop Management	Ber	Integrated crop management in ber	2	1
Integrated Disease Management	Paddy	Management of Bakanae Disease in paddy	10	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Integrated Disease Management	Paddy	Management of Sheath Blight in paddy	7	1
Integrated Disease Management	Cotton	Management of parawilt in cotton	10	1
Integrated Disease Management	Paddy	Management of sheath blight in paddy	5	1
Integrated Disease Management	Paddy	Effect of carbendazim in management of bakane disease	2	1
Integrated Disease Management	Bottle Gourd	Disease management in Bottle gourd	3	1
Integrated Disease Management	Paddy	Effect of mulching and flooding of paddy nursery with polythene sheet for two weeks after irrigation.	5	1
Integrated Farming System	*Poplar*	Assessment of performance of Paddy-Wheat under boundary plantation of Poplar	3	1
Integrated Farming System	*Eucalyptus*	Performance of Eucalyptus Clone No-413 with different spacing's ,Comparison of seedling raised Eucalyptus V/S Clonal Eucalyptus (413)	4	1
Integrated Farming System	Agro forestry	Performance of crops with boundary plantation	16	1
Integrated Nutrient Management	Paddy	Assessment of balance fertilization in paddy (Oryza sativa) yield.	10	1
Integrated Nutrient Management	Potato	Assessment of Integrated Nutrient Management in Potato	5	1
Integrated Nutrient Management	Wheat	Assessment of Balanced fertilization in wheat	1	1
Integrated Nutrient Management	Wheat	Fertilizer application on soil test basis in wheat irrigated with sodic water	10	1
Integrated Nutrient Management	Sugarcane	Assessment of soil amendments for sodic soil	3	1
Integrated Nutrient Management	Sorghum fodder	Assessment of nutrient management in Sorghum fodder	10	1
Integrated Nutrient Management	Mustard	Assessment nutrient management in mustard	10	1
Integrated Nutrient Management	Ber	Assessment of nutrient management in ber orchard	3	1
Integrated Nutrient Management	Kinnow	Nutrient management in Kinnow	1	1
Integrated Nutrient Management	Wheat	Soil test based INM (FYM 10 ton/ ha. + Azatobactor + PSB +NPK)	5	1
Integrated Nutrient Management	Tomato	Nutrient management in tomato,	3	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Integrated Nutrient Management	Baby corn	Comparison of different fertilizer doses in Baby corn	3	1
Integrated Nutrient Management	Sweet corn	Comparison of different fertilizer doses in Sweet corn	3	1
Integrated Pest Management	Cotton	Management of whitefly and other sucking pests	3	1
Integrated Pest Management	Mustard	Insect-pest management in mustard	10	1
Integrated Pest Management	Cotton	Whitefly management in cotton	8	1
Integrated Pest Management	Wheat	Management of molya nematode in wheat	8	1
Integrated Pest Management	Polyhouse	Effect of polythene sheet mulching in polyhouse against root knot nematode population	2	1
Integrated Pest Management	Paddy	Management of Stem Borer in paddy	7	1
Integrated Pest Management	Paddy	Management of Plant Hopper in paddy	7	1
Integrated Pest Management	Wheat	Effect of chlorpyriphos on termite control in wheat.	5	1
Integrated Pest Management	Chickpea	Evaluation of insecticides against Helicoverpa armigera in chickpea	5	1
Integrated Pest Management	Cucumber	Fruit fly management of in cucumber	1	1
Integrated Pest Management	Guava	Management of fruit fly in Guava	1	1
Integrated Pest Management	Cotton	Management of whitefly in cotton	1	1
Integrated Pest Management	Cotton	Management of whitefly and oher sucking pests	5	1
Integrated Pest Management	Sunflower	Head borer pest management in Sunflower	3	1
Integrated Pest Management	Cauliflower	Management of insect-pest in cauliflower	3	1
Integrated Pest Management	Bottle Gourd	Management of insect-pests in management in bottle gourd	3	1
Integrated Pest Management	Guava	Management of fruit fly in guava	10	1
Integrated Pest Management	Bottle Gourd	Management of fruit fly in bottle-gourd	10	1
Integrated Pest Management	Ber	Management of fruit fly in ber	10	1
Integrated Weed Management	Clusterbean	Effect of different techniques on weed management in clusterbean	10	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Integrated Weed Management	Mustard	Combine spray of glyphosate and carbendazim to control orobanche and stem rot	10	1
Integrated Weed Management	Wheat	Comparative performance of Post emergence herbicides vs Pre+ Post emergence application of herbicides against Phalaris minor management in wheat	13	1
Integrated Weed Management	Wheat	Management of Phalaris minor in wheat	20	1
Integrated Weed Management	Wheat	Integration of Pendimethalin with Zero Tillage for Weed Management in Wheat	50	1
Integrated Weed Management	Onion	Weed management in Onion yield	3	1
Integrated Weed Management	Chickpea	Weed management in Chickpea	3	1
Integrated Weed Management	Wheat	Management of weed in what	4	1
Integrated Weed Management	Clusterbean	Evaluation of weed management practices n clusterbean	10	1
Integrated Weed Management	Wheat	Weed management in wheat	20	1
Mushroom cultivation	Mushroom	Pasteurized compost (short method of composting) was compared to conventional method (long method of compost preparation)	3	1
Mushroom cultivation	Mushroom	Low cost white button mushroom cultivation	3	1
Mushroom cultivation	Mushroom	Evaluation of Paddy straw in mushroom	10	1
Resource conservation technology	Chickpea	Moisture conservation in chick pea through hydrogel	5	1
Resource conservation technology	Paddy	Comparative performance of direct seeded rice (DSR) vs manual puddled transplanting in rice.	10	1
Resource conservation technology	Paddy	Alternate crop establishment techniques	10	1
Resource conservation technology	Wheat	Alternate crop establishment technique	8	1
Resource conservation technology	Paddy	Different methods of sowing of paddy	3	1
Resource conservation technology	Wheat	Evaluation of different methods of sowing of wheat	10	1
Resource	Paddy	Comparative assessment of different leveling	3	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
conservation technology		techniques for water management in Paddy (DSR)		
Resource conservation technology	Pearl Millet	Assessment of efficacy of different farm implements	3	1
Resource conservation technology	Wheat	RCT on sowing operation in wheat	10	1
Resource conservation technology	Paddy	Comparative Evaluation of Different Planting Techniques of Paddy , Estimation of water consumption in Paddy	4	1
Resource conservation technology	Wheat	Assessment of sowing Methods	20	1
Small Scale income generating enterprises (Agroforestry)	Wheat	Assessment of potential agro-forestry system	8	1
Value addition	Pearl Millet	Value addition in pearl millets	20	1
Value addition	Green gram	Value added products of pulses & cereals	3	1
Value addition	Sesame	Value added products of til	15	1
Value addition	Groundnut	Value added products of peanut	10	1
Value addition	Pearl Millet	Value added products of pearlmillet	40	1
Varietal evaluation	Wheat	Varietal Evaluation of wheat under saline water	2	1
Varietal Evaluation	Wheat	Variatal Performance of wheat(Triticum aestivam)	105	1
Varietal Evaluation	Green gram	Assessment of improved yielding varieties Moong (Vigna radiata)	30	1
Varietal Evaluation	Mustard	Assessment of high yielding varieties Raya (Brassica juncea)	30	1
Varietal Evaluation	Paddy	Variatal Performance of paddy (Oryza sativa)	5	1
Varietal Evaluation	Wheat	Performance of newly released wheat varieties (HD 3086, WH 1105) was assessed against existing variety HD 2967	8	1
Varietal Evaluation	Paddy	Short duration high yielding varieties of paddy	22	1
Varietal Evaluation	Wheat	Varietal evaluation of different wheat varieties	20	1
Varietal Evaluation	Pearl Millet	Relative performance of pearlmillet hybrids under rainfed conditions	3	1
Varietal Evaluation	Mustard	Relative performance of Mustard under rainfed conditions	5	1
Varietal Evaluation	Mustard	Relative performance of Mustred under irrigated conditions	5	1
Varietal Evaluation	Barley	Varietal evaluation of barley,	1	1

Thematic Area	Crop	Name of the technology	No. of trials	No. of KVKs
Varietal Evaluation	Wheat	Varietal evaluation of late sown wheat	1	1
Varietal Evaluation	Wheat	Relative performance of salt tolerant varieties of wheat	10	1
Varietal Evaluation	Mustard	Relative performance of raya varieties	20	1
Varietal Evaluation	Paddy	Comparative Performance of Different Varieties of Evolved Basmati Rice	15	1
Varietal Evaluation	Wheat	Comparative performance of Different Varieties of Wheat	15	1
Varietal Evaluation	Paddy	Assessment of new paddy variety	3	1
Varietal Evaluation	Mustard	Evaluation of different varieties of mustard	5	1
Varietal Evaluation	Chickpea	Varietial assessment of chickpea	22	1
Varietal Evaluation	Wheat	varietal evaluation of wheat	20	1
Varietal Evaluation	Wheat	Varietal evaluation of wheat under salt affected soils	10	1
Varietal Evaluation	Mustard	Varietal evaluation of mustard under salt affected soils	20	1
Varietal Evaluation	Pearl Millet	Varietal evaluation of pearl-millet under water stress condition	10	1
Varietal evaluation	Wheat	Assessment of variety(s) of wheat	12	1
Varietal evaluation	Berseem	Assessment of variety of berseem	24	1
Total Haryana (108)			**1069**	
Delhi				
Drudgery Reduction	Wheat	Assessment of Capron to protect the workers during harvesting, threshing & winnowing	3	1
Integrated Disease Management	Tomato	Disease management in tomato	3	1
Integrated Nutrient Management	Wheat	Application of fertilizers on soil test basis NPK & Zn + Biofertilizers	3	1
Integrated Nutrient Management	Tomato	Performance evaluation of NAA & CaCl2 on nutrient uptake, growth & yield of tomato	3	1
Integrated Pest Management	Wheat	Seed treatment with Imidacloroprid 17.8SL @ 3.5ml/kg seed	3	1
Integrated Weed Management	Onion	Performance evaluation of oxyfluroben 23.5% and quizalofop ethyle 5% EC weedicide for weed control in onion	3	1
Total Delhi (6)			**18**	
Grand Total (230)			**1834**	

Summary of technologies assessed under livestock by KVKs

Thematic Area	Name of the livestock enterprise	Name of the technology	No. of trials	No. of KVKs
Rajasthan				
Disease of Management	Buffaloes	Management of anestrous in lacting buffaloes	6	1
Disease of Management	Buffaloes	Management of anestrous in lacting buffaloes	6	1
Disease of Management	Cattle	Effect of different balanced feed premixes on fertility of bovine	375	1
Disease of Management	Cattle	Effect of balanced feed with different premixes	50	1
Evaluation of Breeds	Cross Bred Heifers	Effect of mineral mixture on the age of puberty of cross bred cow heifers	3	1
Feed and Fodder	Buffalo	Effect of Special feeding Allowence (challenge feeding during advance stage of pregnancy on peak milk yield buffalo)	10	1
Feed and Fodder	Cow	Feeding of balance concentrate mixture to cow	9	1
Nutrient management	High yielding cross bred cow and buffalo.	Feeding management	6	1
Nutrient management	Bufflow/cow heifer	Feeding management	10	1
Nutrient management	Goat	Assessment of mineral deficiency in goat.	4	1
Nutrition Management	Buffalo	Infertility management through OVSYNCH protocol	8	1
Nutrition Management	Cattle	Effect of supplementary feeding of azolla as concentrate on the milk yield of cattle	15	1
Nutrition Management	Buffalo	Management of High calf mortality in buffaloes in Alwar Rajasthan	15	1
Nutrition Management	Bufalo	Effect of substitutional feeding of concentrate by Azolla as feed suppliment in milk production in Buffalo	7	1
Nutrition Management	Buffalo	The mortality of newly born calf reduced by proper coloustrum feeding with benmith tablet	20	1
Nutrition Management	Goat	Assessment of goat milk dahi supplement augementing the growth of kids.	10	1
Nutrition Management	Cow	Feeding Management	12	1
Nutrition Management	cow	Management and care during pregrancy on peak milk	10	1
Nutrition Management	Cattle	Performance of by-pass protein with mineral mixture to increase fat%+SNF% in milk	6	1
Nutrition Management	Cross bred cow	Assessment of chelated mineral mixture on milk yield	10	1
Nutrition	goat	Assessment of effect of azolla feed	10	1

Thematic Area	Name of the livestock enterprise	Name of the technology	No. of trials	No. of KVKs
Management				
Nutrition Management	Buffalo	Assessment of area specific mineral mixture	13	1
Nutrition Management	Buffaloes	Assessment of effect of azolla feeding on milk yield of buffaloes	20	1
Production and Management	Buffalo	Assessment of feeding mechanism	15	1
Production and Management	Buffalo	Effect of Azolla feed in Murra-Buffalo's Milk yield	20	1
Production and Management	Poultry	Assessment of egg production in Pratapdhan Poultry	10	1
Production and Management	Dairy cows	Azolla as green feed	10	1
Production and Management	cow	assessment of ovsynch protocol for fertility improvement in deshi cow	10	1
Total Rajasthan (27)			**694**	
Haryana				
Evaluation of Breeds	Poultry	Evaluation of Him Samridhi chicken breed of poultry	3	1
Nutrition Management	Reproductive performance	Deworming, mineral mixture and vitamin AD3E supplementation	3	1
Total Haryana (2)			**6**	
Grand Total (29)			**700**	

Summary of Technologies assessed under Home Science / various enterprises by KVKs

Thematic areas	Name of problem	Name of the technology assessed	No. of trials	No. of KVKs
Others: drudgery reduction	Milking stool	Management of drudgery reduction in milch animals	18	1
Drudgery reduction	Naveen sickle	Introduction of Naveen sickle for harvesting of crop	10	1
Nutrition Management	Children	Supplementary nutrition (Diet) for children (3-6 years).	10	1
Nutrition Management	Children	Use of Amilays Rich Food (ARF) as weaning food	10	1
Rajasthan Total (4)			**48**	
Grand Total (4)			**48**	

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