वार्षिक प्रतिवेदन ANNUAL REPORT

2015 - 16



ICAR-Agricultural Technology Application Research Institute Kolkata Indian Council of Agricultural Research Salt Lake, Kolkata-700 097



ICAR-AGRICULTURAL TECHNOLOGY APPLICATION RESEARCH INSTITUTE KOLKATA

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PREFACE

nnual Report of any scientific organization primarily A aims at showcasing various initiatives taken by the organization over a period of time and presenting the achievements of activities accomplished within last one year in a concise but systematic manner. With the upgradation of Zonal Project Directorate to Agricultural Technology Application Research Institute (ATARI), this organ of Indian Council of Agricultural Research did take up diversified activities besides providing regular guidance to 84 KVKs in technical and financial matter. In this compilation, salient achievements of ICAR-ATARI, Kolkata in developing functional linkage with various stakeholders, performance of Directorates of Extension Education of State Agricultural Universities and 84 KVKs have been arranged in a manner to enable all concerned to have clear vision about this Institute, mode of functioning and contribution of KVKs towards agricultural development process.

This document has housed all the major areas of KVK functioning like on-farm trials, frontline demonstration, training programme, seed and planting material production, revenue and resource generation, soil and water samples analyzed, publication, mobile advisory provided, special programmes organized and many others to make various stakeholders understand the importance of KVK system in present-day agriculture.

The details of ICAR-ATARI, Kolkata, its role and responsibility and the performance of Directorates of Extension Education in over viewing KVK activities as well as providing technological backstopping have also been incorporated in this valuable document.

Help and assistance received from the KVKs, host organizations and Indian Council of Agricultural Research, New Delhi as a whole made it possible to compile all the relevant information with facts and figures within the stipulated time. It is sincerely expected that this Annual Report 2015-16 will prove handy for the personnel involved in agricultural development process of this zone in particular and the country as a whole to extend their sphere of activities with the support of KVK system operating in this country.

I extend my thanks to all programme coordinators and the staff of the KVKs in the zone for their dedicated efforts in implementing the mandated activities and furnishing the necessary information for preparing the report.

My thanks are also to all the scientists of the institute for help in compiling and analyzing data for preparing manuscript and bringing out the Annual Report. The contribution of all other staff of this institute is duly acknowledged.

Kolkata 25.07.2016 Director

CONTENTS

Sl. No.	Particulars	Page No.
	कार्यकारी सारांश	i
	Executive Summary	iii
1.0	Organizational structure and Staff position	1
	1.1 Profile	1
	1.2 Budget Provision	2
2.0	Krishi Vigyan Kendras	4
3.0	About Agricultural Technology Application Research Institute (ATARI) Kolkata	8
4.0	Achievements	12
	4.1 On-farm Trial	12
	4.2 Frontline Demonstrations	30
	4.2.1 Oilseeds	30
	4.2.1.1 Kharif Oilseeds	30
	4.2.1.2 Rabi Oilseeds	31
	4.2.2 Pulses	32
	4.2.2.1 Kharif Pulses	32
	4.2.2.2 Rabi Pulses	33
	4.2.3 Other Crops	34
	4.3 Cluster Frontline Demonstrations	36
	4.4 Training Achievements	39
	4.4.1 Practising farmers	39
	4.4.2 Rural youth	47
	4.4.3 Extension functionaries	48
	4.4.4 Sponsored training programme	49
	4.4.5 Vocational training programme	51
	4.5 Extension Programmes	52
	4.5.1 Other extension activities	54
5.0	Production of Seed, Planting materials and Bio-products	55
	5.1 Seed	55
	5.2 Planting materials	57
	5.3 Bio-products	60
	5.4 Livestock production	60
6.0	Soil, Water and Plant sample analysis and 'World Soil Day' celebration	61
7.0	Scientific Advisory Committee	63
8.0	Publication by KVKs	63
9.0	Celebration of Technology Week by KVKs	64
10.0	Technological Backstopping by DEEs	65
11.0	Agricultural Technology Information Centre	66
12.0	HRD Programme	67
13.0	Revenue Generation	68
14.0	National Farmers Portal	69

CONTENTS

Sl. No.	Particulars	Page No.
15.0	Tribal Sub-Plan	70
16.0	Protection of Plant Varieties and Farmers Rights	72
17.0	National Innovations in Climate Resilient Agriculture	72
18.0	Pradhan Mantri Fasal Bima Yojana Kisan Sammelan	77
19.0	Pre-Kharif and Pre-Rabi Kisan Sammelan	78
20.0	Special Programmes	80
	20.1 Swachh Bharat Abhiyan	80
	20.2 Celebration of National Science Day	80
	20.3 Nehru Yuva Kendra	80
	20.4 BSF Personnel Training	81
	20.5 Incidence of Livestock Diseases	81
	20.6 Programme on Rural Agricultural Work Experience (RAWE)	82
	20.7 KVK in Rural School	82
21.0	Training and Capacity Building	83
22.0	राजभाषा	83
23.0	Krishi Unnati Mela 2016	84
24.0	Mera Gaon Mera Gaurav Programme	85
25.0	Diploma in Agricultural Extension Services for Input Dealers (DAESI)	89
26.0	Management Development Programme	90
27.0	Publications	91
28.0	Awards	93



कार्यकारी सारांश

त्नीय परियोजना निदेशालय का कृषि प्रौद्योगिकी अनुप्रयोग संस्थान (अटारी) के रूप में नवीनीकरण इस संस्थान के लिये एक बड़ा सुअवसर है जिससे इसके कार्यकलापों को एक नया आयाम दिया जा सकता है। इस नवीनीकरण के अंतर्गत भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली द्वारा पहले से तय की गई दायित्वों के निर्वाहन को यथावत रखते हुये इसकी वित्तीय, प्रशासनिक तथा प्रबंधन क्षमताओं में वृद्धि की गई है। संस्थान ने परिषद् के संस्थानों, राज्य कृषि विश्वविद्यालयों, राजकीय विभागों तथा अन्य भागीदारों के प्रति अपने दायित्वों को पूर्ण निर्वाह किया है जिससे इस क्षेत्र के कृषि विकास में उन्नति हुई है।

इस संस्थान का मुख्य उद्देश्य कृषि, सहकारिता एवं किसान कल्याण विभाग, कृषि एवं किसान कल्याण मंत्रालय के साथ सहयोगपूर्ण कार्यक्रमों की सहायता से विभिन्न राज्यों जैसे, बिहार, झारखंड और पश्चिम बंगाल के 80 कृषि विज्ञान केन्द्रों के माध्यम से तिलहन और दलहन कृषि संबंधी तकनीकों का प्रदर्शन करना है। इसके लिये वर्ष 2015–16 में संस्थान द्वारा राज्यों के कृषि विश्वविद्यालयों तथा उस क्षेत्र के कृषि विज्ञान केन्द्रों को रबी और राई के फसलों के प्रदर्शन के लिये लगातार प्रेरित किया गया जिसका परिणाम था, 4466.0 हे. क्षेत्र में मसूर, चना, मटर, हरे चने तथा काले चने की कृषि तथा 3365.0 हे. क्षेत्र में सफेद, पीली व काली सरसो, अलसी, मूंगफली, तिल तथा सूरजमुखी की कृषि। इसके लिये कृषि, सहकारिता एवं किसान कल्याण विभाग, नई दिल्ली ने दलहन कृषि के लिये 341.94 लाख तथा तिलहन कृषि के लिये 214.81 लाख की वित्तीय सहायता प्रदान किया तथा भाकृअनुप–अटारी के साथ मिलकर इस कार्यक्रम को सफल बनाने के लिये इसका लगातार अनुवीक्षण किया। इससे यह देखा गया कि नई बीजों और उन्नत तकनीकों की सहायता से तिलहन और दलहन फसलों के उत्पादन में वृद्धि की जा सकती है। पर साथ ही इन फसलों को संक्रमण का खतरा भी बना रहता है जिससे छोटे और गरीब किसानों को आर्थिक क्षति का सामना करना पडता है। इस स्थिति से निबटने के लिये एक विशेष मानव संसाधन विकास कार्यक्रम का शुभारंभ किया गया है जिसके अंतर्गत वनस्पति रक्षा/सस्य विज्ञान/ बागवानी क्षेत्रों के विशेषज्ञों को सम्मिलित किया गया है। इस योजना को भाकृअनुप–राष्ट्रीय समेकित नाशीजीव प्रबंधन (NC-IPM), नई दिल्ली ने प्रायोजित किया है। इस कार्यक्रम में 60 विशेषज्ञ तथा प्रगतिषील कृषकों ने भाग लिया।

मिट्टी की गुणवत्ता की जांच कर संबद्ध कृषकों को सॉयल हेल्थ कार्ड दिया गया है। चूंकि किसानों को सॉयल हेल्थ कार्ड देने और अपेक्षित उत्पादन प्राप्त करने के लिये मिट्टी में पोशक तत्वों को डालने का कार्य राज्य सरकारों के जिम्मे था पर भाकृअनुप–अटारी ने बिहार, झारखंड और पश्चिम बंगाल ने इस दिशा में कार्य किया है जिससे अधि ाक से अधिक किसानों को सॉयल हेल्थ कार्ड दिया जा सके। मिट्टी में पोषक तत्वों की मात्रा इस प्रकार से होना चाहिये जिससे इसकी गुणवत्ता पर कोई प्रतिकूल प्रभाव न पड़े। इसके लिये 68 कृषि विज्ञान केन्द्रों को मृदा परीक्षक उपलब्ध कराया गया है। इसके लिये अतिरिक्त लोगों को लगाया गया जिससे समय पर कार्य पूरा किया जा सके। अंतर्राष्ट्रीय सॉयल हेल्थ दिवस, 5 दिसम्बर 2015 के अवसर पर 21200 से भी अधिक किसानों को यह कार्ड बांटा गया। इस कार्यक्रम में अधि संख्या में जन-प्रतिनिधियों ने भी भाग लिया।

संस्थान में वर्ष 2015 में आरंभ हुआ 'मेरा गांव मेरा गौरव' कार्यक्रम से लगभग 20,000 वैज्ञानिक (इसमें विश्वविद्यालयों में कार्यरत वैज्ञानिक भी हैं) जुड़े हुये हैं जो नियमित तौर पर किसानों को उत्तम एवं नवीन कृषि संबंधी तकनीकों के बारे में बताते रहते हैं। चूंकि भाकृअनुप—अटारी इस कार्यक्रम का नोडल अधिकारी है, इसका कार्य भारतीय कृषि अनुसंधान परिषद् के अन्य 18 संस्थानों, उनके क्षेत्रीय केन्द्रों तथा राज्य कृषि विश्वविद्यालयों के साथ कार्यक्रम को सफल बनाने के लिये अंगीकृत गांवों को कृषि संबंध ी सूचनायें एवं अन्य सुविधायें उपलब्ध कराना है। इस दिशा में उपमहानिदेशक (कृषि सम्प्रसारन), भारतीय कृषि अनुसंधान परिषद, नई दिल्ली की अध्यक्षता में 'मेरा गांव मेरा गौरव' कार्यक्रम से जुड़े समस्त नोडल अधिकारियों की बैठक हुई है जिससे इस कार्यक्रम को सफल बनाने हेतु उचित मार्गदर्शन दिया जा सके।

भारतीय कृषि अनुसंधान परिषद⁄कृषि एवं किसान कल्याण मंत्रालय द्वारा आरंभ की गई खरीफ और रबी फसलों की बुआई से पहले किसान सम्मेलन का आयोजन किया गया जिससे किसानों की उत्तम फसल के लिये और भी जागरूक बनाया जा सके। कृषि विज्ञान केन्द्रों ने



इसके लिये बैठक, प्रदर्शनी, फिल्म शो, संगोष्ठी तथा ऐसी अनेक कार्यक्रमों को आयोजन किया जिसमें 176 जन प्रतिनिधियों तथा 47 हजार से अधिक किसान उपस्थित हुये।

संस्थान ने एक नई योजना, ''प्रधानमंत्री फसल बीमा योजना'' को 80 कृषि विज्ञान केन्द्रों के द्वारा क्रियान्वित किया। इसके साथ किसान सम्मेलन का भी आयोजन किया गया और किसानों को इस योजना से होने वाले लाभ को स्थानीय भाषा में तैयार लेख एवं वीडियो द्वारा अवगत कराया गया। इस कार्यक्रम में 50 हजार से अधि कि किसान उपस्थित थे तथा इसमें कुल 2429 सांसद / जन प्रतिनिधि और 7 केन्द्रीय मंत्रियों ने अपने वक्तव्य प्रस्तुत किये।

संस्थान ने 240 कृषि विज्ञान केन्द्रों द्वारा निकटवर्ती गांवों में जाकर स्वच्छ भारत अभियान को सफल बनाया।

पौधा किस्म और कृषक अधिकार संरक्षण प्राधिकरण, भारत सरकार देशी पौधों की किस्मों तथा कृषक अधिकार संरक्षण के लिये प्रयासरत है जिससे उत्पादन में वृद्धि हो सके और नई किस्मों के विकास के लिये सरकारी एवं निजी स्तर पर वित्तीय सहायता मिल सके। इससे कृषक एवं पौधों के ब्रीडर दोनों ही लाभान्वित होंगे। संस्थान ने इस दिशा में 39 कृषि विज्ञान केन्द्रों द्वारा जन जागरूकता कार्यक्रमों का आयोजन किया जिससे 7156 कृषक लाभान्वित होंगे। इसके लिये कुल चिन्हित फसलों के देशी किस्मों के पंजीकरण हेतु 1341 आवेदन पत्र प्राप्त हुये हैं।

संस्थान की उपलब्धियों में जनजाति कृषकों का विकास विशेष महत्वपूर्ण है। जनजाति उप—योजना के अंतर्गत 46 कृषि विज्ञान केन्द्रों ने कृषि, पशुपालन, मात्स्यिकी एवं प्रशिक्षण द्वारा आदिवासी क्षेत्रों में कार्य किया है। इसके लिये 535 लाख रू. व्यय हुये हैं। इसके अलावा, सामुदायिक उपयोग के लिये मूलभूत सुविधाओं को भी उपलब्ध कराया गया है। संस्थान की अन्य उपलब्धियों में केन्द्र सरकार के पेट्रोलियम संरक्षण कार्यक्रम और राष्ट्रीय विज्ञान दिवस आदि का सुचारू रूप से प्रचार; सीमा सुरक्षा बल के जवानों एवं नेहरू युवा केन्द्र के स्वयंसेवकों को कृषि व संबद्ध क्षेत्रों से संबंधित सूचनायें और प्रशिक्षण देना तथा 142 विद्यालयों के आवेदन पर विद्यार्थियों को कृषि संबंधी सूचनाओं का प्रसार आदि का विशेष स्थान है।

भारतीय कृषि अनुसंधान परिषद् द्वारा परिचालित कार्यक्रम, निक्रा—राष्ट्रीय जलवायु अनुकूल कृषि पहल को 17 कृषि विज्ञान केन्द्रों द्वारा जलवायु परिवर्तन से प्रभावित जिलों में आरंभ किया गया। इससे कृषि, मवेशी पालन तथा अन्य क्षेत्रों में जलवायु परिवर्तन के प्रभाव को कम करने वाली तकनीकों से होने वाले लाभ का पता चला है। इस कार्यक्रम के अंतर्गत वी सी आर एम सी आदि बनाये गये हैं।

इस संस्थान के मुख्य कार्यों में कृषि विज्ञान केन्द्रों का अनुवीक्षण, मूल्यांकन तथा मार्गदर्शन करना है जिससे इन केन्द्रों की कार्य क्षमता को उत्कृष्ठ बनाया जा सके। अतः संस्थान के मार्गदर्शन में कृषि विज्ञान केन्द्रों ने 5638 स्थानों पर 614 फार्म पालन संबधी परीक्षण किये हैं। लगभग 16014 हे. क्षेत्र में कृषि, मवेशी पालन, मात्स्यिकी, बत्तख पालन संबंधी तकनीकों का 61037 प्रदर्शन आयोजन किया गया। 3015291 किसानों ग्रामीण युवाओं तथा विस्तार कार्यकर्ताओं को प्रशिक्षण, दिया गया, 1970 प्रसार कार्यक्रमों द्वारा 514692 लोग लाभान्वित हुये, उत्तम गुणवत्ता वाली 42694 क्विंटल बीज, अनाज, दलहन तथा तिलहन की पैदावार हुई, 1934399 रोपन सामग्रियां मी पैढा किए गए, मिट्टी एवं जल के 52636 नमूनों का परीक्षण किया गया तथा प्रोद्योगिकी सप्ताह के दौरान 108797 किसान और विस्तार कार्यकर्ताओं लाभान्वित हुये हैं।

अतः संस्थान कृषि विज्ञान केन्द्रों के कार्यकलापों के अनुवीक्षण के साथ साथ प्रसार शिक्षा निदेशालयों के सशक्तीकरण के लिये भी प्रयासरत है।

संस्थान का प्रयास, जो कि विभिन्न स्टेकहोल्डरों के बीच समन्वय तथा संपर्क स्थापित करना है, कृषि विज्ञान केन्द्रों द्वारा तकनीकों के प्रचार—प्रसार को और भी गतिशील एवं सुदृढ़ बनाता है। पर साथ ही यह ध्यान देना है कि इन केन्द्रों में नियमित नियुक्ति किया जाय, प्रौद्योगिकी नियमित रुप से उपलब्ध कराया जाय एवं तृणमूल स्तर में समन्वय वनाया जाय ताकि तकनीकों को हर स्तर तक पहुँचा सकें और प्रोद्योगिकी प्रसार की प्रक्रिया को उन्नत बना सके।



EXECUTIVE SUMMARY

U pgradation of Zonal Project Directorate to ICAR-Agricultural Technology Application Research Institute with the financial, administrative and managerial power akin to other ICAR Institutes has created immense opportunity to re-orient its activities without compromising with the roles and responsibilities assigned by Indian Council of Agricultural Research, New Delhi. This Institute to prove its worth discharging multiferous responsibilities has renewed the working relationship with all the ICAR Institutes, State Agricultural Universities, concerned state departments and other stakeholders to lead the agricultural development process of this zone.

Collaborative programme with Department of Agriculture & Cooperation and Farmers' Welfare under Ministry of Agriculture and Farmers Welfare, Govt. of India was the prime initiative of ICAR-ATARI, Kolkata to implement clustered Frontline Demonstration on oilseed and pulse crops through 80 Krishi Vigyan Kendras of Bihar, Jharkhand and West Bengal. Continuous persuasion with all the State Agricultural Universities and KVKs of this zone enabled to go for this demonstration programme during rabi and rai-summer 2015-16. The programme was conducted in 4466.0 ha in pulse with lentil, chick pea, pea, green gram and black gram whereas 3365.0 ha was demonstrated through the oilseed crops like rapeseed & mustard, linseed, ground nut, sesame and sunflower. A fund support of Rs.341.94 lakh for demonstration on pulse crops and Rs.214.81 lakh for demonstration on oilseed crops was provided by DAC&FW, New Delhi. The performance of the demonstration programmes was monitored jointly with DAC&FW team and from ICAR-ATARI to ensure the success of this programme. It was observed that use of newly released varieties and application of improved technological package could increase the yield of pulse and oilseed crops substantially in this zone.

Large-scale infestation of disease and posts in the major cereals, pulses, oilseeds, cash crops, vegetables, fruit crops and other crops often leads to significant loss in production as well as profitability on the part of the small and marginal farmers. In combating the recurring situation, a specialized human resource development programme for the Subject Matter Specialists of Plant Protection/ Agronomy/Horticulture discipline was organized with technical expertise and fund support from NC-IPM, New Delhi. This programme was attended by more than 60 SMSs and progressive farmers to enrich themselves with all aspects of IPM.

Analysis of soil samples and issue of soil health card to the concerned farmers have been attributed highest priority at the appropriate level. Though the primary responsibility was vested with all the State Governments to ensure that farmers get Soil Health Card and apply recommended dose of nutrients to obtain desired yield without affecting soil health. ICAR-ATARI, Kolkata took the initiative to coordinate with the state departments of Bihar, Jharkhand and West Bengal so as to maximum number of farmers could obtain Soil Health Card. The KVKs of this zone were put into this endeavour by providing Mrida Parikshak to 68 KVKs for analysis of soil samples. Additional manpower was also provided to accomplish the set target of observing International Soil Health Day on the 5th of December, 2015 and providing Soil Health Card to more than twenty one thousand two hundred farmers to commensurate with celebration of International Soil Health Day, 2015. A good number of Public Representatives also participated in this programme in different KVKs and distributed Soil Health Card to the farmers.

Launching of Mera Gaon Mera Gaurav programme took place during 2015 to involve 20,000 scientists working under NARES including University scientists to get into touch with the farmers and apprise them of the newer development in the field of agriculture and allied sector. ICAR-ATARI, Kolkata being the Nodal Office of this programme for this zone collaborated with 18 ICAR Institutes, Regional Stations and State Agricultural Universities to adopt villages and visit the farmers to provide them information and other support. A meeting under the Chairmanship of Deputy Director General (AE), ICAR, New Delhi was also convened at this office to enlighten all the Nodal Officers of MGMG programme through interaction with DDG (AE).

Pre-Kharif and Pre-Rabi Kisan Sammelan was another initiative of ICAR/Ministry of Agriculture and Farmers Welfare which was celebrated across the zone to create large-scale awareness about improved agricultural and allied technologies among farmers and other stakeholders. The KVKs organized a number of programmes including meeting, film show, exhibition, seminar and other programmes for this purpose. The programme was attended by 176 Public Representatives and more than 47,000 farmers.

A newly launched programme namely Pradhan Mantri Fasal Bima Yojana was implemented by ICAR-ATRI, Kolkata through 80 KVKs of this zone. The programme was also followed by Kisan Sammelan to make the farmers aware of the importance and benefit of this scheme. Relevant literature in local vernacular and video were made available to KVKs for its distribution among the farmers. The essence of this programme was the participation of 2429 number of MP/MLA/Public Representatives and 7



Union Minister to address more than 50,000 farmers.

ICAR-ATARI, Kolkata also took part in the programme like Swachh Bharat Abhiyan as well as ensured its observance in the KVKs and nearby villages. The significance of 'Swachhta" in our day to day life was elaborated by the KVKs through 240 different programmes.

Preservation of indigenous plant varieties as a base for future research and protecting the rights of farmers nurturing such varieties over a considerable span of time as well as that of Plant Breeders and to stimulate investment for research and development both in public and private sector for the development of new plant varieties, Plant Protection Varieties and Farmers' Rights Authority, Govt. of India is actively carrying out programmes for the benefit of farmers and Plant Breeders. ICAR-ATARI, Kolkata as a part of this campaign conducted awareness programme through 39 selected KVKs of this zone for the benefit of 7156 farmers. Moreover, 1341 applications from this zone have been submitted for registration of indigenous varieties of the identified crops.

Development of tribal people is another area where this Institute has made noteworthy inroads. Under Tribal Sub-Plan, 46 KVKs are involved for the benefit of Scheduled Tribe through various agricultural and allied activities like farming, animal husbandry, fishery, vocational training etc. with the fund support to the tune of Rs.535 lakh. Besides, 4567 number of assets have also been created in the tribal villages for community use.

This Institute has been instrumental in implementing various Central Govt. Schemes and celebration of special event through KVKs like Petroleum Conservation programme, National Science Day and others. Alongside the KVKs are also providing training to BSF personnel and volunteers of Nehru Yuba Kendra to impart knowledge and skill in agriculture and allied fields. The KVKs under the guidance of ICAR-ATARI, Kolkata have also research the rural schools to infuse sense of pride among the young people about training. In the process, 142 schools were approached by 51 KVKs of this zone to provide preliminary knowledge about farming.

National Initiative on Climate Resilient Agriculture, a flagship programme of Indian Council of Agricultural Research, New Delhi has been implemented by 17 KVKs of this zone who fall under climatically vulnerable districts. The programme has not only showcased the benefit of climate resilient technologies in farming, livestock rearing and other areas but also infused a positive sense towards community approach. Formation of VCRMC and custom hiring centres under this progamme has been lauded by all concerned.

Monitoring, evaluation and guidance provided to the KVKs as the core activity of this Institute have brought visible improvement in the performance of KVKs. The output of mandated activities of KVK in all fronts clearly indicates greater reach of KVKs among the farming community. The KVKs conducted 614 on-farm trials in 5638 different locations to provide technological solution in farming, livestock, fishery and other sectors, brought 16014.0 ha under frontline demonstration through 61037 programmes, imported training to 305291 farmers, rural vouths and extension functionaries, organized 1970 extension activities for 514692 beneficiaries, produced 42694 q of quality seeds of major cereals, pulses and oilseeds and 1934399 number of planting materials, analyzed 52636 soil and water samples and celebrated technology week for the benefit of 108797 farmers and extension officials.

ICAR-ATARI is also strengthening the Directorates of Extension Education for providing technological backstopping to the KVKs and overseeing the activities of KVKs.

Coordination and linkage established with various stakeholders have immensely helped this Institute to effectively fulfill its duties and responsibilities towards improvement in KVK system and linking research and extension system to foster technology generation and dissemination process. However, the areas like recruitment of staff in KVKs regular backstopping of technology and convergence at the grass-root level to avoid repetition of efforts need to address at the appropriate level to make the process of technology dissemination a fruitful one.

1. ORGANIZATIONAL STRUCTURE AND STAFF POSITION

I ndian Council of Agricultural Research, New Delhi elevated the status of all Zonal Project Directorates to Agricultural Technology Application Research Institutes (ATARI) during 2015-16 owing to multi-purpose activities carried out by this institute. Accordingly, ICAR-ATARI, Kolkata in the line of other seven ATARIs has been entrusted with the following role and responsibilities:

- Formulate, implement, monitor and evaluate strategies on technology assessment and demonstration for its application and capacity development in the respective zones.
- Initiate, plan, coordinate and execute the extension research to support and improve technology dissemination system.
- Link KVK efforts to strengthen approaches viz. Consortium, convergence, public-private-partnership, farmer-led and market-led extension in the zone.
- Dovetail technology application programmes by coordinating and fostering linkages with technology generation and delivery system and other stakeholder of agriculture development in the zone.
- Coordination with different host organizations.
- Conducting HRD programmes.
- Compilation and submission of reports, case studies.
- Documentation of technological inventory of zone.
- Creation of agro-climatic zone wise date base and

impact analysis.

- Perspective plan.
- Monitoring of infrastructural development and utilization.
- Staffing, budgeting and funding.

In accomplishing the assigned responsibilities, ICAR-ATARI, Kolkata has actively collaborated with ICAR Agricultural Institutes. State Universities. State Departments and other stakeholders to guide, evaluate and monitor the activities of 83 KVKs under the jurisdiction of this institute spread across the Union Territory of A&N Islands and the States of Bihar, Jharkhand and West Bengal. In addition, ICAR-ATARI, Kolkata is also strengthening six Directorates of Extension Education of the SAUs of this zone to more effectively monitoroversee the performance of KVKs as well as providing technological backstopping.

1.1 PROFILE

ICAR-ATARI, Kolkata is functioning as an integral part of Division of Agricultural Extension, New Delhi headed by the Deputy Director General (AE). All the SMDs in ICAR including Division of Agricultural Extension convert under the office of Secretary (DARE) and Director General (ICAR). The organizational structure of ICAR-ATARI, Kolkata is depicted below through a concise chart.



83 KVKs and 6 Directorates of Extension Education of the SAUs of this zone. In the process, a sum of Rs 7693 lakh has been released during 2015-16 from Assessment of budget requirement, placing demand for fund and releasing fund are the most important activities of ICAR-ATARI, Kolkata to run the institute, ICAR-ATARI, Kolkata. Head-wise details are as follows:

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ZPD/KVK			Recu	rring				No	n-Recurr	ing		Revol.	Grand
	Ρ&Α	T.A.	H.R.D	Cont.	TSP Cont.	Total	Equip. &furn	Works	Lib.	Vehicle	Total	Fund	total
ICAR-ATARI, Kolkata	175.00	11.10	0.82	38.08	0.00	225.00	0.00	3.21	0.00	4.75	7.96	0.00	232.96
State Agricultural University													
BAU, Sabour, Bihar (20)	1441.86	20.50	1.20	261.30	0.00	1724.86	35.00	0.00	0.00	24.00	59.00	0.00	1783.86
RAU, Pusa, Bihar (11)	572.21	11.50	0.00	143.00	0.00	726.71	15.00	0.00	0.00	13.20	28.20	0.00	754.91
BAU, Ranchi, Jharkhand (16)	742.33	16.00	0.00	42.00	172.50	972.83	76.72	36.83	0.00	18.60	132.15	0.00	1104.98
UBKV, Coochbehar, West Bengal (5)	403.35	5.00	0.00	50.00	20.00	478.35	32.00	0.00	0.00	6.00	38.00	0.00	516.35
BCKV, Nadia, West Bengal (3)	282.39	3.00	0.00	33.50	11.00	329.89	06.0	3.00	0.00	3.60	7.50	0.00	337.39
WBUA&FS, Kolkata (3)	209.18	3.00	0.00	29.00	12.00	253.18	06.0	0.00	0.00	3.60	4.50	0.00	257.68
ICAR													
CIARI, A&N Islands (3)	230.00	4.00	0.00	25.00	15.00	274.00	12.50	0.00	0.00	2.40	14.90	0.00	288.90
ICAR RCER, Patna, Bihar (2)	113.80	2.00	0.00	21.50	6.00	143.30	9.10	0.00	0.00	7.15	16.25	0.00	159.55
CRRI, Cuttack, Orissa (1)	49.82	1.00	0.00	8.60	6.50	65.92	0.30	0.00	0.00	1.20	1.50	0.00	67.42
IINRG, Ranchi (1)	0.00	1.00	0.00	0.00	12.00	13.00	10.80	0.00	0.00	5.95	16.75	0.00	29.75
CRIJAF, West Bengal (1)	96.50	1.00	0.00	12.00	4.00	113.50	0.30	0.00	0.00	1.20	1.50	0.00	115.00
Central University, West Bengal (1)	126.71	1.00	0.00	11.00	4.00	142.71	15.30	0.00	0.00	1.20	16.50	0.00	159.21
Deemed University, RKMVU, West Bengal (1)	95.00	1.00	0.00	12.50	4.50	113.00	3.30	65.29	0.00	1.20	69.79	0.00	182.79
State Govt. Undertaking													
SCADA, Bihar (1)	89.61	1.00	0.00	13.00	0.00	103.61	0.30	0.00	0.00	1.20	1.50	0.00	105.11
WBCADC, Kolkata (1)	39.07	1.00	0.00	10.00	4.00	54.07	0.30	0.00	0.00	1.20	1.50	0.00	55.57
NGO													
Bihar (5)	400.54	5.00	0.00	59.00	10.00	474.54	21.50	5.00	0.00	6.00	32.50	0.00	507.04
Jharkhand (5)	481.10	5.00	0.00	23.00	54.00	563.10	39.50	0.00	0.00	6.00	45.50	0.00	608.60
West Bengal (3)	314.53	3.00	0.00	32.50	14.50	364.53	2.10	0.00	0.00	2.40	4.50	0.00	369.03



ZPD/KVK			Recu	rring				No	n-Recurr	ing		Revol.	Grand
	P & A	T.A.	H.R.D	Cont.	TSP Cont.	Total	Equip. &furn	Works	Lib.	Vehicle	Total	Fund	total
Strengthening of DEEs													
DEE, BAU, Sabour, Bihar	0.00	1.50	5.00	8.25	0.00	14.75	0.00	0.00	0.00	0.00	0.00	0.00	14.75
DEE, RAU, Pusa, Bihar	0.00	0.75	3.00	6.00	0.00	9.75	0.00	0.00	0.00	0.00	0.00	0.00	9.75
DEE, BAU, Ranchi, Jharkhand	0.00	1.00	4.00	6.50	0.00	11.50	0.00	0.00	0.00	0.00	0.00	0.00	11.50
DEE, UBKV, Coochbehar, WB	0.00	0.75	2.00	5.00	0.00	7.75	0.00	0.00	0.00	0.00	0.00	0.00	7.75
DEE, BCKV, Nadia, WB	0.00	0.75	2.50	4.50	0.00	7.75	0.00	0.00	0.00	0.00	0.00	0.00	7.75
DEE, WBUA&FS, Kolkata, WB	0.00	0.65	2.00	2.75	0.00	5.40	0.00	0.00	0.00	0.00	0.00	0.00	5.40
GRAND TOTAL	5863.00	101.50	20.52	857.98	350.00	7193.00	275.82	113.33	0.00	110.85	500.00	0.00	7693.00

ICAR-ATARI KOLKATA





2. KRISHI VIGYAN KENDRAS

Krishi Vigyan Kendra plays an intermediary role between agricultural research and extension. At the grass-root level of all rural districts in the country. Krishi Vigyan Kendra are in operation with a set of objectives to provide technological and information support to the farming community. Under the jurisdiction of ICAR-ATARI, Kolkata, 84 KVKs are working, administrative control of which is vested with different host organizations. The KVKs of Zone-II are primarily involved in technology assessment and refinement, conducting frontline demonstrations, providing training to farmers, youths and extension personnel, extending technical expertise to various central/state agencies and collaborating with state extension mechanism for large-scale dissemination of proven technologies for the benefit of the farmers. Many central and state government programmes aimed at the benefit of farming community are implemented through KVKs.

STATE-WISE DISTRIBUTION OF KVK

In Zone-II, 84 KVKs are presently in operation out of proposed 86 KVKs. In Bihar, 38 KVKs, Jharkhand 24 KVKs, West Bengal 18 KVKs and in A&N Islands, 3 KVKs and one KVK under Lakshadweep are functioning with their delineated role and responsibility. Host organizationwise distribution of the KVKs in Zone-II indicates that 58 KVKs are under SAUs, 8 under ICAR Institutes, 13 under NGOs, 2 under Govt. undertaking and 1 each under Central University and Deemed University. The details of state-wise and host organization-wise distribution of KVKs in Zone-II are given in the following tables:

Table: State wise status of Krishi Vigyan Kendras

Name of the	No. of Districts			No.	of KVK	s under			TOTAL
State		SAU	ICAR	DU	CU	NGO	SDA	Oths	
Bihar	38	31	1			5	1		38
Jharkhand	24	16	3			5	-		24
West Bengal	20	11	1	1	1	3	1		18
A&N Islands	3		3						3
Lakshadweep	1		1						
Total	86	58	9	1	1	13	2		84

ICAR – Indian Council of Agricultural Research, SAU – State Agricultural University, DU- Deemed University, CU- Central University, NGO – Non-Governmental Organization, SDA- State Department of Agriculture

Table: Host organization wise distribution of Krishi Vigyan Kendras

Sl. No.	State/UT	Host Institution	Total
1.	A & N Islands(3)	Central Agricultural Research Institute, (ICAR) Port Blair	3
2.	Bihar (38)	Rajendra Agricultural University, Pusa, Samastipur	11
		Bihar Agricultural University , Bhagalpur	20
		ICAR Research Complex for Eastern Region, Patna	1
		Sone Command Area Development Agency, (SDA) Bhojpur	1
		Shrama Bharti, Khadigram, Jamui (NGO)	1
		Vanavasi Seva Kendra, Bhabhua, Kaimur (NGO)	1
		S.K. Chaudhary Educational Trust, Madhubani (NGO)	1
		Gram Nirman Mandal, Nawada (NGO)	1
		Samata Seva Kendra, Sitamarhi (NGO)	1
3.	Jharkhand (24)	Birsa Agricultural University, Kanke, Ranchi	16
		Central Rice Research Institute, (ICAR) Cuttack	1
		Ram Krishna Mission Ashram, Ranchi (NGO)	1
		Holy Cross, Hazaribag (NGO)	1
		Vikas Bharati, Gumla (NGO)	1
		Santhal Paharia, Deoghar (NGO)*	1

ICAR-ATARI KOLKATA



Sl. No.	State/UT	Host Institution	Total
		Garmin Vikas Trust, Godda (NGO)	1
		Indian Institute of Resins and Gum, Namkum, Ranchi	1
		ICAR Research Complex for Eastern Region, Patna	1
4.	West Bengal (18)	Bidhan Chandra Krishi Viswavidyalaya, Nadia	3
		Uttar Banga Krishi Viswavidyalaya, Coochbehar	5
		West Bengal University of Animal & Fishery Sciences, Kolkata	3
		Visva Bharati, Bolpur, Santiniketan (CU)	1
		Central Research Institute for Jute and Allied Fibres, (ICAR) Barrackpore	1
		W.B. Comprehensive Area Development Corporation, (SDA) Kolkata	1
		Kalyan, Purulia (NGO)	1
		Seva Bharati, West Midnapore (NGO)	1
		Rama Krishna Ashram, South 24-Parganas (NGO)	1
		Ram Krishna Mission Vivekananda Universty, Belur Math	1
5	Lakshadweep (1)	ICAR- Central Agricultural Research Institute, Portblair	1
	Total		84

*Presently under state administration.

GROWTH OF KVKS IN ZONE-II

The first KVK in Zone-II and the 2nd in the entire country was established in Midnapore district of West Bengal in the year 1974 under the administrative control of Seva Bharti, an NGO. The number of KVKs was increased in this zone during subsequent Five Year Plans and Annual Plans. However, most number of KVKs (44) established in this zone during X Five Year Plan followed by VIII Five Year Plan (16 no.), XI Five Year Plan (8 no.) and XII Plan (3 no.). In this zone, all the rural districts are having KVKs except in East Midanpore district of West Bengal. This zone has been sanctioned three additional KVKs also owing to larger size of the districts namely, South 24 Parganas, Burdwan and Murshidabad of which additional KVK in South 24 Parganas district of West Bengal has become functional. As per the decision of Govt. of India, 6 additional KVKs in Bihar and 10 in West Bengal are likely to establish in near future. Plan-wise growth of KVKs in this zone is shown in the following graphs:





Mandate: The mandate of Krishi Vigyan Kendras is to assess, refine and demonstrate technologies/products to cater to the needs of farming community, extension personnel and other stakeholders in the district. In order to accomplish the aim, KVKs carry out the following activities:

- Conduct on-farm trials to identify the location specificity of agricultural technologies under various farming systems.
- Organize frontline demonstrations to establish production potential of various crops and enterprises on the farmers' fields.
- Organize need based training for farmers to update their knowledge and skills on modern agricultural technologies and provide training to extension personnel to orient them in the frontier areas of technology development.
- Oreate awareness about improved agricultural technologies among various clientele groups through appropriate extension programmes.
- Produce quality seeds, planting materials, livestock breeds, animal products, bio-products etc. as per the demand and supply the same to different clienteles.
- Work as knowledge and resource centre of agricultural technologies to support the initiatives of public, private and voluntary sectors for improving the agricultural economy of the district.

Manpower: Staff strength provided to each KVK was 16 which includes one Programme Coordinator, six Subject Matter Specialists, three Programme Assistants, two administrative staff, two drivers and two supporting



staff. Accordingly, the total sanctioned staff for 83 KVKs of Zone II is 1328, out of which 996 (75 per cent) are **Table: Staff position in KVK**

in position. Details of state wise and category wise staff strength of KVKs are furnished in the following table:

Category	I	BIHAR	1	JHA	ARKHA	AND	WEST	Γ BEN	GAL	A 8	x N IS	LANDS	1	OTAL	
	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V
Programme Coordinator	38	28	10	24	7	17	18	14	4	3	2	1	83	51	32
Subject Matter Specialist	228	171	57	144	99	15	108	76	32	18	14	4	498	360	108
Prog. Assistant	114	83	31	72	44	28	54	37	17	9	3	6	249	169	80
Admin.	76	63	13	48	26	22	36	26	10	6	4	2	166	119	47
Auxilary	76	63	13	48	33	15	36	32	4	6	5	1	166	133	33
Supporting	76	78	0	48	43	5	36	41	0	6	2	4	166	164	2
Total	608	486	124	384	252	102	288	226	67	48	30	18	1328	996	302





REVOLVING FUND

Since the KVKs has been provided revolving fund as one time seed money for making KVK farm self sufficient in terms of resources through seed/ sapling production, use of ponds for fish production and establishment of horticulture orchards. Income generated was used for improvement of the farm. Revolving fund reported by 66 KVKs of Zone-II where revolving fund scheme is operating accumulated a net balance was Rs. 10.18 crore as on 1st April, 2016. In the year 2015-16, a substantial amount of fund i.e. 8.262 core was generated by the KVKs of Zone II through revolving fund scheme. As per state is concerned, Bihar KVKs earned the amount of Rs. 282.46 lakh, West Bengal of 430.11 lakh and Jharkhand of Rs. 113.69 lakh through this scheme in the year 2015-16. The detail status of revolving fund of KVKs under Zone II has been presented in table

State	Year	Opening balance as on 1 st April	Income during the year	Expenditure during the year	Net balance in hand as on 1 st April of each year
Bihar	2013-14	30064165	29651610	25027859	36003613
	2014-15	35848876	32199702	24582480	37079426
	2015-16	44716731	28246542	24438288	46522183
Jharkhand	2013-14	5193100	6871068	6255183	6300492
	2014-15	5985345	7689084	6321527	7659169
	2015-16	6101265	11369122	9513049	10073517
West Bengal	2013-14	11050862	19319972	15588133	20469979
	2014-15	20819648	25216945	25095113	26407927
	2015-16	28040060	43011633	28468220	45236743
Total	2013-14	46308127	55842650	46871175	62774084
	2014-15	62653869	65105731	55999120	71146522
	2015-16	78858056	82627297	62419557	101832443

Table: Detailed status of revolving fund of KVKs under zone-II

Infrastructure facilities: In order to enable the KVKs to accomplish its set objectives, KVKs have been provided with number of infrastructure facilities like administrative building, farmers' hostel, staff quarter, demonstration unit, soil and water testing laboratories, rain water harvesting structure with micro-irrigation facilities, portable carp hatchery, IFS model, E-connectivity, vehicles etc. In most of the cases, KVKs utilize the facilities for the cause of the farmers to demonstrate the benefit of proper management practices. The details of infrastructure facilities available with the KVKs are given in Table. No additional infrastructure was provided to KVK in last financial year.

Table: State-wise details of infrastructureavailable with KVKs

SI. No.	Infrastracture	A&N Islands	Bihar	Jhar- khand	West Bengal	Total
1	Administrative Building	1	37	21	17	76
2	Farmers Hostel	1	37	22	17	77
3	Staff Quarter	1	37	21	15	74
4	Demonstration Unit	2	51	35	32	120
5	Rain water harvesting		1	19	6	26

Sl. No.	Infrastracture	A&N Islands	Bihar	Jhar- khand	West Bengal	Total
6	E-connectivity	1	5	4	5	15
7	Soil & water testing	1	24	16	13	54
8	Portable carp harchery	1	1	2	8	12
9	Minimal procesing unit			1	3	4
10	Plant Health diagnostic facilty		8	10	8	26
11	Integrated farming system		7	6	9	22
12	Jeep	3	38	22	18	81
13	Tractor	1	38	22	18	79
14	Two wheeler	2	0	1	0	3

Thrust area: Thrust areas are identified based on the prevailing agro-ecological situation, existing cropping pattern and farming systems and expectation of the district economy on agriculture. Accordingly, KVKs are working on the following thrust areas:

Productivity enhancement of cereals, pulses and oilseeds



- Crop diversification and development of alternate land use system
- Establishment of farming system in the region
- Use of resource conservation technology
- Major initiative to combat climate change in the region.
- Contingency planning for monsoon
- Initiative for growth of fodder technology
- Water harvesting and watershed management
- Integrated nutrient, pest and disease management
- Production of quality inputs like seed of major crops,

planting materials etc. and breeds of livestock

- Empowerment of women in terms of improved nutrition, income and drudgery reduction through technological literacy
- Value addition, processing and market facilitation of household and commercial enterprises
- Small scale mechanization for reducing cost and drudgery
- Capacity building among rural youths towards selfemployment

3. ABOUT AGRICULTURAL TECHNOLOGY APPLICATION — Research institute (Atari), Kolkata

The network of 645 Krishi Vigyan Kendras spread across the country is the part of Division of agricultural Extension of ICAR. Deputy Director General (AE) who looks after the administrative, financial and overall functioning of KVK. Agricultural Technology Application Research Institutes (ATARIs) are looking after monitoring the KVK system in the state and district level. The Division of Agricultural Extension of ICAR is supported by eight erstwhile Zonal Project Directorates (now Agricultural Technology Application Research Institutes (ATARIs). The objective of the Institute is to plan, monitor, evaluate and guide and monitor the programmes of the KVK and judge the performance of KVKs time to time.

Genesis: The Zonal Project Directorate (erstwhile Zonal Coordinating Unit), Zone-II began its journey from the office premises located within the Directorate of Extension Education Complex of B.C.K.V., Mohanpur, Nadia, West Bengal with the specific objective to monitor and evaluate the Lab to Land Programme (LLP), country wide launched in the year 1979 in celebration of the ICAR Golden Jubilee Year and drawing fund support from the Cess Fund of ICAR. Alongside, it was entrusted with the responsibility to monitor and guide the activities of KVKs which were gradually coming up that time with great future promise as District Level First Line Agricultural Institutions. The initial operational jurisdiction of the Unit was spread over West Bengal, Orissa and A&N Islands. However, due to demanding administrative reasons, the state of Bihar was subsequently brought under the fold of Zone-II in the year 1991 in lieu of Orissa, which was then shifted under Zone VII. The jurisdiction of ZPD was further extended to include the newly created state of Jharkhand in the year 2000. After ten years of its operation from B.C.K.V., the office of the then ZPD-II was shifted to Veterinary College Campus, Belgachia, Kolkata for required infrastructural facilities. However, conversion of Veterinary College in to West Bengal University of Animal and Fishery Sciences again necessitated the Unit to shift its office to NBSS&LUP Campus, Salt Lake, Kolkata in the year 1996. During those years of instability in office housing, nevertheless, the Unit went on widening its service domains creditably in the form of successful implementation of a score of ICAR supported programmes like Operational Research Project, National Demonstration and All India Coordinated Research Project on Scheduled Caste and Scheduled Tribe. Besides, special projects on Frontline Demonstrations under National Oilseed Production Programme (NOPP) and under National Pulse Production Programme (NPPP) were also carried out. Front Line Demonstrations on Farm Implements and Cotton were also initiated by this Unit in this Zone. Finally, the Zonal Coordinating Unit has been upgraded to Zonal Project Directorate in the pattern of other Project Directorates / Institutes of ICAR including administrative and financial power since 2009. The Directorate moved to its new administrative building in Salt Lake, Kolkata in 2013. Since July 2015, this Directorate has been renamed as Agricultural Technology Application Research Institute, Kolkata.

Mandate: The Agricultural Technology Application Research Institute, Kolkata functions to achieve the following mandates:

- Formulate, implement, monitor, guide and evaluate the programmes and activities of KVKs.
- Coordinate the work relating to KVKs and ATICs implemented through various agencies such as SAUs, ICAR institutes, voluntary agencies and development departments.



- Coordinate with State/Central Government organizations, financial institutions and other organizations for successful implementation of programmes.
- Partnering with Directorates of Extension Education of SAUs in assured technological backstopping to KVKs and appropriate overseeing of KVK activities.
- Strengthening the Directorates of Extension Education of SAUs with financial support.
- Save as feedback mechanism from the projects to research and extension systems.
- Implementing projects of ICAR like NICRA, NIFTD and others.
- Maintain close liaison with ICAR headquarter particularly with Division of Agricultural Extension for preparing reports, write ups and other important documents.

Staff: The Agricultural Technology Application Research Institute, Kolkata is having total sanctioned staff strength of 19, out of which 15 are filled up

Table:StaffstrengthofAgriculturalTechnologyApplicationResearchInstitute,Kolkata

Category	Sanctioned	Filled
Director (RMP)	1	1
Scientific	6	5
Technical	2	1
Administrative	8	7
Skilled Supporting Staff (Gr. II)	2	1
Total	19	15

INSTITUTE MANAGEMENT COMMITTEE

Institute Management Committee meeting for Agricultural Technology Application Research Institute, Kolkata was held on 22 December 2015. The members were apprised of the functioning of Agricultural Technology Application Research Institute, Kolkata, achievements and various initiatives taken to monitor the activities of the KVK. In the course of discussion initiative taken in the field of research and technological backstopping was also discussed. Suggestion of the members were taken for the effective functioning of the Institute. Approval for the proposed agenda items was also taken.

INITIATIVE OF AGRICULTURAL TECHNOLOGY APPLICATION RESEARCH INSTITUTE, KOLKATA TO ENHANCE THE VISIBILITY OF KVKS

Apart from regular activities, Agricultural Technology Application Research Institute, Kolkata also involved the KVKs in a number of flagship programmes based on the need of the district as well as availability of expertise and ability of KVKs to contribute towards growth of agriculture and allied sector. The major programmes being carried out through the KVKs include National Initiative on Climate Resilient Agriculture (NICRA), National Initiative on Fodder Technology Demonstration (NIFTD), Monitoring and Surveillance of Animal Diseases (MSAD), Strategic Deworming of Livestock (SDL), Nutritional Trial in Wheat and Maize (NTWM), Assessment of Suitable Cultivar of Wheat (ASCW), Preservation of Plant Varieties and Farmers' Rights (PPV&FR) etc. A brief about such initiatives is presented below.

NICRA

National Initiative on Climate Resilient Agriculture was initiated in this zone in 17 KVKs are involved. It includes interventions for crop production, natural resource management, livestock rearing and fish production etc. main objective was to cope up with the climatic stress which is common during last few years. The KVKs have constituted Village Climate Risk Management Committee (VCRMC) and established Custom Hiring Centres for improved farm implements and machinery which are the main attractions of the project. The VCRMC, generated a revenue of Rs. 8.43 lakhs, during 2015-16. Details of the achievements under the scheme are given in the report in the following chapters.

DEMONSTRATION ON FARM TOOLS AND IMPLEMENTS

Around 20 KVKs of the Zone are involved in demonstration on farm tools & implements

PROGRAMMES WITH CDB (FOCT)

In collaboration with Coconut Development Board, Ministry of Agriculture, Govt. of India to enable unemployed youths to undergo training programme at 11 KVKs of this Zone.

KISAN CHAUPAL

All the KVKs of Bihar are involved in Kisan Chaupal programme

PPVFR

In order to establish an effective system for the protection of plant varieties, the rights of farmers and plant breeders and also to encourage the development as well as cultivating new plant varieties, Government of India enacted *'The Protection of Plant Variety and Farmers Right Act'* during 2001 in India. Protection of the plant varieties under the Act accelerates agricultural development and stimulates investment for research and development for developing new plant varieties facilitating the growth of seed industry and also ensuring the availability of high quality seeds



including planting materials to the farmers. However, in the era of fast growing agricultural systems where advance biotechnological tools are being used for increasing the agricultural productivity for its full potential, it is very essential to judiciously use of available genetic resources and to protect the proper right of the farmers. In support, the KVKs of ICAR-ATARI, Kolkata conducted several programmes in their respective districts throughout the period of 2015-16 which was aimed in conserving, improving and making available plant resources for future use in favour of human kind. Out of total 85 training programmes organized in the Zone, Bihar organized 25, Jharkhand 31 and West Bengal 29. A total of 235 resource persons were involved in the training programme. In Bihar, 2389 farmers were participated whereas 2444 and 2332 farmers were participated from Jharkhand and West Bengal, respectively. Thirty nine KVKs from ICAR-ATARI, Kolkata (14 from Bihar, 13 from Jharkhand and 12 from West Bengal) were involved in PPVFR programme. During the period under report, 103 indigenous crop/ varieties from Bihar, 120 from Jharkhand and 293 from West Bengal were identified. A total of 1341 number of registration forms were filled up and submitted to the concerned authorities to register the varieties.

PD_ADMAS

The incidence of various livestock diseases was started reporting by the KVKs of ICAR-ATARI, Kolkata during the year 2013-14 in collaboration with National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI), Bengaluru. During the period under report, a substantial numbers of livestock especially cattle, buffalo, sheep, goat, pig, duck, poultry were affected by various diseases like Foot and Mouth Disease (FMD), Black Quarter (BQ), Haemorrahagic Septicaemia (HS), Peste des Petits Ruminants (PPR), Goat Pox, Ranikhet etc. which caused huge economic loss. The KVKs of this Zone reported the incidence of such outbreaks and conducted awareness and vaccination camps to control livestock diseases. Out of total 69515 vaccinated animals, 31991 animals were from Bihar, 13588 from Jharkhand and 23936 from West Bengal state.

TSP

46 KVKs of the Zone operated TSP scheme to ensure direct benefit to individual or family belonging to ST. The Tribal Sub-Plan (TSP) strategy was evolved for the rapid socioeconomic development of tribal people and for bridging the gap between their levels of livelihood to that of the general communities. During the year 2015-16, forty six KVKs of ICAR-ATARI, Kolkata were involved in this scheme. This Zone earmarked Rs. 535 lakhs under Tribal Sub-Plan for the period. The KVKs of ICAR-ATARI, Kolkata conducted various activities throughout the year which favoured the livelihood upliftment of tribal people. The scheme ensured the direct benefit to the individual or families belonging to schedule tribes adopting various agricultural and allied sectoral activities e.g. agricultural farming, horticulture, animal husbandry, fish production, vocational training and so on.

STRATEGIC DEWORMING OF LIVESTOCK

In collaboration with IVRI ERS, Kolkata, 4 KVKs of WB are involved for taking strategic deworming for livestock.

PROGRAMME WITH FAI

Trials and demonstration on fertilizer package/assessment in collaboration with FAI are undertaken in some KVKs of the zone.

SWACHH BHARAT ABHIYAN

As a part of mass movement of cleanliness, initiated by the Government of India, all the staff members of ICAR-ATARI, Kolkata including KVKs under this Zone picked up the broom to clean the dirt, garbage, debris, litters, other obnoxious/ unwanted materials from the office surroundings, roads, dwelling places etc. The KVKs of this Zone observed the cleanliness drive through sensitizing farmers/ villagers adopting the slogan "Neither litter, nor let others litter". A number of awareness programmes, sensitizing workshops and campaigns were carried out within KVKs and even in the remote villages for all categories of citizens. A sense of responsibility was evolved among the people to keep the environment clean. Scientists of KVKs made effort to train the people for making compost from different kinds of waste materials and also taught them in maintaining hygiene and sanitation in and around the houses. Fifty five KVKs under ICAR-ATARI, Kolkata conducted this abhiyan during last one year. State-wise data envisaged that Andaman & Nicobar Islands, Bihar, Jharkhand and West Bengal organized 45, 61, 63 and 71 programmes, respectively in various forms.

COLLABORATION TRAINING PROGRAMME WITH NEHRU YUVA KENDRA AND BORDER SECURITY FORCE

The training to the volunteers of Nehru Yuba Kendra (NYK) was a part of KVK activities during the year 2015-16. Various need based training programmes particularly on mushroom cultivation, bee keeping, vermi-composting, protected vegetable cultivation etc. were organized for the rural youths to enrich their knowledge and skills with latest available technologies in the field of agri-based enterprises which could help them in generating employment. In this light, 3 KVKs of Jharkhand state trained 135 persons and 12 KVKs of Bihar state trained 558 persons.



The scientists of KVKs of this Zone extended their hands in educating BSF personnel available in their respective districts on various agricultural technologies for increasing production through utilizing existing resources. They were trained for horticultural production, grafting techniques, honey production, hi-tech agriculture, livestock rearing, fish rearing and so on. The KVK also established very good liaison between army personnel and local civilians. During the period under report, four KVKs from Bihar state organized 13 training programmes to train 644 BSF personnel. On the other hand, one KVK of Jharkhand and 3 KVKs of West Bengal trained 160 and 192 BSF personnel, respectively in different areas.

KVK IN RURAL SCHOOL

Agriculture has always been an important factor in developing and sustaining of human society like India. Proper agricultural knowledge and skills, attitude and dedication of farming community are considered as the prerequisites for successful farming. New technologies are being developed and adopted to cope up with the changing agricultural scenario considering its potentiality, production and demand. Now-a-days, farmers are well aware of these technologies. But, the most unfortunate part is that the current generation of children and youths are rarely accepting agriculture as their dignified profession. Therefore, it has become very essential to properly educate the children at young stage about the importance and benefits of agricultural farming so that they can choose agriculture in their career. Fifty one KVKs of ICAR-ATARI, Kolkata made effort to motivate such young buds to inculcate the basic knowledge of agriculture through delivering lectures, showing audio visuals, distributing leaflets and pamphlets, group discussion, presentations, organizing quizzes etc. One hundred and forty two schools from Andaman & Nicobar Islands, Bihar, Jharkhand and West Bengal were approached for this activities. In Bihar, 63 programmes were conducted whereas in Jharkhand, West Bengal and Andaman & Nicobar Islands 59, 38 and 4 programmes, respectively were conducted during the year 2015-16.

CELEBRATION OF NATIONAL SCIENCE DAY

During the year 2015-16, the National Science Day was celebrated by a number of KVKs under ICAR-ATARI, Kolkata to popularise the benefits of scientific knowledge and its practical appropriation in day to day life. Eighteen KVKs i.e. 2 from Andaman & Nicobar Islands, 6 from Bihar, 4 from Jharkhand and 6 from West Bengal state observed National Science Day through organizing lectures, quiz competitions, debates, film shows, awareness camps, demonstrations, seminars, trainings, painting competitions etc. to inculcate the latest scientific knowledge on various issues related to agriculture, animal husbandry, fishery sciences and other day to day activities. Out of total 26 such different programmes, Bihar state conducted maximum programmes during the period. More than 1200 persons from different strata of the society participated in such programmes.

PRADHAN MANTRI FASAL BIMA YOJANA (PMFBY) KISAN SAMMELAN

Pradhan Mantri Fasal Bima Yojana (PMFBY) is a newly launched crop insurance scheme of the Union Government which has replaced the previously existed two crop insurance schemes- i) National Agricultural Insurance Scheme (NAIS) and ii) Modified NAIS. The scheme aims at supporting sustainable production in agriculture sector by way of - a) providing financial support to farmers suffering crop loss/damage arising out of unforeseen events, b) stabilizing the income of farmers to ensure their continuance in farming, c) encouraging farmers to adopt innovative and modern agricultural practices, and d) ensuring flow of credit to the agriculture sector which will contribute to food security, crop diversification and enhancing growth and competitiveness of agriculture sector besides protecting farmers from production risks. This team is advantageous over others with regards to premium rate of 1.5%, 2% and 5% for rabi, kharif and cash crops, respectivly In this regard, all the KVKs under ICAR-ATARI, Kolkata have been given responsibility to sensitize the farming community towards the new insurance and to create awareness on different other schemes like soil health cards, production of organic inputs and water use efficiency etc. through organizing PMFBY Kisan Sammelan. During the year 2015-16, 80 KVKs from this Zone organized the programme involving local MPs, MLAs and other public representatives of the concerned districts. From the Union Territory of Andaman and Nicobar Islands, total 559 farmers participated in the meeting and from Bihar, Jharkhand and West Bengal state, the number of participants was 28901, 16234 and 6357, respectively. In addition to total 2129 number of MPs, MLAs and other public representatives from different districts, 4 Central Ministers from Bihar and 3 Central Ministers from Jharkhand graced the occasion.

PRE-KHARIF AND PRE-RABI KISAN SAMMELAN

Under the banner of the Indian Council of Agricultural Research (ICAR), Ministry of Agriculture and Farmers' Welfare, the Pre-Kharif and Pre-Rabi Sammelan 2015-16 were organized by the KVKs of ICAR-ATARI, Kolkata to create awareness amongst the farmers and other stake holders about the latest agricultural technologies through using different extension methodologies and for wider publicity of the KVK. On the occasion, group meetings, film



shows, exhibitions, demonstrations, seminars, lectures etc. were arranged by the KVK personnel to enrich the farmers with agricultural knowledge for developing and adopting various strategies for the ensuing crop season. During the period under report, Pre-Kharif and Pre-Rabi sammelan were organized by 43 KVKs each from this Zone which involved 176 number of public representatives in the concerned district. A total of 47075 farmers got benefit from conducting such types of programmes.

4. ACHIEVEMENTS —

4.1 ON-FARM TRIAL

During 2015-16, a total of 83 KVKs of Zone-II conducted on-farm trials with an objective to assess and refine the technologies developed by different institutions in agriculture and allied sectors. Specifically prioritized area of assessing the technologies by KVKs sometimes demanded refinement of the technologies through either KVKs or the research institutions. The technologies, which were assessed and refined, included those in the areas of crop production, insect-pest and disease management, nutrient management, feed and fodder management, livestock production and health management, drudgery reduction, value addition and other areas. More than 20 thematic areas were identified for assessment and refinement of technologies and presented in following table.

Newly developed improved technologies related to crop production, livestock production, fish production, drudgery reduction and value addition etc. have been assessed to provide technological solution to the farming community pertaining to various aspects of agriculture and allied areas. During the year 2015-16, the KVKs conducted 614 on-farm trials in 5638 locations to assess and refine a total of 412 technologies. Among various thematic areas, technologies were tested in integrated nutrient management through 93 on-farm trials followed by integrated pest management (61 on-farm trials), integrated disease management (45 on-farm trials), weed management (41 on-farm trials), varietal evaluation (39 on-farm trials), value addition (32 on-farm trials) and others. In livestock sector, the highest number (57) of onfarm trial was conducted in the area of livestock production and management followed by Disease management (23 on-farm trials). State-wise analysis of on-farm trials conducted showed that 47 on-farm trials were conducted by KVKs of Bihar in integrated nutrient management, 28 by KVKs of Jharkhand and 15 by KVKs of West Bengal in the same thematic area. The other important areas for the KVKs of Bihar were integrated disease management (34 on-farm trials), integrated pest management (30 on-farm trials), weed management (26 on-farm trials), varietal evaluation and livestock production and management (20 on-farm trials each) etc. In Jharkhand, integrated nutrient management was the most important thematic area with 28 number of on-farm trials followed by integrated pest management (17 on-farm trials), livestock production and management (11 on-farm trials), integrated crop management (10 on-farm trials) and others. In West Bengal, Livestock production and management was the most important thematic area (24 on-farm trials) followed by integrated nutrient management (15 on-farm trials), integrated pest management and varietal evaluation (13 on-farm trials each), and fishery (11 on-farm trials) etc. The performance of the technologies has also been brought to the notice of research and extension wing for their effective dissemination in the entire zone. Some of the on-farm trials conducted by the KVKs are presented below with table, photographs and relevant information.

Thematic Areas	A & N Is	A & N Islands Bihar Jhark		Jharkh	Jharkhand West Bengal		engal	Total		
	No. of locations	No. of OFT	No. of locations	No. of OFT	No. of locations	No. of OFT	No. of locations	No. of OFT	No. of locations	No. of OFT
Integrated Crop Management (ICM)	19	3	129	13	97	10	27	3	272	29
Integrated Disease Management (IDM)	8	2	316	34	10	1	68	8	402	45
Integrated Nutrient Management (INM)	20	3	431	47	244	28	122	15	817	93
Integrated Pest Management (IPM)	10	1	253	30	162	17	111	13	536	61
Varietal Evaluation (VE)	0	0	178	20	65	6	133	13	376	39

Table: State-wise no. of on-farm trials conducted by the KVKs

Annual Report 2015 - 16

ICAR-ATARI KOLKATA



Thematic Areas	A&NI	slands	Biha	Bihar		and	West Bengal		Total	
	No. of locations	No. of OFT								
Weed Management (WM)	5	1	245	26	79	8	42	6	371	41
Storage Technology (ST)	0	0	8	1	0	0	20	2	28	3
Value Addition (VA)	7	1	193	19	64	7	53	5	317	32
Resource Conservation Technology (RCT)	5	1	169	18	10	1	14	2	198	22
Integrated Farming System (IFS)	0	0	0	0	0	0	24	3	24	3
Drudgery Reduction (DR)	0	0	7	1	10	1	8	1	25	3
Farm Implements & machineries (FIM)	0	0	60	7	24	3	10	1	94	11
Food and nutrition ((F&N)	0	0	20	2	70	7	34	5	124	14
Others	5	1	381	38	251	29	198	24	835	92
Total	79	13	2390	256	1086	118	864	101	4419	488
Production and Management (P&M)	9	2	196	20	108	11	235	24	548	57
Nutrient Management (NM)	10	2	0	0	0	0	0	0	10	2
Fishery	17	3	60	7	8	1	112	11	197	22
Feed and fodder	10	1	82	9	0	0	65	4	157	14
Breed Evaluation (BE)	0	0	0	0	12	1	58	5	70	6
Disease management	0	0	142	14	30	3	52	6	224	23
Total	46	8	480	50	158	16	522	50	1206	124
Enterprise	0	0	0	0	6	1	7	1	13	2
Grand total	125	21	2870	306	1250	135	1393	152	5638	614

BIHAR

KVK Begusarai

Thematic area: Integrated Nutrient Management

Effect of Fe and Zn along with various sources and rate of NPK on performance of paddy cultivation under aerobic condition

Under paddy-paddy production system with medium land, loam soil and assured irrigation condition of Begusarai district, a serious concern arose with improper and imbalanced use of fertilizers in aerobic rice, coupled with Fe and Zn deficiency. To address this issue, a field trial was carried out by KVK Begusarai at 6 different locations for assessing the efficacy of foliar application of Fe and Zn at different crop stages along with use of vermicompost and application of NPK. It was evident from the trial that higher yield advantage and efficient resource utilization can be achieved if rice is grown as aerobic rice in Begusarai district with two foliar sprays of FeSO4 1% and ZnSO4 0.5% alongwith 100% recommended dose of NPK.

Table: Effect of various doses of fertilizers on yield attribute and yield of rice

Technology option Yield component			ent	Yield	Cost of	Gross	Net	B:C
	Panicles/m ²	No. of grans per panicle	Test wt. (1000 grain wt.)	(q/ha)	cultivation (Rs./ha)	return (Rs/ha)	return (Rs./ha)	ratio
FP: Farmers' practice (Imbalance use of fertilizers & excessive use of urea)	229.91	48.96	24.27	36.27	34649	58032	23383	0.67
TO-I: Recommended Dose of Fertilizers(RDF)	237.02	49.64	24.52	38.54	28539	61664	33125	1.16



Technology option		Yield compone	ent	Yield	Cost of	Gross	Net	B:C
	Panicles/m ²	No. of grans per panicle	Test wt. (1000 grain wt.)	(q/ha)	cultivation (Rs./ha)	return (Rs/ha)	return (Rs./ha)	ratio
TO-II: 75% Of Recommended Dose of Nitrogen+100% Recommended Dose of PK+ Vermicompost 2t/ha	246.27	52.13	25.10	39.31	38239	62896	24657	0.64
TO-III: 25%N+100% PK of RDF)	249.13	52.70	25.20	39.69	28539	63504	34965	1.23
TO-IV: RDF + (one foliar spray of NPK@1%+FeSO4@1%) ZnSO4 0.5%)	260.40	54.20	25.60	41.99	31362	67184	35822	1.14
TO-V: RDF+ two foliar spray of ZnSO4@ 0.5%	258.90	53.30	25.40	40.16	30739	64256	33517	1.09
TO-VI: RDF+ two foliar spray of FeSO4@1%	270.30	58.10	25.80	43.23	29885	69168	39283	1.28
TO-VII: RDF + (two foliar spray of FeSO4@ 1% + ZnSO4@ 1%) 0.5%)	275.60	60.40	26.10	44.61	31285	71376	40091	1.31
CD (P=0.05)	14.11	5.96	1.09	22.1				

KVK East Champaran

Thematic area: Weed management

Integrated weed management in turmeric

Economic loss due to decreased turmeric production has been attributed to severe weed infestation. An OFT on integrated weed management was conducted by KVK East Champaran during Kharif, 2015-16 at 10 different locations using the turmeric variety, Rajendra Sonia. The trial showed that TO-II, i.e., application of Metribuzin @0.7kg/ha with one weeding at 60 DAS was found to be the most effective weed management technique which recorded maximum yield of turmeric (285q/ha).

Table: Effect of various weed management techniques on yield of turmeric

Technology option	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	B:C ratio
FP: No application of weedicide only two weeding at 30 and 60 DAS	204	64000	277440	213440	4.33
TO-I: Application of Pendimethaline @ 1 kg/ha+ one weeding at 60DAS	236	55600	320960	265360	5.77
TO-II: Application of Metribuzin @0.7kg/ha+one weeding at 60DAS	285	58500	387600	329100	6.62

KVK West Champaran

Thematic area: Value Addition

Income generation of farm women by preparing value added product from aonla (*Phyllanthus emblica*)

Agro-processing sector of the Indian economy has vast potential for growth and socio-economic empowerment of women. The technology for preparation of health foods from aonla is simple and can be easily adopted by women either singly or in groups like SHG. So, for increasing consumption and marketability of the aonla, value addition is must. Aonla is nutritionally and medicinally important but its consumption in fresh form is negligible due to its high acidic and astringent taste. Secondly farm women have less opportunity for self-employment. Keeping this in view, a field trial was conducted by KVK West Champaran at 8 different locations to assess various techniques of value addition in aonla. Results revealed that value addition of aonla in the form of juice (TO-III) was the best among the available technologies in terms of acceptability and B:C ratio.



Table: Performance of locally prepared value added products from aonla

Technology option	Shelf life (month)	Acceptability of the product	Cost of Production (Rs./q)	Cost of Processing (Rs./q)	Gross return (Rs./q)	Net Return (Rs/q)	B:C ratio
FP: Farmers' practice (No value addition of aonla)	<1	Negligible	6742	NIL	1680	938	2.26
TO-I: Commercial value addition of aonla in the form of Chyavanprash	36	Good		Not Available	34800	-	
TO-II : Value addition of aonla at local level by preparation of health food.	>12	Good	12110	9850	34800	24950	2.87
TO-III : Value addition of aonla in the form of juice	>12	Good	12920	15400	68500	40180	5.30

KVK Vaishali

Thematic area: Resource Conservation Technology

Evaluation of different technologies for direct seeded Rice-Maize cropping system

In the existing production system of rice and wheat in Vaishali district, wheat is gradually being replaced by rabi maize due to late sowing of wheat. Conservation of soil moisture in the current rice-maize cropping system has been identified as a matter of concern. In order to address this aspect, KVK Vaishali conducted a field trial on different technologies for direct seeded rice-maize cropping system to evaluate their efficiency of conserving soil moisture at 7 different locations. It was evident from the trial that TO-II (maize sowing by zero tillage) yielded the highest with a B:C ratio of 3.07.

Table: Effect of various resource conservation technologies on yield of maize

Technology option	Yield component			Disease/	Yield	Cost of	Gross	Net	B:C
	No. of effective tillers/plant	No. of Cob per plant	Test wt. (100 grain wt. gm)	insect pest incidence (%)	(q/ha)	cultivation (Rs./ha)	return (Rs/ha)	return (Rs./ha)	1000
FP: Farmer's practice (Line sowing of Maize by dibbling)	01	02	22	15	40	50000	65000	15000	1.30
TO-I: Maize sowing by cultivator	01	02	28	09	52	42000	78000	36000	1.85
TO-II: Maize sowing by zero tillage	01	02	38	02	61	28000	86000	58000	3.07

KVK Bhojpur

Thematic area: Varietal evaluation

Evaluation of suitable wheat cultivar for late sown condition in paddy (long duration)-wheat cropping system

Under existing production system, harvesting of long duration paddy MTU-7029 resulted in delay in sowing of wheat. On the other hand, the widely grown wheat variety,

HUW-234, was a very old variety with comparatively low yield under late sown condition. Keeping this in view, KVK Bhojpur conducted a field trial on evaluation of suitable wheat cultivars for late sown condition in paddy (long duration)–wheat cropping system at 20 different locations. It was found that TO-I (Cultivation of late sown DBW-14) resulted in yield increase of 11.31% as compared to FP with a B:C ratio of 2.42.



Technology	Y	ield component		Yield	Cost of	Gross	Net return	B:C
option	No. of effective tillers/hill/m²	No. of spikelet per panicle	Test wt. (100 grain wt.)	(q/ha)	cultivation (Rs./ha)	return (Rs/ ha)	(Rs./ha)	ratio
FP: Farmers Practice i.e. cultivation of HUW 234	188	33.2	3.563	28.3	19530	42450	22920	2.17
TO-I: Cultivation of DBW-14	201	35.8	3.675	31.5	19530	47250	27720	2.42

Table: Comparative performance of different wheat varieties

Note: No. of farmers: 4(SC) +16(Others) =20 Male, Cost of Wheat Rs.1500/Qt.

KVK Sitamarhi

Thematic area: Fishery

Evaluation of various fish management techniques under paddy-cum-fish farming

Low income of fish farmers under the existing paddy-cumfish farming was identified as the most important problem in fish farmers of the district. In order to see the potential of income generation of the paddy-cum-fish farming along with composite fish farming, KVK Sitamarhi conducted a field trial at 5 different locations. The results showed that application of supplementary feed @ 2% of present biomass and present natural fish food in paddy field as insect, snails, larvae, plankton etc. was better than other tested technological options on the all parameters. The fish production was increased as pond culture in paddy-cumfish farming without disturbance of field.

Table: Effect of various fish management techniques under paddy-cum-fish farming

Technology option	Stocking time length of fish seed	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs. /ha)	B:C ratio
FP: Farmers practices (u se of occasionally supplementary feed and cow dung)	4-5 cm	11	47000	132000	85000	2.80
TO-I: 600 no. of IMC species stock and provide organic manure @ 10 tones/ha/year. 50% quantity of cow dung used before stocking and less quantity for 7 month @ 700 kg/ha./ month and @ 2% supplementary feed of present biomass in one time every day.	4-5 cm	15.12	54287	181440	127153	3.34
TO-II: Build corner trench in paddy field 3 feed deep and 12 feed wide and stock 4000 no of Indian major carp after 4 to 5 days of paddy transplantation. The deep water variety of paddy Swarna Sub-1 use for transplantation and @ 2% supplementary feed used of the present biomass.	4-5 cm	11.22+25 paddy	42400	134640 fish + 37500 paddy = 172140	116740	4.05

KVK Nawada

Thematic area: Nutritional Security of farm women

Evaluation of various nutritional supplements in iron deficiency among farm woman

To combat the problem of low haemoglobin content and body weight among farm women due to their ingestion of nutritionally poor diet, KVK Nawadah took up a field trial at 12 different locations for evaluating various nutritionally rich supplements. For improving the health status of the farm women, available nutritional supplements were used for this trial. It was found that TO-III, i.e., Diet containing dried leaves of *Moringa olifera* @ 10 gm /day/person was the best giving the increase in haemoglobin content by 7.43% and in body weight by 0.29 %.

Table: Efficacy of various nutritional supplements in iron deficiency among farm woman

Technology option	Bef	ore	Aft	er	% Increase		
	Haemoglobin (%)	Body weight (kg)	Haemoglobin (%)	Body weight (kg)	Haemoglobin (%)	Body weight (kg)	
FP: Farmers practice (Normal diet)	9.45	40.0	9.82	40.27	3.91	0.6	





Technology option	Bef	ore	Aft	er	% Increase		
	Haemoglobin (%)	Body weight (kg)	Haemoglobin (%)	Body weight (kg)	Haemoglobin (%)	Body weight (kg)	
TO-I: Diet containing green leafy vegetables @ 50 gm/day	8.85	39.75	9.3	39.87	5.08	0.3	
TO-II: Diet containing dried leaves of drumstick (<i>Moringa olifera</i>) @ 10 gm /day	8.47	40.05	9.10	40.62	7.43	0.29	

KVK Gopalganj

Thematic area: Integrated Pest Management

Management of shoot and fruit borer in okra

Shoot and fruit borer is the major pest of okra crops which adversely affects the crop yield and quality of the vegetable in Gopalganj district. To solve this problem, KVK Gopalganj carried out a multi-locational trial at 10 different locations. The technology tested was timely application of selective and efficient insecticides in okra crops for managing the infestation by shoot and fruits borer. All the treatments significantly reduced the pest incidence as compared to farmers practice. However, TO-II (Removal of infested shoots and fruits followed by spraying with Spinosad 45 EC @ 0.5ml/lt of water at 15 days interval significantly reduced the incidence of shoot (2.25%) and fruit damage (5.64%) and produced higher yield (126.89 q/ha) with highest B:C ratio (2.15).

Table: Efficacy of insecticides against shoot and fruit borer in okra

Technology option	Mean (%) of shoot damage	Mean (%) of fruit damage	Yield (q/ha)	Gross return (Rs/ha)	Cost of cultivation	Net Return (Rs/ha)	B:C ratio
FP: Farmer's practice (Chlorpyriphos 20 EC @ 1.5ml/lit of water)	6.41 (14.65)	15.92 (23.50)	90.12	108144	73848	34296	1.46
TO-I: Spraying of Nimbicidine (0.15%) @4.0 ml/lit of water followed by Novaleuran 10 EC@1.0 ml/lit of water at 15 days interval	3.37 (10.63)	9.86 (18.34)	112.68	135216	68562.00	66654	1.97
TO-II: Removal of infested shoots and fruits followed by spraying of Spinosad 45 EC@0.5ml/lit of water at 15 days interval	2.25 (8.72)	5.64 (13.69)	126.89	152268	70946	81322	2.15
TO-III: Removal of infested shoots and fruits followed by spraying of Cartap hydrochloride 50 SP@1.0gm/lit of water at 15 days interval.	2.86 (9.81)	7.73 (16.11)	123.75	148500	70461	78039	2.10
SEm (<u>+)</u>	0.631	0.805	3.582				
CD at 5%	1.892	2.416	10.745				

Figures in parentheses are Arc sine transformed values. Market price of okra @ Rs 1200/quintal

KVK Saharsha

Thematic area: Integrated nutrient management

Performance of Trichoderma spp. application on yield and quality of cabbage

Farmers of Saharsa district suffered greatly due to wilting and rotting problems in cabbage and these problems led to reduction in yield and quality of cabbage in the markets. KVK Saharsa conducted a field trial at 10 different locations for evaluating the performance of applying bio-fertilizer (Trichoderma spp.) in attempt to address the issue. On the basis of growth parameters, yield contributing traits and economics of the OFT, it was clear that TO-I performed better in comparison to farmers practice (FP) and TO-II. A critical perusal of data also showed that the cost of cultivation in TO-II was higher than TO-I and the B:C ratio of TO-I was the highest (6.37).

Table: Effect of application of bio-fertilizer on yield and quality of cabbage

Technology option	Yield c	Yield components		Cost of	Gross	Net return	B:C ratio	
	Plant height (cm)	Average weight of fruit (kg)	(q/ha)	cultivation (Rs/ha)	return (Rs/ha)	(Rs/ha)		
FP: Farmer's practice (No use of bio-fertilizers)	45	1.70	209	38000	209000	171000	5.5	



Technology option	Yield components		Yields	Cost of	Gross	Net return	B:C ratio
	Plant height (cm)	Average weight of fruit (kg)	(q/ha)	cultivation (Rs/ha)	return (Rs/ha)	(Rs/ha)	
TO-I: Soil application of 500 gm <i>Trichoderma spp</i> . with compost and seed treatment by <i>Trichoderma spp</i> . @5gm/lit. of water +recommended dose of fertilizer	55	2.10	255	40000	255000	215000	6.37
TO-II: Soil application of 1kg <i>Trichoderma spp</i> . with compost and seed treatment by <i>Trichoderma spp</i> . @10 gm/lit. of water +recommended dose of fertilizer	50	1.90	239	42000	239000	197000	5.69

KVK Darbhanga

Thematic area: Income generation of landless farm women

Evaluation of various substrates for mushroom production by landless farm women

In Darbhanga district, the mushroom production technology has gained enormous popularity and the farm womenfolk are mainly engaged in this enterprise for generating extra family income. A problem of unavailability of wheat husk (the mostly used substrate for mushroom) has been encountered during the main growing season. To avoid this problem, KVK Darbhanga designed and conducted a field trial at 10 different locations using various substrate/ combinations for evalution of their performance in terms of income generating potential. Results revealed that the mostly used substrate (wheat husk) was the best for getting the highest yield (2.2 kg/bag), net return (Rs. 721/ unit) and B:C ratio (2.90).

Table: Effect of various substrates on mushroom production

Technology option	Yield (Kg/bag)	Cost of cultivation (Rs./unit of 4 bag)	Gross return (Rs./unit of 4 bag)	Net return (Rs./unit of 4 bag)	B:C ratio
FP: Farmers Practice (Use of wheat husk)	2.2	379	1100	721	2.90
TO-I: Use Paddy straw	1.7	347	850	503	2.44
TO-II: Use of 50% paddy straw + 50 % wheat husk	2.0	363	1000	637	2.75

KVK SIWAN

Thematic area: Varietal evaluation

Assessment of different varieties of potato for controlling late blight disease

Low yield of potato due to heavy infestation of late blight disease was a great problem for potato growers of Siwan district. In an attempt to solve the problem, KVK Siwan conducted a field trial at 5 different locations for evaluating some potato varieties in respect of their yield and disease resistance/ tolerance. The results of the trial showed that TO-I (Kufri Pokhraj) performed better in the terms of yield and economics as compared to other TO. The disease incidence was also less in case of TO-I.

Table: Performance of different varieties of potato against late blight disease

Technology option Yield com			i	Disease/	Yield	Cost of	Gross	Net return	B:C
	No. of effective tuber/plant	Weight of tubers/plant (gm.)	Test wt. (100 grain wt.)	insect pest incidence (%)	(q/ha)	cultivation (Rs./ha)	return (Rs/ha)	(Rs./ha)	ratio
FP: Local variety	3.33	167	-	35.33	98.0	68000	117600	49600	1.72
TO-I: Kufri Pokhraj	7.00	600	-	09.33	205.0	72500	246000	173500	3.36
TO-II: Rajendra Aloo-1	5.33	490	-	12.00	198.5	73000	238200	165200	3.26
TO-III: Kufri Kanchan	4.67	350	-	28.67	115.0	70000	138600	68600	1.98



Thematic area: Weed management

Evaluation of different pre-emergence weedicides for controlling weeds in onion

To reduce the cost of cultivation and thereby to increase

Table: Effect of different weedicides in onion

the income of onion growers of Munger district, KVK conducted a field trial at 10 different locations using various pre-emergence weedicides in place of hand weeding which is usually practiced in the district. The results revealed that the highest yield was recorded in TO-I (Pendimethalin @ 3 lit/ha) followed by TO-II and FP.

Technology option	Yield co	mponent	Av. Yield	Cost of	Gross return	Net	BC
	Av. wt. of bulb/ plant (gm)	Av.plant height (cm)	(q/ha)	cultivation (Rs./ha)	(Rs/ha)	return (Rs./ha)	ratio
FP: Farmer practice (Hand weeding)	30	30	200	65000	200000	135000	3.07
TO-I: Pendimethalin (3 lit/ha) as a pre- emergence chemical weedicide	33	35	220	55000	220000	165000	4.0
TO-II: Oxyflorfen (800ml/ha as a pre- emergence chemical weedicide	31.50	32	210	55000	210000	155000	3.81

KVK Madhubani

Thematic area: Integrated Pest Management in Makhana

Assessment of certain bio-pesticides for control of case worm and root borer

Makhana is an aquatic crop and it is grown under the water in pond. It is one of the richest source of protein and minerals. It is also treated as an important cash crop in Madhubani district. In recent years, low yield of makhana as well as inferior quality of the crop is being attributed to infestation of case worm and root borer. This low productivity of makhana due to insect-pest attack has become a concern and KVK Madhubani took up a field trial to address this issue at 10 different locations with using bio-pesticides in control of makhana pests. The results showed that TO-II, i.e., application of 25 kg Neem cake as basal dose during final preparation of field, gave the highest yield and most profitability.

Table: Assessment of some bio-pesticides for control of case worm and root borer

Technology option	Disease/ insect pest incidence (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	B:C ratio
FP: Farmers Practice (Using chemical insecticide)	42	6	12800	30000	18000	2.5
TO-I: Spraying of 0.3% aqueous solution of Neem extract (Neem oil) in standing crop	20	8.5	14200	42500	26300	2.9
TO-II: Application of 25 kg Neem cake as basal dose during final preparation of field	5	10.9	16040	52000	35960	3.2

KVK Jehanabad

Thematic area: Varietal evaluation

Evaluation of performance of short and medium duration varieties of finger millet

For addressing the problem of low yield of finger millet, KVK Jehanabad conducted a varietal trial at 10 different locations using the early and medium maturing varieties of finger millet. It was observed that, among medium duration varieties, TO-IV, i.e., the finger millet variety GPU 67 produced higher yield of 8.7q/ha with more B:C ratio of 2.9 than RAU 8 (TO-V) with yield of 8.2q/ha and

B:C ratio of 2.73. Among early maturing varieties, TO-II, i.e., GPU 45 produced highest yield of 7.9q/ha with B:C ratio 2.63, followed by TO-III (var. VL 352) with yield of 7.6 q/ha and B:C ratio of 2.53, while TO-I (RAU 3) produced 7.4q/ha with B:C ratio of 2.46. Therefore, it can be concluded that TO-IV, i.e., variety GPU 67 from medium maturing vars. and TO-II (GPU 45) among early maturing varieties produced higher yields with higher B:C ratios among all the cultivars tested, respectively. Therefore, these varieties can be recommended to be grown in Jehanabad district.



Technology option	Yield component				Cost of	Gross	Net	B:C
	No. of tillers per plant	Length of ear (cm)	Test wt. (1000 grain wt.) gm	(q/ha)	cultivation Rs./ha	Return (Rs.)	return (Rs.)	ratio
FP: Farmer's practice (Local variety)	2	4.5	1.84	6.4	10000	20000	10000	1.00
TO-I: RAU 3	3	5.5	2.74	7.4	12000	29000	17000	2.46
TO-II: GPU 45	5	8	2.8	7.9	12000	31600	19600	2.63
TO-III: VL 352	4	7	2.85	7.6	12000	30400	18400	2.53
TO-IV: GPU 67	6	9	2.9	8.7	12000	34800	22800	2.9
TO-V: RAU 8	6	8	2.8	8.2	12000	32800	20800	2.73

Table: Performance of short and medium duration varieties of finger millet

KVK Saran

Thematic area: Integrated Pest Management

Assessment of IPM modules against major pests of brinjal in Saran district

Brinjal is one of the most commercially important vegetable crops grown in Saran district. It is extensively grown during summer and Kharif seasons. The low average productivity is mainly due to poor availability and adoption of high yielding varieties/ hybrids, production and protection technologies coupled with the vagaries of seasonal weather pattern. Incidence of pests is one of the major constraints. Amongst various insect-pests causing damage, shoot and fruit borer, little leaf disease transmitted by white fly (*Bemisia tabaci* (Gen)) and red spider mite (*Tetranychus cinnabarinus* (Boisd)) are considered as the most limiting factors. The excessive and indiscriminate use of pesticides to control these pests has resulted in undesirable ecological changes. Keeping this in view, KVK Saran carried out a field trial at 10 different locations to evaluate the efficacy of various IPM modules against the major pests of brinjal. The results revealed that TO-II (IPM Module IV) was most profitable among the technologies tested.

Technology option*	Brinjal shoot & fruit borer (% infestation) on shoot	Brinjal shoot & fruit borer (% infestation) on fruits	Little leaf disease of brinjal (% infestation)	Red spider mites (% infestation)
FP: Farmers practice (IPM module II)	9.15	11.20	7.10	10.65
TO-I: IPM module III	4.55	6.25	5.05	3.25
TO-II: IPM module IV	4.05	6.85	4.75	2.75
SEm ±	0.85	0.78	0.64	0.61
CD 5%	2.52	2.31	1.89	1.81

* **IPM module II:** Spraying of imidacloprid 0.5 ml/l water once at 30 days after sowing, Application of quinalphos @ 2 ml/l water 2 to 3 time at 7-10 days interval started 65-70 days after sowing, Spraying of fenvalerate @ 1 ml/l water twice at 7 days interval commenced 85-90 days after sowing; **IPM module III:** Deep summer ploughing, Seed treatment with imidacloprid 70% WS @ 10g /kg of seeds, Use of neem cake @ 250kg/ha before transplanting, Spraying of spinosad @ 0.4 ml/l water 40 and 50 days after transplanting, Application of imidacloprid 0.5ml/l water 70 days after transplanting, Spraying of abamectin @ 1 ml/l

water between 60 and 70 days after transplanting; **IPM module IV:** Deep summer ploughing, Seed treatment with imidacloprid 70% WS @ 10g /kg of seeds, Use of neem cake @ 250kg/ha before transplanting, Hand picking and destruction of infested leaves, shoots and fruits of shoot and fruit borer and mite infested leaf at initial stage, Spraying of indoxacarb @ 0.4 ml/l water 45 and 60 days after transplanting, Application of thiomethoxam 1g/l water 75 days after transplanting, Spraying of hexythiazox (acaricides) @ 0.5 ml/l water between 65 and 85 days after transplanting.



Table: Economic viability of different IPM modules in brinjal

Treatments	Yield (q/ha)	Gross return (Rs./ha)	ross return Cost of treatments (Rs./ha) (Rs./ha)		B:C ratio
FP: Farmers practice (IPM module II)	205.05	143353	18880	124655	6.60
TO-I: IPM module III	243.00	170100	21950	148150	6.75
TO-II: IPM module IV	261.20	182840	23020	159820	6.94

Note: The sale price of fruit was considered as Rs. 700 per quintal

ANDAMAN & NICOBAR ISLANDS

KVK North & Middle Andaman

Thematic area: Fish culture

Rearing of fish fry in rice field under mono and poly culture

Non availability of optimum size fingerlings for stocking ponds is the biggest lacuna in development of scientific fish farming in the area. Rice field available here have good potential to store water for 3 to 4 months where fish fry can be raised to advanced fingerling. Fish fry rearing in rice field for 2-3 months will be of optimum size and adequate number for stocking in grow-out fish ponds. It will also reduce incidence of insects and pest in rice. Keeping this in view, a field trial was conducted by KVK North & Middle Andamans at 5 different locations. Rearing of fish fry in paddy field under mono and poly culture condition was evaluated in farmer's field. Four technical options including farmers practice were evaluated in five replications. Total area for paddy field trials was 0.40 ha. Technical option 1 (Rearing of Rohu fry in rice field) was found to be higher in fingerling production followed by Technical option 3 (Rearing of Catla + Rohu fry in rice field) and control whereas minimum was recorded in Technical option 2. Rice production in Technical option 1, 2 and 3 was similar whereas higher in production than farmers practice. During the culture practice no rodent infestation was recorded in fish cum rice field whereas rodent problem was observed in rice fields without fish cultivation. During the trial, costs incurred towards the farming operation were Rs. 72,300/ha and Rs. 34000/ha for experimental groups and control, respectively. Net return obtained for TO-III was Rs73,200/ ha with B:C ratio of 2.01, as against the control with net return of Rs11,000/ ha and B:C ratio of 1.32.

Table: Analysis of experimental observations on yield of fish and paddy

Technology option	No. of trials/ replication	Yie	ld component		Sur-	Nos of fish fingerling harvested/ ha (Nos)	Rice	Cost of	Gross	Net	B:C
		Weight on day of stocking (g)	Weight on 7 th week of stocking (g)	Weight on 13 th week (g)	vival (%)		yield (q/ha)	(Rs./ha)	(Rs/ha)	return (Rs./ ha)	ratio
FP : Farmers practice (Composite culture)	5	-	-	-	-	-	45.00	34,000	45,000	11,000	1.32
TO-I: Rohu fry	5	0.12	9.39	24.36	49.00	12250	47.5	72,300	1,01,500	19,200	1.43
TO-II: Catla Fry	5	0.15	6.84	13.57	15.00	3750	47.5	72,300	77,500	5,200	1.19
TO-III: Rohu fry + Catla fry	5	0.14	8.12	17.66	27.00	6750	47.5	72,300	1,45,500	73,200	2.01



KVK Port Blair

Thematic area: Integrated nutrient management

Intercropping of elephant foot yam in coconut gardens and their integrated nutrient management practices

Coconut is an important crop of the island agriculture.

Rearing of fish in paddy field

Being perennial in nature, more intensive utilization of agricultural land covered under coconut in the district through intercropping with elephant foot yam (EFY) was attempted during last two years. Now, by conducting a field trial at 5 different locations by KVK Port Blair, the nutrient management in such intercropped situations



was also tested by taking various technology options. It was evident from the trial that EFY cv. Gajendra could successfully be intercropped in coconut gardens with the application of 50 % recommended dose of NPK fertilizers along with vermicompost + Neem cake (each @ 1kg $plant^{-1}$).

Table: Growth characters and yield of elephant foot yam in coconut gardens as influenced
by integrated nutrient management practices

Technology option	Plant height (cm)	Psedostem girth at base (cm)	Plant canopy spread (E-W) cm	Plant canopy spread (N-S) cm	Yield (kg plant ⁻¹)	B:C ratio
FP: Farmers practices (Intercropping of elephant foot yam with coconut with no use of fertilizer)	47.05	9.38	90.21	91.05	1.202	1.04
TO-I: Intercropping of elephant foot yam with coconut with use of fertilizer (Full dose of NPK @80:60:110 kg ha ⁻¹)	68.37	14.88	129.53	132.13	2.231	1.64
TO-II: Intercropping of elephant foot yam with coconut with use of fertilizer (50%NPK + FYM + Neem cake (each @1kg plant ⁻¹))	61.43	12.75	101.21	103.58	1.407	1.79
TO-II: Intercropping of elephant foot yam with coconut with use of fertilizer (50%NPK + vermicompost + Neem cake (each @1kg plant ⁻¹))	59.02	12.81	101.20	107.21	1.603	1.86





JHARKHAND KVK Deoghar

Thematic area: Integrated crop management

Performance of rice under brown manuring condition

Under the rice-fallow-rice production system of Deoghar district, low yield of rice due to poor organic carbon content in soil as well as deteriorating soil health has been identified as a problem area. KVK Deoghar, in its attempt to address this issue, conducted a trial at 10 different locations for assessing the technologies available for improvement in soil condition through manuring. Results revealed that TO-II (Transplanting of Rice seedling + Broadcasting of Dhaincha seed at 3 days after transplanting + Application of 2, 4 D Na salt at 30 days after transplanting) showed highest yield with highest B:C ratio.

Technology Option	No. of Effective Tillers/hill	Yield (q/ha)	Cost of cultivation (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	B:C ratio
FP: Farmers Practice (Rice alone)	258.7	29.6	28500	42365	13865	1.49
TO-I: Direct Seeding of Rice (Pre-germinated) through paddy drum seeder in puddle condition + Broadcasting of Dhaincha seed + Application of 2, 4 D Na salt at 30 days after sowing	286.4	32.5	30700	45984	15234	1.52
TO-II: Transplanting of Rice seedling + Broadcasting of Dhaincha seed at 3 days after transplanting + Application of 2, 4 D Na salt at 30 days after transplanting	302.8	36.1	31200	48425	17225	1.55

FP: Farmer's practice; TO: Technology option



Thematic area: Integrated Pest Management

Assessment of various management techniques of diamond back moth (DBM) in cauliflower

Low yield of cauliflower due to infestation of DBM insects is a serious problem of East Singhbhum district. The problem has been attempted to be addressed by KVK East Singhbhum through carrying out a trial at 10

different locations. The results of the trial showed that TO-II (Alternate spraying of cypermethrin + NSEK 5% at 25 DAT, 35 DAT and 45 DAT) was found to be more effective as compared to TO-I and TO-III; and was finally recommended for micro level situation of the farmers. However, due to rapid multiplication of DBM insects, spraying of chemical insecticides was required frequently resulting into more usage of chemicals. On the basis of these results, IPM in cauliflower should be developed.

Table: Effect of various management techniques of DBM in cauliflower

Technology Option	Mean No of Larvae per 5 plants	Yield (q/ha)	B:C ratio
FP: Farmer's practice(use of locally available chemicals)	19.59	67.28	0.79
TO-I: Cauliflower + Coriander & also used 50gm NSKE at the time of transplanting	4.97	179.89	5.93
TO-II: Alternate spraying of cypermethrin + NSEK 5% (Starting from 25 DAT, 35 DAT & 45 DAT)	3.51	193.41	7.02
TO-III: Cauliflower + Mustard (1 : 1)	6.33	162.58	4.30

DAT: Days after transplanting

KVK Sahibganj

Thematic area: Integrated Crop Management

Evaluation of different pigeon pea based intercropping systems in upland situation of Sahibganj

In order to solve the problem of low net return with sole crop of pigeon pea under pigeon pea-fallow

production system, KVK Sahibganj assessed the available technologies for including partial shed loving horticultural crops in the cropping system through a field trial at 5 different locations. It was evident from the trial that TO-II, i.e., intercropping of pigeon pea with ginger resulted in better B:C ratio as compared to FP as well as TO-I and TO-III.

Table: Performance of different pigeon pea based intercropping systems in upland situation

Technology option	Yield			Cost of	Gross	Net	B:C
	Yield of Pigeon pea (q/ha)	Yield of Inter crops (q/ha)	Grain Equivalent Yield (q/ha)	cultivation (Rs./ha)	return (Rs/ha)	return (Rs./ha)	ratio
FP: Pigeon pea as sole crop	14	-	14.0	24,000	60,900	36,900	2.9
TO-I: Pigeon pea + Turmeric (1:1)	7.4	150	41.8	60,000	1,81,830	1,21,830	3.0
TO-II: Pigeon pea + Ginger (1:1)	7.0	83	83.3	97,000	3,62,355	2,65,355	3.7
TO-III: Pigeon pea + Elephant Foot Yam (1:1)	1.5	170	99.2	1,43,000	4,31,520	2,88,520	3.0

KVK Dhanbad

Thematic area: Integrated Nutrient Management

Evaluation of *Pseudomonas fluorescence* on damping off disease in tomato nursery

Low yield of tomato due to damping off has been a problem of tomato growers of Dhanbad district. This situation warranted for taking up a trial on the available technologies for effective control of the disease. Therefore, a trial was designed by KVK Dhanbad at 10 different locations to assess various techniques of Pseudomonas fluorescence treatment in controlling this disease in tomato. From the trial, it was observed that TO-III, i.e., seed and soil treatment with *Pseudomonas fluorescence*, was very effective in controlling damping off in tomato.

Table: Effect of applying Pseudomonas fluorescence in damping off disease in tomato

Technology option	Average no. of damping off			Average	seed germin	ation (%)	Average Shoot length (cm)		
	25 DAS	35 DAS	45 DAS	15 DAS	25 DAS	35 DAS	25 DAS	35 DAS	45 DAS
FP: Farmer's Practice (untreated seed)	61.6	40	23	44.1	47.6	50.4	3.6	5.8	8.4



Technology option	Average no. of damping off			Average	seed germin	ation (%)	Average Shoot length (cm)			
	25 DAS	35 DAS	45 DAS	15 DAS	25 DAS	35 DAS	25 DAS	35 DAS	45 DAS	
TO-I: Seed treatment with <i>Pseudomonas fluorescence</i>	7.6	13	8	46.8	61.8	76.7	5.1	8.6	13.3	
TO-II: Soil treatment with <i>Pseudomonas fluorescence</i>	16	14.3	4.3	46.7	65.7	73.3	4.9	7.5	14.1	
TO-III: Seed and Soil treatment with <i>Pseudomonas</i> <i>fluorescence</i>	4.6	10	2.6	46.7	63.7	76.9	4.9	8.2	12.2	

DAS: Days after sowing

KVK Godda

Thematic area: Integrated crop management

Assessment of different types of machan for elephant foot yam + bitter gourd cropping system under multilayer vegetable cultivation system

Low yield of elephant foot yam due to improper machan has been identified as a problem in multi-layer vegetable cultivation in Godda district. KVK Godda conducted a trial at 10 different locations to assess the effect of different types of machan on the growth and yield of elephant foot yam and bitter gourd. The maximum yield of elephant foot yam (378.80 q/ha), bitter gourd (148.50 q/ha) and CB ratio (1 : 2.25) was recorded in the plots in which machan was of pandal type machan with central support. However it was found to be at par with the observations recorded in the plots in which machan was of conical shape. For maximum yield of elephant foot yam (378.80 q/ha) and bitter gourd (148.50 q/ha) and CB ratio (1 : 2.25) was recorded in the plots in which machan was of pandal type with central support (TO-I).

Table: Effect of different types of machan on the growth and yield of elephant foot yam and bitter gourd

Technology option	Y	ield compone	ent	Yield		Cost of	Gross	Net	B:C
	Height of	Girth of	Canopy	(q/	ha)	cultivation	return (Rs/ha)	return (Rs./ha)	ratio
	pseudo stem (cm)	pseudo stem (cm)	spread (cm) at 90 DAP	EFY	Bitter gourd	(100 111)	(13/114)		
FP: Farmers, practice (Improper machan)	51.20	17.45	76.80	293.50	129.80	398000	716800	318800	1.80
TO-I: Pandal type machan with central support (7' height from bottom)	54.18	21.20	82.60	378.80	148.50	402500	906100	503600	2.25
TO-II: Conical shaped machan (7' height from bottom)	55.20	20.52	81.40	349.50	142.20	400500	841050	440550	2.10
CD	NS	NS	NS	30.40	8.60				

DAP: Days after planting





Babu lal Manjhi, Gharbad



KVK Dumka

Thematic area: Feeding management

Evaluation of partial replacement of concentrate mixture with Azolla in crossbred milch cow

Low milk yield due to lack of protein supplement in crossbred cow was a serious concern in Dumka district. To address this issue, a field trial was carried out by KVK Dumka at 4 different locations with 6 crossbred milch cows at each location. The results showed that feeding of paddy straw with concentrate mixture @ 1 kg/day/ cow and Azolla @2kg/day/cow (TO-II) was at par with feeding of paddy straw with concentrate mix. (2 kg/anim./ day). Therefore, replacing 1 kg concentrate mixture with 2 kg Azolla was proved to have no deleterious effect on milk production.

Table: Effect of	f partial replacen	ent of concentrat	e mixture with	Azolla in cr	ossbred milch	cow
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Technology option		Yie	d (lit./day/co	ow)		Cost of	Gross	Net	B:C
	0 th day	30 th day	60 th day	90 th day	180 th day	production (Rs./day)	return (Rs/day)	return (Rs./day)	ratio
FP: Farmer's practice (paddy straw with concentrate mix. (2 kg/ anim./day)	6.40±0.50	6.80±0.54	6.80±0.68	5.90±0.6	5.40±0.62	80	240	160	2.00
TO-I: Paddy straw + concentrate mix.(1 kg/ anim./day)+ Azolla (1 kg/anim./day)	7.2±0.37	6.5±0.39	6.0±0.27	5.4±0.29	4.2±0.41	60	160	100	1.60
TO-II: Paddy straw + concentrate mix.(1 kg/ anim./day)+ Azolla (2kg/ anim./day)	7.2±0.25	7.0±0.22	6.8±0.2	6.7±0.2	5.5±0.32	60	180	120	2.00
TO-III: Paddy straw + concentrate mix.(0.5 kg/ anim./day)+ Azolla (2kg/ anim./day)	5.8±0.37	5.2±0.37	4.8±0.2	4.4±0.24	3.4±0.24	50	120	70	1.40

KVK Pakur

Thematic area: Integrated Nutrient Management

Effect of potash application in boosting potato productivity

Under the existing maize-potato production system of Pakur district, low productivity of potato has been identified as the problem of potato growers. In order to solve this problem, KVK Pakur took up a multi-locational field trial at 7 different locations of the district. The aim was to determine the effect of balanced potash application on the productivity of potato. The result of the experiment showed that among the potash doses, TO-I, i.e., application of 30 kg K/ha along with the Farmer practice gave the highest yield (187.2q/ha), net return (Rs.20922/ha) and B:C ratio (1.29). Farmer's practice produced the lowest yield (173.3q/ha), net return (Rs.14839/ha) and BC ratio (1.21).

Table: Effect of potash application on potato productivity

Technology option	Disease/ insect pest incidence (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	B:C ratio
FP: Farmer practice (140:90:90 NPK/ha)	Blight disease -14%	173.3	71811	86650	14839	1.21
TO-I: Farmer practice + 30 kg K/ha	Blight disease -9%	187.2	72678	93600	20922	1.29
TO-II: Farmer practice + 60 kg K/ha	Blight disease -5%	191.7	73545	93850	20305	1.27

KVK East Singhbhum

Thematic area: Human nutrition

Management of nutritional anemia among farm women

Occurrence of Nutritional Anaemia among farm women is a serious concern in East Singbhum district. To address this issue, a multi-locational trial was designed and conducted by KVK East Singbhum at 8 different locations. The aim of the experiment was to ameliorate the problem of Aneamia arising due to malnutrition through improving the nutritional status of the farm women. The result revealed that the food for farm women comprising of rice, potato, green vegetables (drumstick, palak, methi, beet root),



pulses (100-150 gm/day), one laddu (50 gm of roasted groundnut & 50 gm Jaggery) with 1 IFA tablet (5 mg) daily for 3-6 months (TO-II) was the best for improving

overall health status as well as hemoglobin percentage in farm women as indicated through the increase in mean body weight.

Annual Report 2015 - 16 ICAR-ATARI KOLKATA

Table: Effect of balanced supplementation and IFA tablet on health parameters

Technology option	Ν	/Iean of Hb (gm/d	l)	Mean of weight (in kg)			
	Before treatment	Intermediate after 1 months	After treatment	Before treatment	Intermediate after 1 months	After treatment	
FP: Farmer's practice (Rice + Potato veg. etc.)	9.0	9.03	9.85	48.91	48.91	49.7	
TO-I: Farmers practice with green vegetable i.e. drinks stick, palak, methi, beet root and pulses. (100-150 gm/day)	9.0	9.34	10.85	48.91	50.31	52.19	
TO-II: TO-I + one Laddu (i.e50 gm of roasted groundnut + 50gm Jaggery) + 1 IFA tablet (5mg) daily for 3-6 months	9.0	10.00	12.32	48.91	51.94	54.16	

KVK Nicobar

Thematic area: Livestock health management

Evaluation of Iron supplementation for reduction of pre-weaning piglet mortality

The Nicobarese rear their pigs in extensive system (free range). The furrowing takes place in jungle and after 3-5 days the sow brings its litters back at owner's dwellings. 40% of the piglet dies before weaning. This may be attributed to piglet anemia. To identify the potential solution

of this problem, a trial was carried out by KVK Nicobar at 7 different locations using iron supplementation to piglets. The results revealed that the mortality percentage was to the tune of 50% in FP whereas TO-II and TO-I had 37.5% and 25% mortality at 3 months of age, respectively. The body weight at 3 months of age revealed that TO-I had better body weight gain (16.42kg) followed by TO-II (16.3kg) and FP (16.13kg) with B:C ratios of 3.67, 3.39 and 3.02, respectively.

Table. Effect of Iron supplementation on reduction of pre-weaning piglet mortality in Nicobar

Treatments	Average weight at 3 mon. (Kg)	Mortality at 3 mon. of age (%)	Total live wt. (Kg)	Total dressed wt. (Kg)	Gross Exp. (Rs.)	Gross Income (Rs.)	Net Income (Rs.)	B:C ratio
FP: Farmer's practice (Sow milk)	16.13	50.0	64.5	48.4	4800	14512	9712	3.02
TO-I: Sow milk + 100mg Fe I/M	16.42	25.0	98.5	73.9	6033	22162	16129	3.67
TO-II: Sow milk + 100mg Fe Oral	16.30	37.5	81.5	61.1	5411	18337	12926	3.39

WEST BENGAL

KVK Jalpaiguri

Thematic area: Healthy Seedlings production

Assessing the nursery technique for seedling production of winter vegetables

High mortality of seedlings due to improper management of seedbed has been identified as a serious problem in the district of Jalpaiguri. To solve this problem, a field trial was taken up by KVK Jalpaiguri at 12 different locations. The experiment revealed that the number of healthy seedlings was highest (920) in TO-II (Healthy seedbed and apply inoculated Vermicompost (*Trichoderma viridae*) @100g with 20kg/bed (3x1m)) and lowest in FP (610) during the study period after germination of 1000 seedlings. It was also observed that the disease infestation was lower in TO-II. B:C ratio was also highest in TO-II (1. 00) and lowest in FP (0.96). Therefore, it may be concluded that the TO-II was the best among all the management practices tested.


Table: Growth and economic parameters of various seedling production techniques

Technology option	Growth pa old seedling	nrameters (24 gs) Studied o seedlings	4 days n 1000	Disease/ insect pest incidence	Studied on 1000 seedlings (No. of healthy	Cost of cultivation (input, seed)Rs.	Cost of per seedling	Gross return (Rs./ 1000	B:C ratio
	Av. length of seedling (cm)	No. of roots per seedling	Root length (cm)	(%)	seedlings)	/bed)	(Rs.)	seedlings)	
FP: Farmers' practice(Plain seedbed applyonly FYM @ 30kg/bed(3x1m))	12.2	41	3.60	36	1000-360 = 640 seedlings	Unit Rs.90+520 = 610	0.96	614.00	0.96
TO-I: HealthyseedbedandapplyonlyVermicompost@20kg/bed(3x1m)	12.5	52	4.32	21	1000-210 = 790 seedlings	Unit Rs.120+520 = 640	0.81	639.00	0.99
TO-II: Healthy seedbed and apply inoculated V e r m i c o m p o s t (<i>T r i c h o d e r m a</i> <i>viridae</i>)@100g with 20kg/bed(3x1m)	12.4	61	4.66	8	1000-80 = 920 seedlings	Unit Rs.120+20+520 = 660	0.72	662.00	1.00

KVK Howrah

Thematic Area: Weed management

Assessment of different weed management practices on yield of Olitorious jute in medium land condition of Howrah district

In order to address the issues like lower yield of jute due to weed infestation and costlier manual weeding, KVK Howrah took up a field trial at 7 different locations to assess the weed management in jute. Though hand weeding twice at 20 and 40 DAS produced highest fibre yield but the result showed that it was economical to apply Butachlor @1 kg ai/ha within 24-48 hours of sowing + Quizalofop Ethyl @50 g ai/ha + adjuvant@ 1 ml/l at 15 DAE (TO-II) for managing weeds in jute fields.

Table: Performance of the weed management technology

Technology option	Soil fertil	ity status	Tota	l weed	density	r / m ²	Fibre Yield (q/ ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ ha)	Net Return (Rs / ha)	B:C ratio
	Initial(Av.) (N:P ₂ O ₅ :K ₂ O kg/ha	Final (Av.) (N:P ₂ O ₅ :K ₂ O kg/ha)	15 DAS	25 DAS	35 DAS	45 DAS					
FP: Farmers Practice (Two hand weeding at 20 and 40 days after sowing)	244:32:225	239:30:219	44.3	14.3	29.7	10.1	38.22	23600	38220	14620	1.62
TO-I: QuizalofopEthyl @60g ai/ha +adjuvant@1nl/1at15DAE +onehandweeding at 40DAS	244:32:225	239:30:219	46.8	20.4	30.2	13.5	35.46	18100	35460	17360	1.95
TO-II: Butachlor @1 kg ai/ha within 24- 48 hours of sowing + Quizalofop Ethyl @50 g ai/ha + adjuvant@ 1 ml/l at 15DAE	244:32:225	239:30:219	29.4	18.1	20.8	22.6	37.50	17100	37500	20400	2.19
SEm <u>+</u>			1.51	1.12	1.48	1.79	0.12				
CD(P=0.05)			4.74	3.51	4.64	5.62	0.38				

DAE: days after emergence



KVK Darjeeling

Thematic area: Food and nutrition

Evaluation of various nutritious food supplements in combating undernutrition among children of 8 to 12 years

To combat the problem of malnourished children (aged: 8 to 12 years) in rural areas of Darjeeling district, KVK carried out a field trial at 5 different locations using various nutritious food supplements. The results showed that TO-I (Supply of mix (Wheat: groundnut: green gram – 2:1:1) 30gm/day for 2 months) had better anthropometric values (height and weight gain, general physical appearance) as compared to other groups. It may be recommended that the pulse based mushroom mix should be taken regularly apart from the daily diet to improve the health condition and prevent malnutrition. This formulation could be specifically adopted by children consuming vegetarian diet as mushroom would supply a good amount of high quality protein.

Table: Anthropometric parameters in relation to various food supplements

Technology option	Initial weight (kg)	Final weight (kg)	Net weight gain (kg)	Initial height (cm)	Final height (cm)	Net height gain (cm)
FP: Farmers practice (regular diet)	15.5	16.7	1.2	125	132	7
TO-I: Supply of mix (Wheat: groundnut: green gram – 2:1:1) 30gm/day for 2 months	15.6	17.2	1.6	126	134	8
TO-II: Supply of mix (Wheat: groundnut: green gram $-2:1:1$) + 10 % mushroom powder 30gm/day for 2 months	15.6	17.5	1.9	126	138	12

KVK South 24 Parganas (Narendrapur)

Thematic area: Integrated Disease Management

Assessment of techniques to reduce leaf curl disease of chilli for higher production and productivity

Chilli is the most important crop in South 24 Parganas and this crop suffers heavily from leaf curl virus spread by whitefly. Besides CLCV the crop faces heavy loss due to infestation mite, (thirp), fruit borer and Sclerotium root rot. Due to heavy infestation of leaf curl virus the acreage under the crop is decreasing. If the trend of green chilli production of the district is critically looked into, it has been clear that within the period of 2000 to 2006 the production comes 7.7 thousand tonnes to 1.3 thousand tonnes due to infestation of chilli leaf curl virus. High infestation of virus-vector (Thrips) leads to damage of chilli due to growing problem of leaf curl disease. To manage this disease effectively, KVK Narendrapur took up a field trial at 7 different locations by assessing various pest/ disease management options. It is apparent from the observed results that one minor effective change in the treatment schedule can give much better result than the conventional practice. In this regard it is prominent that integration of insect proof net in the nursery bed alongwith the neem oil spray can bring a effective impact against the leaf curl incidence. In our on farm test, integration of Nursery bed covering with net + Main field spray with NSKE (10000 ppm) @ 1 ml/litre of water along with Diafenthiuron @ 1.5 g/liter water, spray in 15 days interval in rotation (TO-II) can increase the yield as well as the unit cost of production becomes low.

Table: Effect of various disease management techniques on yield of chilli

Technology option	Leaf curl incidence (%)	Mite/ leaf (Mean of 10 scout) (%)	No. of thrips/leaf (Mean of 10 scout)	Yield (t/ha)	Cost of cultivation (Rs.lakh/ ha)	Gross return (Rs.lakh/ ha)	Net return (Rs.lakh/ ha)	B:C ratio
FP: Farmers practice (Var. Bullet Local); Planofix (4 ml/60 lit., Acephate 1g/lit or Hostathion 2 ml/lit) only in the main field after infestation	70.5	7.6	5.5	4.6	0.90	1.38	0.48	0.53
TO-I: Nursery bed covering with net + Main field spray with NSKE (10000 ppm) @ 1 ml/litre of water	38.6	3.4	2.2	5.2	0.70	1.56	0.86	1.22
TO-II: TO-I + Diafenthiuron @ 1.5 g/liter water, spray in 15 days interval in rotation	21.2	1.8	0.5	6.6	0.72	1.98	1.26	1.75



Technology option	Leaf curl incidence (%)	Mite/ leaf (Mean of 10 scout) (%)	No. of thrips/leaf (Mean of 10 scout)	Yield (t/ha)	Cost of cultivation (Rs.lakh/ ha)	Gross return (Rs.lakh/ ha)	Net return (Rs.lakh/ ha)	B:C ratio
SEm (±)		0.09	0.05	0.24	-	-	-	-
CD (P=0.05)		0.49	0.35	1.42	-	-	-	-

KVK Birbhum

Thematic area: Livestock management

Evaluation of different non-antibiotic growth promoters in broiler

In Birbhum district, like other districts of West Bengal, the small holder broiler farming is an important livestock related activity which gives ample scope of increasing family income. In recent years, it has been evident that use of antibiotic growth promoters in broiler feeds is becoming so rampant that it may pose a serious threat of development of antibiotic resistant bacteria in the human system leading to an important public health concern. This situation warrants a critical look into the issue and a serious attempt of searching effective alternatives to antibiotic growth promoters. Keeping this in view, a field trial was conducted by KVK Birbhum at 7 different locations with an objective to avoid/ reduce the potential of antibiotic resistant strains of bacteria and transfer of antibiotic resistance genes from animal to human. Results revealed that TO-II, i.e., Use of probiotics (Lactobacillus + Saccharomyces) had better growth and B:C ratio at 42nd day (1.32) as compared to other groups indicating a good scope of replacing existing antibiotic growth promoters with probiotics. This would have a future benefit of reducing the chance of developing antimicrobial resistance.

Table: Performance of different non-antibiotic growth promoters in broiler birds

Technology option	Body we	eight gain	FO	CR	Mor	tality	Cost of	Gross	Net Return	B:C
	At 21 st Days (gm)	At 42 nd Days (gm)	At 21 st Days	At 42 nd Days	At 21 st Days	At 42 nd Days	(Rs./unit i.e 2400 nos)	(Rs./unit i.e. 2400 nos)	(Rs /unit i.e 2400 nos)	Tudo
FP: Farmer's practice (Use of antibiotic growth promoters)	756.23 ± 28.89	2216.95 ± 44.31	1.63 ± 0.047	1.67 ± 0.047	15.28 ± 2.38	25.28 ± 3.85	314220	356886	42666	1.13
TO-I: Use of Probiotics (Lactobacillus + Saccharomyces)	796.72 ± 31.32	2306.92 ± 38.75	1.48 ± 0.035	1.51 ± 0.042	9.57 ± 1.63	17.95 ± 2.67	288066	381426	68943	1.32
TO-II: Multiple Enzyme (Xylanase + Phytase + Amylase + Protease)	768.41 ± 23.45	2181.55 ± 41.39	1.57 ± 0.039	1.59 ± 0.051	14.41 ± 2.26	22 .19 ± 3.17	301990	351098	49108	1.16
TO-III: TO-I + TO-II	787.38 ± 26.97	2276.19 ± 31.38	1.51 ± 0.031	1.55 ± 0.039	7.09 ± 1.46	13.08 ± 2.36	295603	370852	75249	1.25

KVK Burdwan

Thematic area: Integrated nutrient management

Assessment of effectiveness of different bio-fertilisers on productivity of lentil

Problem of low productivity of lentil was addressed by KVK Burdwan by conducting a field trial at 5 different

locations of the district. The effectiveness of various bio-fertilizers like phosphate solubilizing bacteria and rhizobium etc. were tested. The results indicated that TO-III, i.e., application of combination of PSB and Rhizobium (as seed treatment) was significantly more effective than single application. Further, application of bio-fertilizer can increase productivity significantly over farmers' practice.

Table: Effect of application of bio-fertilizer in lentil

Technology option	Yield(q/ ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	B:C ratio
FP: Farmers' practice: Only inorganics (20:50:20 N:P:K)	7.4	12250	31080	18830	2.54
TO-I : FP + Phosphate solubilizing bacteria (PSB)	8.2	13100	34440	21340	2.63
TO-II : FP + Rhizobium	8.6	13100	36120	23020	2.76
TO-III : FP + PSB + Rhizobium	10.1	13950	42420	28470	3.04
LSD at 5%	0.73				



4.2 FRONTLINE DEMONSTRATIONS

Production and productivity of pulse and oilseed crops have remained a major concern for Indian agriculture as the consumption of pulses and vegetables oil mainly depends on import at the cost of state exchequer. In spite of a number of initiatives taken by the Government, desirable production in both pulse and oilseed crops could not be achieved. The performances is mainly attributed to rainfed farming of pulse and oilseed crops, stagnation of area, fluctuation of prices, biotic and a-biotic stresses, climatic variability and shifting of farmers' interest to go for cash crop cultivation. However, to arrest the trend of cultivating pulse and oilseed crops under rainfed condition and with old varieties, the Krishi Vigyan Kendras across the country have opted for conducting frontline demonstration in the farmers' field with improved varieties, package of practices and newer technologies.

The KVKs of Zone-II, in the process to augment the production and productivity of identified pulse and oilseed crops conducted frontline demonstrations both in kharif and rabi season to showcase the performance of improved seed and technology to the farmers in all the districts of Zone-II, i.e. Bihar, Jharkhand and West Bengal. A summary of the performance indicates that in both the seasons of 2015-16, 16014.9 ha was brought under demonstration with the involvement of 61037 number of farmers.

In Rabi oilseed, 683.2 ha was covered through 1912 number of demonstrations whereas it was 86.2 ha in kharif oilseed through 331 number of demonstration. In pulse crops, 387.7 ha was put under demonstration through 1205 number of demonstrations in rabi and in kharif it was 175.8 ha and 741 number, respectively. Stat-wise performance of frontline demonstration indicates that the KVKs of Bihar conducted 782 and 74 number of demonstrations in rabi and kharif oilseed for an area of 260.7 ha and 23.9 ha, respectively. In pulse crops, area covered by the KVKs of Bihar was 305.2 ha and 68.1 ha through 950 and 236 number of demonstrations, respectively. The KVKs of Jharkhand, on the other hand, carried out 382 and 215 number of demonstrations in identified oilseeds for an area of 222.9 and 54.0 ha, respectively, during rabi and kharif 2015-16. In pulse crops, frontline demonstrations conducted by the KVKs of Jharkhand were to the extent of 123 and 102 numbers in rabi and kharif to cover 54.0 and 44.1 ha, respectively. In West Bengal, the KVKs put 199.6 and 8.3 ha under frontline demonstrations in oilseed crops during rabi and kahrif season, 2015-16. Number of farmers involved in the demonstrations were 757 and 42, respectively in rabi and kharif. KVKs of West Bengal also conducted demonstrations on pulse crops both in rabi and kharif seasons to cover 38.3 ha and 81.7 ha, respectively. Apart from pulse and oilseed crops, demonstrations were also conducted by the KVKs of this zone in other crops including cereals, vegetables, fruit crops, spices, ornamental and medicinal plants, cash crops and many others. In this process, KVKs brought 3079.1 ha area under demonstrations with the involvement of 18024 number of farmers. Altogether the KVKs conducted 22222 number of demonstrations including pulse, oilseed and other crops for an area of 4411.9 ha in a bid to enhance the productivity of the identified crops as given in the following table.

State	Rabi Oilseeds		lseeds Kharif Oilseeds			ulse	Kharif	Pulse	Other Oilseec Puls	than l and se	Total		
	No. of A Farmers (1 &N 0 0		No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	
A&N Islands	0	0.0	0	0.0	2	0.1			116	23.2	118	23.2	
Bihar	782	260.7	74	23.9	950	305.2	236	68.1	7947	1859.2	9989	2517.1	
Jharkhand	382	222.9	215	54.0	123	44.1	102	26.0	2124	402.4	2946	749.4	
West Bengal	757	199.6	42	8.3	130	38.3	403	81.7	7837	794.3	9169	1122.2	
Total	1921	683.2	331	86.2	1205	387.7	741	175.8	18024	3079.1	22222	4411.9	

 Table: Frontline demonstration on oilseeds and pulses

4.2.1 Oilseeds

Oilseeds are cultivated in this zone both in rabi and kharif season, though rabi season occupies more area than kahrif oilseeds. As per the practice of the farmers, groundnut, niger, soybean, sesame, mustard, toria, sunflower and linseed were identified to conduct frontline demonstrations with improved varieties/seeds, package of practices and newer technologies. Performance of demonstrations of oilseed crops in kharif and rabi season 2015-16 are as follows:

4.2.1.1 Kharif Oilseed: During kharif 2015-16, the KVKs of this zone demonstrated groundnut, niger, soybean and sesame as kharif oilseed crops. However, only sesame was demonstrated in all three states – Bihar, Jharkhand and



West Bengal to cover an area of 33.0 ha. Out of total area under frontline demonstration of 86.2 ha, niger occupied 35.5 ha and was solely demonstrated in Jharkhand, soybean was demonstrated in Bihar and Jharkhand to cover an area of 13.7 ha whereas groundnut and niger were demonstrated only in Jharkhand for an area of 4.0 ha and 35.5 ha, respectively.

In respect of yield, as high as 100 per cent increase in average demonstration yield in sesame was recorded in West Bengal followed by 46.3 per cent in Bihar and 42.3 per cent in Jharkhand. The benefit-cost ratio was almost equal in all the states.

Niger was another oilseed crop demonstrated in the highest

area (35.5 ha) of all the oilseed crops but only in Jharkhand. The demonstrated variety/improved technologies gave an average yield increase of 44.8 ha per cent with 1.63 benefit-cost ratio. Soybean, though was demonstrated both in Bihar and Jharkhand, the average was only 13.7 ha. Average increase in yield through demonstration in both the states was almost identical – 28.6 per cent in Bihar and 28.1 per cent in Jharkhand. In respect of benefit-cost ratio also, no marked difference as observed. The least area (4.0 ha) covered through demonstration during kharif was groundnut. It was only demonstrated in Jharkhand and 30.0 per cent increase in average yield was recorded with 1.83 benefit-cost ratio.

SI. No.	Сгор	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	*Econo	omics of a (Rs./	lemonstr ha)	ation	*Econo	mics of a	check (R	s./ha)
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR
1	Groundnuts	Jharkhand	22	4.0	16.9	12.3	38.0	30375	72732	42357	2.39	28167	51610	23443	1.83
		Total	22	4.0	16.9	12.3	38.0	30375	72731	42356	2.39	28166	51610	23443	1.83
2	Niger	Jharkhand	132	35.5	4.9	3.4	44.8	10142	20769	22941	2.05	8808	14373	5565	1.63
		Total	132	35.5	4.9	3.4	44.8	10142	20769	22941	2.05	8808	14373	5565	1.63
3	Soybean	Bihar	32	7.4	12.6	9.8	28.6	38967	71533	37501	1.84	30000	51600	21600	1.72
		Jharkhand	40	6.3	11.4	8.9	28.1	26953	66608	39655	2.47	24720	35700	10980	1.44
		Total	72	13.7											
4	Sesame	Bihar	42	16.5	4.2	2.9	46.3	8125	20640	12515	2.54	7355	8825	6510	1.20
		Jharkhand	21	8.2	3.7	2.6	42.3	12345	27139	14781	2.20	10901	18490	7756	1.70
		West Bengal	42	8.3	4.6	2.3	100.0	29250	45200	15950	1.55	28500	40800	12300	1.43
		Total	105	33.0											
]	Fotal kharif	oilseed	331	86.2											

Table: Frontline demonstration on kharif oilseeds

4.2.1.2 Rabi Oilseed: Frontline demonstration in respect of crops does not indicate uniformity as observed from the following Table depicting the performance of different oilseed crops demonstrated during rabi/rabi-summer of 2015-16. Among the crops demonstrated by the KVKs of this zone, mustard and linseed were the only crops taken up for demonstration in all the three states of Bihar, Jharkhand and West Bengal whereas ground nut and sunflower were only demonstrated in West Bengal as rabi-summer crop and toria in Bihar and Jharkhand. However, the acreage under rabi oilseed demonstration was higher (683.2 ha) than that of kharif oilseed (86.2 ha). Among the crops demonstrated, mustard occupied 577.8 ha area whereas toria, linseed, sunflower and ground nut occupied 28.5 ha, 36.0 ha, 16.3 ha and 14.6 ha, respectively. In terms of yield, an increase in 49.2 per cent in mustard demonstration was recorded in Jharkhand with 1.8 benefit-cost ratio followed by 33.4 per cent in Bihar and 22.3 per cent in West Bengal. The benefit-cost ratio was the highest (2.07) in Bihar in respect of mustard demonstration programme.

Linseed was the another crop demonstrated in all the three states though the coverage of area was only 36.0 ha. Newly released varieties and improved package of practices produced 71.9 per cent more average yield over check in West Bengal though Bihar recorded highest benefit-cost ratio (2.66). In Bihar, however, increase in yield was only 11.8 per cent whereas it was 39.7 per cent in Jharkhand.

Toria was demonstrated in an area of 38.5 ha in Bihar and Jharkhand through 145 programmes. The demonstrated varieties/package of practices enhanced the average yield to the extent of 31.0 and 21.2 per cent in Jharkhand and Bihar, respectively with benefit-cost ratio of 1.63 in Bihar and 1.30 in Jharkhand.

Sunflower was demonstrated in 16.3 by KVKs of West Bengal. The demonstrated technologies produced 42.3 per



cent more average yield over check with 1.76 benefit-cost ratio.

Groundnut was demonstrated during rabi-summer season in West Bengal for an area of 14.6 ha. However, the results are awaited.

51. No.	Сгор	State	Farmers	Area (ha)	rieia	(фла)	[%] Increase	*ECOIIO	(Rs./	ha)	ration	*ECON	onnes oi	спеск (к	is./naj
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR
1	Mustard	Bihar	572	202.0	11.6	8.7	33.4	17129	43668	26727	2.55	15712	32564	16879	2.07
		Jharkhand	347	212.3	11.1	7.5	49.2	17129	43399	26432	2.53	15162	28512	13548	1.88
		West Bengal	648	163.5	11.1	9.1	22.3	18710	41644	22928	2.23	17627	34894	17182	1.98
		Total	1567	577.8											
2	Toria	Bihar	142	37.5	10.3	8.5	21.2	16000	36050	20050	2.25	18200	29750	11550	1.63
		Jharkhand	3	1.0	5.5	4.2	31.0	13050	22000	8950	1.69	12910	16800	3890	1.30
		Total	145	38.5											
3.	Sunflower	West Bengal	26	16.3	25.9	18.2	42.3	29610	80443	50833	2.72	28380	50050	21670	1.76
		Total	26	16.3											
4	Linseed	Bihar	68	21.2	8.5	7.6	11.8	36476	102804	66328	2.82	34320	91500	57180	2.66
		Jharkhand	32	9.6	6.7	4.8	39.7	13431	22649	9239	1.69	11562	17323	5761	1.50
		West Bengal	17	5.2	5.5	3.2	71.9	13379	29400	16021	2.20	12121	22746	10625	1.88
		Total	117	36.0											
5	Groundnut	West Bengal	66	14.6											
		Total	66	14.6											
Tota	l Rabi Oilse	ed	1921	683.2											

Table: Frontline demonstration on rabi oilseeds

4.2.2 Pulses

4.2.2.1 Kharif Pulse: In this zone, the commonly grown pulse crops during kharif season are red gram, black gram, green gram and horse gram though horse gram is predominantly grown in Bihar only. The KVKs of this zone accordingly chose those four pulse crops for demonstration during kharif 2015 with improved technological package. In the process the KVKs brought 175.8 ha area under demonstration through 741 programmes. Among the crops, red gram was demonstrated in an area of 67.8 ha followed by black gram (52.0 ha), horse gram (23.0 ha) and green gram (11.3 ha). In red gram, the KVKs of Bihar recorded increase in average demonstration yield to the extent of 81.6 per cent whereas it was 52.4 per cent in West Bengal. In Jharkhand, a modest 23.3 per cent increase in yield was recorded. In respect of benefit-cost ratio, however, highest ratio (4.2) was worked out in Jharkhand followed by West Bengal (3.3) and Bihar (2.6).

In black gram, highest increase in average demonstration

Table: Frontline demonstration on Kharif pulses

yield recorded in Jharkhand (54.0%) followed by West Bengal (32.3%) and Bihar (29.5%). However, the KVKs of Bihar worked out the benefit-cost ratio of 2.52, highest among the all the states followed by West Bengal (2.12). In Jharkhand, it was only 1.59.

In terms of both average and number of demonstration conducted, green gram occupied the third position among all the pulse crops demonstrated in kharif 2015-16. An area of 33.0 ha was brought under this crop through 128 number of demonstrations. Increase in yield of demonstration over check varied from 33.5 to 45.1 per cent, the highest being in Jharkhand. However, in West Bengal maximum benefit-cost ratio of 2.52 was worked out.

Horse gram was demonstrated only in Bihar and the acreage was 23.0 ha. The demonstrated variety/package of practices produced 22.2 per cent higher yield over check with 3.06 benefit-cost ratio. The details are given in the below mentioned table.

SI. No.	Сгор	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	*Economics of demonstration (Rs./ha)				*Economics of check (Rs./ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR
1	Redgram	Bihar	91	26.9	14.2	7.8	81.6	21176	58937	48804	2.78	19203	49682	30716	2.59



SI. No.	Сгор	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	*Econ	omics of ((Rs./	demonstr ha)	ation	n *Economics of check (Rs./ha)				
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR	
		Jharkhand	41	7.0	12.1	9.4	23.3	16635	75800	59165	4.56	16703	69800	53098	4.18	
		West Bengal	132	33.9	13.2	8.6	52.4	18906	67369	53984	3.56	17953	59741	41907	3.33	
		Total	264	67.8	13.2	8.6	52.4	18906	67369	53984	3.56	17953	59741	41907	3.33	
2	Blackgram	Bihar	31	5.0	7.9	6.1	29.5	22590	65520	42930	2.90	22100	55650	33550	2.52	
		Jharkhand	34	10.5	8.9	5.9	54.0	17505	40384	22879	2.31	16748	26558	9810	1.59	
		West Bengal	218	36.5	8.5	6.2	32.3	19291	45744	26428	2.37	16509	34965	18456	2.12	
		Total	283	52.0												
3	Greengram	Bihar	48	13.2	9.5	7.3	43.5	22747	68287	45540	3.00	21580	51411	29831	2.38	
		Jharkhand	27	8.5	11.8	7.9	45.1	18043	60448	42406	3.35	15704	39138	23433	2.49	
		West Bengal	53	11.3	8.8	6.6	33.5	15008	47128	32087	3.14	13939	35160	21221	2.52	
		Total	128	33.0												
4	Horsegram	Bihar	66	23.0	15.4	11.9	22.2	24081	85380	61299	3.55	20766	63580	42814	3.06	
		Total	66	23.0												
Tota	l kharif pulse	2	741	175.8												

4.2.2.2 Rabi Pulse: The KVKs of Zone-II demonstrated improved variety and proven package of practices to exhibit the potentiality of newly released varieties and standardized package of practices in lentil, chickpea and pea during Rabi 2015-16. The frontline demonstrations on the selected crops were conducted in 387.6 ha area where 1205 number of farmers were involved. However, among the crops, lentil occupied highest area (244.1 ha) followed by chick pea (114.3 ha) and pea (29.2 ha). Again, the KVKs of Bihar covered more area in all the crops through demonstration programme than the KVKs of Jharkhand, West Bengal and A&N Islands. Involvement of farmers was also higher in respect of demonstrations conducted by the KVKs of Bihar. Crop-wise performance of demonstration indicates that in the case of lentil, an average demonstration yield of 33.4 q/ha was realized in Bihar followed by 13.2 q/ha in Jharkhand, 12.0 q/ha in A&N Islands and 10.0 g/ha in West Bengal. But in respect of increase in yield over check, 34.0 per cent increase was recorded in the demonstration conducted in West Bengal

against 33.3 per cent, 31.3 per cent and 31.0 per cent in A&N Islands, Jharkhand and Bihar, respectively. Highest benefit-cost ratio (2.4) was also recorded in West Bengal.

In chick pea, demonstration conducted by the KVKs of Jharkhand produced highest increase in average demonstration yield (52.5%) over check followed by Bihar (34.6%) and West Bengal (34.5). But the demonstrations conducted in Bihar recorded maximum benefit-cost ratio (4.1) followed by West Bengal and Jharkhand.

In pea also highest increase in average demonstration yield was recorded in Bihar (39.2%) whereas it was least in Jharkhand (13.2%). The KVKs of West Bengal recorded a modest increase of 24.2 per cent in the demonstration over check. In Bihar, again, highest benefit-cost ratio was worked out (2.5) but it was only 1.6 in West Bengal. The KVKs of Jharkhand recorded 2.4 benefit-cost ratio in the demonstration conducted in pea. The details of performance of the identified crops under frontline demonstration are given in table.

Sl. No.	Сгор	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	*Econo	omics of (Rs./	demonstı 'ha)	ration	*Economics of check (Rs./ha)					
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR		
1	Lentil	A&N Islands	2	0.01	12.0	9.0	33.3	200	960	860	4.80						
		Bihar	638	208.4	33.4	25.5	31.0	20406	64954	51034	3.18	22102	49251	29905	2.23		
		Jharkhand	31	14.2	13.2	10.1	31.3	20485	47851	27366	2.34	18979	37399	18421	1.97		

Table: Frontline demonstration on rabi pulses



Sl. No.	Crop	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	*Econo	omics of (Rs./	demonsti /ha)	ration	*Economics of check (Rs./ha)				
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR	
		West Bengal	58	21.5	10.0	7.5	34.2	18410	48513	30170	2.64	15445	37278	21280	2.41	
		Total	729	244.1												
2	Chickpea	Bihar	252	80.4	14.5	10.7	34.6	24364	70203	45720	2.88	21652	90149	30863	4.16	
		Jharkhand	64	21.3	14.0	9.2	52.5	21283	56374	35338	2.65	18747	37438	18636	2.00	
		West Bengal	52	12.6	16.3	12.1	34.5	17146	47061	31121	2.74	19295	48804	23718	2.53	
		Total	368	114.3												
3	Pea	Bihar	60	16.4	52.6	37.8	39.2	28588	89621	61034	3.13	28368	73381	47393	2.59	
		Jharkhand	28	8.6	65.9	58.2	13.2	27660	86324	58665	3.12	23646	57142	33560	2.42	
		West Bengal	20	4.2	57.4	46.2	24.2	24707	52800	28093	2.14	26765	44921	18156	1.68	
		Total	108	29.2												
	Total rab	i pulse	1205	387.6												

4.2.3 Other Crops

Apart from conducting frontline demons-tration in selected oilseed and pulse crops during 2015-16, the KVKs of this zone also carried out 17934 number of demonstrations to cover an area of 3169.1 ha to demonstrate various technologies in cereal, vegetables, onion, spices, elephant foot yam and a large number of other crops throughout the year. Among the crops demonstrated, paddy occupied highest area (923.4 ha) followed by wheat (899.4 ha), onion (286.2 ha), maize (266.1 ha), fodder (115.1 ha), cauliflower (114.8 ha), tomato (102.3 ha) and others. Crop-wise performance analysis indicates that the KVKs of A&N Islands recorded an increase of 40.9 per cent in average demonstration yield over check in paddy and it was only 15.6 per cent in West Bengal. KVKs of Jharkhand worked out an increase of 30.4 per cent followed by 18.1 per cent in Bihar. The benefit-cost ratio varied from 1.07 to 1.64 (A&N Islands to Jharkhand). In wheat, average yield increase in demonstration was in the range of 17.2 (Bihar) to 25.2 (West Bengal) per cent with identical benefit-cost ratio. In maize, however, substantial increase (83.4%) in average yield was recorded in Jharkhand with nearly 2.0 benefit-cost ratio. The increase was to the extent of 45.4 per cent in West Bengal and 33.3 per cent in Bihar. Maize when demonstrated as fodder, however, gave 72.9 per cent more average yield against 16.1 per cent in Bihar.

Among the vegetables, cauliflower produced an average increase in yield to the extent of 49.5 per cent in West Bengal against 24.0 per cent in Bihar and 18.4 per cent in Jharkhand. However, benefit-cost ratio worked out indicates that on an average, vegetable cultivation provided higher ratio in comparison with other crops.

Demonstration on onion in Bihar and turmeric in Jharkhand was found lucrative in terms of benefit-cost ratio as they gave 4.59 and 4.22 benefit-cost ratio, respectively. The overall assessment of demonstration conducted by the KVKs of this zone indicates that except in one or two cases, there has been substantial increase in average yield of the crops when improved seeds and package of practices are put into demonstration. The details are given in the following table.

Sl. No.	Сгор	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	*Econo	mics of c (Rs./	lemonstr ha)	ation	*Econo	omics of c	heck (Re	s./ha)
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR
1	Paddy	A&N Islands	5	2.2	46.5	33.0	40.9	35000	46500	11500	1.33	35000	37500	2000	1.07
		Bihar	1240	501.8	37.7	32.0	18.1	25567	51996	27500	2.03	26984	42144	15621	1.56
		Jharkhand	711	200.1	36.8	28.2	30.4	26415	58441	32105	2.21	24372	39874	15788	1.64
		WB	1102	219.3	61.7	53.4	15.6	32581	57291	24709	1.76	31758	46740	15011	1.47
		Total	3058	923.4	45.7	36.6	24.7	29891	53557	23954	1.79	29529	41565	12105	1.41

Table: Frontline demonstration on other crops

ICAR-ATARI KOLKATA



Sl. No.	Сгор	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	*Econo	mics of c (Rs./	lemonstr ha)	ation	*Econo	omics of o	check (Rs	s./ha)
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR
2	Wheat	Bihar	1704	803.0	33.4	28.5	17.2	25954	51527	23706	1.99	25528	46050	20305	1.80
		Jharkhand	226	52.8	30.7	24.5	25.1	22046	43925	21879	1.99	20417	34189	13953	1.67
		WB	292	43.6	34.1	27.2	25.2	25684	48073	22389	1.87	25825	39590	13753	1.53
		Total	2222	899.4	32.7	26.8	22.3	24562	47842	22658	1.95	23923	39943	16004	1.67
3	Maize	Bihar	265	101.0	77.7	58.3	33.3	40642	84151	43509	2.07	38043	67733	29555	1.78
		Jharkhand	327	56.13	56.7	30.9	83.4	22471	73746	51275	3.28	17332	34548	17216	1.99
		WB	765	109.0	61.3	42.2	45.4	25863	54875	29013	2.12	20925	33833	12908	1.62
		Total	1357	266.1	65.3	43.8	49.0	29658	70924	41265	2.39	25433	45371	19893	1.78
4	Maize fodder	Bihar	1	0.2	360.0	310.0	16.1	25000	72000	47000	2.88	25000	62000	37000	2.48
		WB	746	114.9	134.7	77.9	72.9	18191	33637	16841	1.85	12625	21215	8590	1.68
		Total	747	115.1	247.4	194.0	27.5	21596	52818	31921	2.45	18813	41608	22795	2.21
5	Brinjal	Bihar	200	28.7	337.9	272.7	23.9	78397	305508	225861	3.90	75275	236850	160300	3.15
_		Jharkhand	75	13.3	300.3	231.3	29.9	66854	219450	152596	3.28	63833	168660	104827	2.64
_		WB	535	41.8	310.9	253.8	22.5	95482	294472	198990	3.08	99246	224750	125504	2.26
		Total	810	83.8	316.4	252.6	25.3	80244	273143	192482	3.40	79451	210087	130210	2.64
6	Tomato	Bihar	234	45.2	243.5	189.1	28.7	57421	254429	213478	4.43	53761	179948	127096	3.35
		Jharkhand	97	8.0	386.5	289.1	33.7	59878	276402	217509	4.62	56057	2485068	84622	44.33
_		WB	1765	49.1	309.2	237.1	30.4	100680	204630	141750	2.03	114250	197913	86163	1.73
_	D	Total	2096	102.3	313.0	238.4	31.3	72660	245154	190912	3.37	74689	954309	99294	12.78
.7	Potato	Bihar	250	33.6	278.6	237.3	17.4	75881	228342	152545	3.01	69730	181990	104144	2.61
		Jharkhand	20	0.3	204.0	145.0	40.7	72775	162425	192425	2.23	68233	188500	1120267	2.76
_		WB Tradal	54	6.1 20.0	283.1	230.5	22.8	11//4/	20/660	89913	1.76	100150	166933	66/83	1.67
0	Cauliflar.com	Dihar	324	39.9	104.1	204.2	25.0	88801 C1755	1994/6	144961	2.25	/93/1	1/9141	430398	2.20
0	Cauiiiiower	Dilidi Ibarkhand	120	27.0	104.1	140.5	19.4	61755	220495	111000	3.57 2.22	01972 4710E	120200	130295 9261E	3.10 2.75
			120	0.2 81.0	177.3	118.6	10.4	159700	345352	229240	2.16	4/105	123000	110518	2.75
		Total	1127	114.8	197.8	154.4	-40.0 28.2	90652	242552 242749	168792	2.10	69487	181998	113476	2.20
q	Onion	Bihar	3252	269 576	209.3	164.3	20.2	417914	333067	249479	0.80	84054	385400	301347	2.02
5	Onion	Iharkhand	113	4.6	195.3	137.3	42.2	49572	169385	119813	3.42	43929	117708	73779	2.68
		WB	186	12.0	163.6	132.2	23.8	224963	560541	325545	2 49	231843	491607	259764	2.00
		Total	3551	286.2	189.4	144.6	31.0	230817	354331	231612	1.54	119942	331572	211630	2.76
10	Elephant footyam	Bihar	50	3.0	530.0	480.0	10.4	280000	954000	674000	3.41	265000	864000	599000	3.26
		Jharkhand	64	1.4	463.7	222.7	108.3	1590067	737477	608000	0.46	223940	292507	160667	1.31
		WB	48	0.6	593.5	397.3	49.4	236354	721800	485446	3.05	222871	526033	303163	2.36
		Total	162	5.0	529.1	366.6	44.3	702140	804426	589149	1.15	237270	560847	354276	2.36
11	Turmeric	Bihar	63	3.4	330.3	274.9	20.2	141823	464447	285690	3.27	131213	398258	267379	3.04
		Jharkhand	44	0.7	200.0	152.5	31.1	44250	240000	190750	5.42	46500	196000	149500	4.22
		WB	83	4.2	201.8	142.3	41.8	99825	187375	112692	1.88	98420	160940	62920	1.64
		Total	190	8.3	244.0	189.9	28.5	95299	297274	196377	3.12	92044	251733	159933	2.73
12	Others	A & N Islands	111	21.0											
		Bihar	471	92.1											
		Jharkhand	327	58.9											
		WB	1134	112.7											
		Total	2043	284.7											



Demonstration on livestock and fishery

Livestock rearing and fish farming are the integral part of livelihood of the small and marginal farmers of this zone along with farm-women. However, the productivity in respect of egg, meat, milk and fish is quite low. In a bid to enhance the productivity of livestock and livestockbased product as well as fishery, the KVKs of Zone-II conducted 5264 number of demonstration to exhibit the benefit of improved breed/quality fingerlings in increasing the production and productivity. In livestock sector, demonstration was conducted in poultry, duck, pig, dairy animals, sheep, goat and others whereas various fish species were considered for the demonstration. It was observed that the demonstration produced higher productivity in all the livestock though the degree varied from 15 to 89 per cent. In fishery sector, mainly the KVKs of West Bengal were involved in demonstrating improved management practices in IMC, ornamental fish, cat fish, mono-sex tilapia, deshi magur, pangas and other species. In all the caes, on an average 40-90 per cent increase in productivity was recorded. The performance assessment clearly indicates that the productivity of livestock and fish could be increased many fold with significant monitory return with the large-scale and option of the demonstrated technologies.

Demonstration on Enterprise

In a bid to improve the existing enterprises of this zone, the KVKs conducted 2019 number of demonstrations on various enterprises like kitchen garden, mushroom production, vermicompost production, azolla production, bee keeping, value addition, mineral mixture preparation etc. Enterprise-wise analysis indicates that proper method of mush production could increase the production to the extent of 55.0 per cent, honey production could be increased to 40.0 per cent and backyard cultivation of vegetables could fetch nearly 50.0 per cent more production. The low cost technologies demonstrated by the KVKs served as the eye-opener for the resource-poor farmers and farm-women to enhance their additional income with the improved management of their existing enterprises.

Demonstration on Implements

The KVKs of Bihar demonstrated zero tillage, drumseeder and seed-cum-fertilizer drill to show its efficacy in minimizing the labour requirement as well as productivity enhancement of crops. It was observed that with the application of seed-cum-fertilizer drill during sowing of wheat could increase the yield to the extent of 33.2 per cent. Likewise, zero tillage and drum seeder increased the yield to the range of 16 to 23 per cent in respective crops. However, the performance could bring the change in productivity only when implements are made available to farmers.

4.3 CLUSTER FRONTLINE DEMONSTRATIONS

In view of augmenting production and productivity of oilseed and pulse crops as well as reducing the dependence on import of both oilseed and pulse crops, Department of Agri. Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Govt. of India has initiated a special clustered frontline demonstration on selected oilseed and pulse crops through the KVKs of this country. Accordingly, the KVKs of Bihar, Jharkhand and West Bengal carried out this programme in an area of 3450.0 ha in oilseed and 4486.0 ha in pulse crops. The crops identified for demonstration during rabi 2015-16 in oilseed were rapeseed & mustard, linseed, groundnut, sesame and sunflower whereas lentil, chickpea, black gram, field pea and green gram were the crops taken up for demonstration during rabi as pulse crops. However, ground nut, sesame and sunflower under oilseed and green gram under pulse crop were demonstrated during rabi-summer 2015-16. In implementing the demonstration programmes, the DAC&FW provided the fund support to ICAR-ATARI to the extent of Rs.214.81 lakh for oilseeds and Rs.341.94 lakh for pulse crops. Based on the intensive interaction with the Directors of Extension Education of six State Agricultural Universities and 80 KVKs of this zone, finally an area of 3365.0 ha was brought under oilseed demonstration programme and 4466.0 ha area was put under pulse crops demonstration. The demonstration programmes were supervised by a team of experts constituted by DAC&FW in the presence of a scientist from ICAR-ATARI to suggest means for better conduct of frontline demonstration. Empahsis was given to bring rice-fallow under such demonstrations as much as possible followed by adherence to other stipulated norms like conducting demonstration in cluster approach of at least 10.0 ha per cluster, use of seed not older than 10 years old, promotion of INM and IPM and others. ICAR-ATARI Kolkata, through 80 KVKs made all possible efforts to successfully demonstrate the newly released varieties field to showcase the benefit of clustered demonstration programme to a large number of farmers. The results of the programme are given below with other details.

Rabi oilseeds

Rabi Oilseeds are largely grown under the agro-ecological condition of the states of Bihar, Jharkhand & West Bengal and considered as companion crops mitigating the adverse weather situation. Rapeseed & Mustard are most important Oilseed crops of Eastern region of India. Demonstration on Rapeseed & Mustard was conducted covering 1537.2 ha area involving 5252 no of farmers. Several improved technologies were applied during demonstration like varietal management, nutrient management, seed treatment, bio-fertilizer application, bio-pesticide application, aphid management, sulfur management, INM, IPM to enhance the yield/ha. The varieties demonstrated were Rajendra suflam, RGN-48, Pusa Mahak, Uttra, Pusa-27, NC-1, Agrani, B-9 etc. In Rabi season another important oilseed crop is Linseed in eastern states that covered 508.3 ha area involving 1648 farmers with major varieties like Subhra, Garima, Sharda, Surbhi, Neelam, Ruchi & Azad Alsi-1. Demonstrations on Linseed were done with complete package of practices and component technologies like seed treatment, nutrient management, disease management, weed management, varietal management etc.

Table: Area covered under cluster frontlinedemonstration oilseed during rabi-summer2015-16

Sl. No.	Crop	State	No. of Demonstration	Area (ha)
		Bihar	-	-
1	Ground	Jharkhand	-	-
1.	nut	West Bengal	600	240
		Total	600	240
		Bihar	517	206.7
2	Sacama	Jharkhand	13	5
۷.	Sesame	West Bengal	775	310
		Total	1305	521.7
		Bihar	1394	557.8
2	Sun	Jharkhand	-	-
з.	flower	West Bengal	-	-
		Total	1394	557.8
	Grand T	otal	3299	1319.5

Performance appraisal of rabi oilseeds indicates that in rapeseed and mustard, the increase in yield was recorded to the tune of 56.7 to 98.0 per cent, the highest being in the state of Jharkhand. However, the benefit-cost ratio was identical in Bihar and West Bengal (1.83) than Jharkhand (1.5). In linseed also, Jharkhand recorded highest average demonstration yield (124.2%) followed by West Bengal and Bihar which were 85.7 and 83.7 per cent, respectively. With regard to benefit-cost ratio, Bihar was ahead of Jharkhand and West Bengal with 1.9 whereas it was 1.6 and 1.3 for West Bengal and Jharkhand, respectively. In mustard and rapeseed, the KVKs of Bihar demonstrated the varieties like Rajendra Suflam, RGN-48, Pusa Mahak and Uttra whereas Pusa Mahak, Pusa-26, Pusa-28, Pusa-27 and Pusa Bold were the major varieties demonstrated in Jharkhand. In West Bengal, alongwith Pusa Mahak, Kashinath, B-9, NC-1, B-54 and PAN-70 were also demonstrated. In respect of other technologies, seed treatment either with



Table:ClusterFrontlineDemonstrationconducted on Rabi Oilseeds during 2015-16

State	Rabi Oils	eed
	No. of Farmers	Area (ha)
Bihar	2657	935.5
Jharkhand	1934	530
West Bengal	2309	580
Total	6900	2045.5

In addition, groundnut, sesame and sunflower were also taken up for demonstration during rabi-summer season to cover an area of 1319.5 ha through 3299 number of demonstration programmes. However, the yield could not be obtained as the crops were yet to harvest within the period of this Annual Report. State-wise and crop-wise area and number of demonstration planned are given in the following table.



Carbendazim, Bavistin or *Trichoderma* was the common practice followed in all demonstration on rapeseed & mustard. Nutritional management, application of biofertilizer, weed management, application of micronutrient etc. were the other technologies demonstrated by the KVKs of this zone.

In linseed, the KVKs of Bihar demonstrated Subhra, Garima and Shekhar varieties whereas Sharda, Ruchi, Neelam, Surbhi and Azad Alsi-1 were the preferred varieties in the demonstration programme of Jharkhand. In West Bengal, Deepika, Ruchi, Shekhar, Parvati, Sharda and Neelam varieties were demonstration during rabi 2015-16. In respect of demonstrated technologies, seed treatment with Carbendazin and Trichoderma, weed management, line sowing, micronutrient application, nutrient management and disease management were the commonly applied practices in all the three states.



Sl. No.	Crop	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	Eo demon	conomics (stration (I	of Rs./ha)	Economics of check (Rs./ha)			
					Demo	Check		Gross Cost	Net Return	BC ratio	Gross Cost	Net Return	BC ratio	
1.	Rapeseed	Bihar	2265	792.2	13.5	7.6	77.6	18511	28760	2.21	16695	18958	1.83	
	& Mustard	Jharkhand	1198	305	10.1	5.1	98	14508	24926	2.29	12457	10802	1.5	
	Mustard	West Bengal	1789	440	12.7	8.1	56.7	16998	21614	2.47	18286	17833	1.83	
		Total	5252	1537.2	12.1	6.9	75.3	16672	25100	2.32	15812	15864	1.72	
2.	Linseed	Bihar	392	143.3	10.1	5.5	83.6	19149	34530	2.43	15369	21210	1.9	
		Jharkhand	736	225	7.4	3.3	124.2	11383	11682	1.6	9568	5475	1.33	
		West Bengal	520	140	3.9	2.1	85.7	14927	45064	1.92	12817	10754	1.61	
		Total	1648	508.3	7.1	3.6	97.2	15153	30425	1.98	12584	12479	1.61	

Table: Cluster frontline demonstration on rabi Oilseeds during 2015-16

Rabi pulse

Rabi Pulse is the most important crop in majority of the states Bihar, Jharkhand & West Bengal. It is a predominately rainfed crop grown in different land situation like rice-fallows, upland. Pulses hort duration leguminous crop, enriches soil fertility. Major pulses in the eastern states are grown in rabi season. Chickpea, lentil, green gram, field pea and blackgram are the major rabi pulses in the states of Bihar, Jharkhand and West Bengal. Among these three states, West Bengal produced blackgram in large areas. Out of 4486 ha allotted demonstrations, coverage was made in 4466 ha area involving 15430 farmers.

Lentil is the most important pulse crop in eastern states. The coverage area in Bihar was 1008 ha whole coverage in West Bengal was 306 ha. Total area under lentil was 1314 ha and farmers involved were 3285. Variety demonstrated were PM 5 (L-4594), HUL-57, DPL-62, WBL-77, Moitree etc. Technology like seed management, micronutrient management, zero tillage, weed management, plant protection etc. were also demonstrated in Chickpea a major rabi pulse in Bihar, Jharkhand and West Bengal. Demonstration was put in 3050 ha involving 1200 farmers. Chickpea varieties like GNG 1581, JG-11, JG-16, P-547, DGM-547, JAKI 9218, Pusa 362 were demonstrated in relatively less areas. Demonstration in seed treatment and bio-fertilizer alone contributed 13.9 % increase in yield. Greengram is grown in all the three states especially in rabi. The state of Bihar demonstration was made in 448.4 ha and number of demonstrations was 1121. Major varieties like PDM-84-139, SML 668, Samrat were demonstrated and technologies like seed treatment, INM, Bio-fertilizer application (Trichodermaviridi and Pseudomonas fluorescence 1.2 kg/ha) resulted in 24.9% increase in yield. In field pea large area was covered under demonstration in Bihar which was about 693.6 ha. HUDP- 15, Prakash were the major varieties which were demonstrated in these states. Technologies like seed treatment, INM, IPM, Bio-fertilizer etc. which as the part of the demonstration. Blackgram was also demonstrated in 154 ha involving 385 farmers mainly in West Bengal. Variety WBU-108 were the major varieties which were demonstrated in these states. Results showed, percentage yield increase was 29.6 to 59.5 in chickpea, 33.4 to 37.5 in lentil, 30.3 to 60.3 in fieldpea, 36 to 44.7 greengram, 41.8 blackgram. Economics of rabi pulse showed that chickpea gave 2.2-3.9, lentil 2.9-3.2, greengram 2.8-3.4, fieldpea 2.1-2.5, blackgram 3.2 BCR in rabi pulses.

Table:ClusterFrontlineDemonstrationsconducted on Rabi Pulses during 2015-16

State	Rabi P	ulses
	No. of Farmers	Area (ha)
Bihar	8037	2648
Jharkhand	4132	948
West Bengal	3261	870
Total	15430	4466

Table: Demonstration on rabi pulses during 2015-16

Sl.	Crop	State	No. of	Area	Yield	(q/ha)	%	*Econon	nics of dem	onstration ((Rs./ha)	*Econo	omics of o	check (R	s./ha)
No.			Farmers	(ha)	Demo	Check	Increase	Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR
1	Lentil	Bihar	2901	1008	14.14	10.4	37.5	19243	47196	28220	2.6	21258	65474	43588	3.2
		West Bengal	1343	306	9.5	7.2	33.4	17978	40967	22989	2.4	21192	57533	36341	2.9
		Total	4244	1314	11.8	8.8	35.5	18611	44082	25605	2.5	21225	61504	39965	3.1



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Sl. No.	Сгор	State	No. of Farmers	Area (ha)	Yield	(q/ha)	% Increase	*Econ	omics of (Rs./	demonstr 'ha)	ation	*Econo	omics of o	check (R	s./ha)
					Demo	Check		Gross Cost	Gross Return	Net Return	** BCR	Gross Cost	Gross Return	Net Return	** BCR
2	Chickpea	Bihar	1550	498	14.2	10.8	34.4	21505	53061	31645	2.5	23038	70285	47174	3.1
		Jharkhand	1990	502	14.6	9.5	59.5	17889	39213	21481	2.3	20677	77842	41341	3.9
		West Bengal	918	200	12.3	9.6	29.6	20744	48096	27353	2.3	23321	51769	32168	2.2
		Total	4458	1200	13.7	10.0	41.2	20046	46790	26826	2.4	22345	66632	40228	3.1
3	Pea	Bihar	2427	693.6	14.3	10.4	40.2	21069	39374	18289	1.9	23103	54940	31838	2.5
		Jharkhand	440	86	14.04	8.9	62.3	20394	33708	13311	1.7	23007	50782	27642	2.3
		West Bengal	355	80	9.0	7.3	30.4	18841	31817	12976	1.7	19800	39645	19845	2.1
		Total	3222	859.6	12.4	8.9	44.3	20101	34966	14859	1.8	21970	48456	26442	2.3
4	Grengram	Bihar	1159	448.4	10.3	7.4	44.7	16988	41389	24401	2.3	19325	64164	44839	3.1
		Jharkhand	831	282	9.5	6.7	43.8	16956	41240	24284	2.6	19943	64624	44681	3.4
		West Bengal	1014	208	8.4	7.1	36.7	26231	68971	42740	2.9	21407	49754	28347	2.4
		Total	3004	938.4	9.3	7.0	39.4	18719	44336	25617	2.4	22266	66241	43976	3.1
5	Blackgram	West Bengal	502	154	10.3	7.26	41.8	24210	57225	32390	2.7	30795	80250	49955	3.2
		Total	502	154	10.3	7.26	41.8	24210	57225	32390	2.7	30795	80250	49955	3.2
	Total rabi	nulses	15430	4466											



4.4 TRAINING ACHIEVEMENTS

4.4.1 Practicing farmers

The development of agriculture, among other factors, depends on the appropriate application of improved agricultural practices by the farming community. The faster improvement of agriculture and allied technologies needs adequate knowledge and skill for its application in the actual field condition. Hence, providing knowledge and skill to the practicing farmers is pre-requisite in developing agriculture through adoption/application of advanced agricultural technologies. The farmers and farm-women registered their names in large number to acquire improved knowledge and skill in different areas of crop production, horticulture, fruit management, ornamental plant cultivation, plantation crop management, tuber crop management, spices, medicinal & aromatic plant management, soil health & fertility management, livestock production & management, home science & women empowerment, agricultural engineering, plant protection, fisheries development, production of inputs at site, capacity building & group dynamics, agro-forestry and other areas. Rural youths, on the other hand, enrolled



their name to obtain training in more specific areas which are considered to have potentiality for enterprise development in the respective districts. In respect of extension functionaries, the assessment of training need was made by the concerned departments/organizations KVK helped them to refresh their knowledge mainly in the areas of frontier technology generation and application. In imparting training to farmers, rural youths and extension functionaries, the KVKs resorted to on campus and off-campus condition as per the requirement of training course curriculum. As the farmers need field application of newly generated technologies/practices, emphasis was given by the KVKs to conduct more number of off-campus programmes whereas for rural youths and extension functionaries, KVKs concentrated on providing more number of on-campus training programmes.

The training programmes organized by the KVKs during 2015-16 altogether was 7459 number covering 227533 number of farmers. Out of these, 156194 numbers of farmers attended in off-campus training 5009 number of courses at KVK campus. Whereas 84855 number of farmers participated in 2450 number of courses conducted



in the villages as off-campus training. Participation of farm women in these training programme was significant which constitute about 23.6% of the beneficiaries.

A close look on training programmes of rural youths and girls showed that 21387 rural youths were provided training through 799 training programmes conducted at KVKs whereas about 30636 youths were participated in 1387 number of training programmes organized outside KVKs. For extension functionaries 321 off-campus courses were conducted where 10746 participants were benefitted. In contrast 478 courses were organized for 14989 participants in respect of on-campus programmes. The cumulative figures of training programme for rural youths was 52023 and extension functionaries was 25735. The number of courses was 2186 and 799 for rural youth and extension functionaries, respectively.

Table: Training conducted for farmers and farm women

State	No. of Courses	No. of Participants										Grand Total			
			Other			SC			ST						
		M	F	Т	М	F	Т	М	F	Т	М	F	Т		
A & N ISLAND	60	613	459	1072	0	0	0	547	355	902	1160	814	1974		
BIHAR	4290	83348	15395	98743	15130	7468	22598	3483	2452	5935	101961	25315	127276		
JHARKHAND	1483	11409	3478	14887	2537	1453	3990	18623	8849	27472	32569	13780	46349		
WEST BENGAL	1626	19083	5910	24993	11443	3954	15397	7418	4126	11544	37944	13990	51934		
TOTAL:	7459	114453	25242	139695	29110	12875	41985	30071	15782	45853	173634	53899	227533		

Table : Training conducted for rural youths

State	No. of	No. of Participants									Grand Total			
	Courses		Other	SC ST										
		М	F	Т	Μ	F	Т	М	F	Т	M	F	Т	
A & N ISLAND	27	324	246	570	0	0	0	102	95	197	426	341	767	
BIHAR	1079	13372	5112	18484	2731	1702	4433	763	1131	1894	16866	7945	24811	
JHARKHAND	420	1661	785	2446	335	299	634	3811	2370	6181	5807	3454	9261	
WEST BENGAL	660	6878	2728	9606	3572	1450	5022	1399	1157	2556	11849	5335	17184	
TOTAL:	2186	22235	8871	31106	6638	3451	10089	6075	4753	10828	34948	17075	52023	

Table : Training conducted for extension functionaries

State	No. of	No. of Participants										Grand Total			
	Courses		Other			SC			ST						
		М	F	Т	M	F	Т	M	F	Т	Μ	F	Т		
A & N ISLAND	7	108	76	184	0	0	0	1	0	1	109	76	185		
BIHAR	457	9818	1288	11106	1864	504	2368	316	647	963	11998	2439	14437		
JHARKHAND	152	2102	263	2365	337	65	402	2464	670	3134	4903	998	5901		
WEST BENGAL	183	1717	1142	2859	796	784	1580	278	495	773	2791	2421	5212		
TOTAL:	799	13745	2769	16514	2997	1353	4350	3059	1812	4871	19801	5934	25735		

Group-wise trend of participation in the entire zone in respect of training organized for farmers' portrays that nearly twenty four per cent (23.68%) women constituted the total participants with highest percentage recorded in A&N Islands (42.1%). In Bihar, 32.0 per cent of the total participants were women, in Jharkhand the percentage was 29.7 and it was 26.9 per cent in the case of West Bengal. for rural youths, however, depicts much healthier percentage where more than 32 per cent (32.8%) of the participants were girls. State/Union Territory-wise analysis of the participation showed that the participation of girls was to the extent of 32.0 per cent in Bihar, in Jharkhand it was 37.3 per cent and it was 31.0 per cent in the case of West Bengal.

Participation of girls in the training programmes organized

In respect of extension functionaries, only 23.0 per cent



women contributed the total participants in the zone though it was as high as 46.5 per cent in the case of West Bengal and followed by 41.0 per cent in A & N Islands. In Bihar and Jharkhand only 16.8 per cent of the total participants were women.

Detailed analysis of category-wise training programmes organized by the KVKs of Zone-II indicates that out of total 7459 programmes, 1690 courses were conducted in crop production related areas, 1163 in horticulture, 986 in livestock production and management, 980 in plant protection, 811 in home science and women empowerment, 688 in soil health and fertility management, 425 in agricultural engineering, 265 in fisheries, 161 in production of inputs, 235 in capacity building and group dynamics, 44 in agro-forestry and 31 other areas. In respect of participation by the farmers, 52559 farmers and farm-women took part in crop production related training programmes, 29957 in plant protection related thematic areas; 34839 in horticulture including vegetable, fruit, ornamental plants, plantation crops, tuber crops, spices and medicinal and aromatic plants; 22047 in soil health and fertility management, 28128 in livestock production and management; 23926 in home science; 13391 in agricultural engineering; 8435 in fisheries; 7221 in capacity building; 1528 in agro-forestry and 923 in other areas.

Table: Training Programme for Practicing farmers and Farm Women

Thematic Area	No. of	No. of No. of Participants											
	Courses		Other			SC			ST		G	rand Tot	al
		М	F	Т	М	F	Т	M	F	Т	M	F	Т
I. Crop Production	1	0	0	0	0	0	0	20	10	30	20	10	30
Weed Management	155	2739	516	3255	787	199	986	558	281	839	4084	996	5080
Resource Conservation Technologies	161	2817	332	3149	533	158	691	875	362	1237	4225	852	5077
Cropping Systems	101	1511	143	1654	315	97	412	585	198	783	2411	438	2849
Crop Diversification	144	2262	219	2481	790	106	896	1478	515	1993	4530	840	5370
Integrated Farming	77	798	257	1055	291	96	387	708	219	927	1797	572	2369
Water management	70	924	88	1012	276	89	365	438	187	625	1638	364	2002
Seed production	246	4292	370	4662	981	143	1124	857	244	1101	6130	757	6887
Nursery management	75	1373	114	1487	385	48	433	295	122	417	2053	284	2337
Integrated Crop Management	352	6456	556	7012	1260	388	1648	1125	369	1494	8841	1313	10154
Fodder production	40	710	65	775	200	47	247	191	63	254	1101	175	1276
Production of organic inputs	58	943	263	1206	226	58	284	254	99	353	1423	420	1843
Others, (cultivation of crops)	211	4551	439	4990	966	172	1138	923	264	1187	6440	875	7315
TOTAL	1690	29376	3362	32738	7010	1601	8611	8287	2923	11210	44673	7886	52559
II. Horticulture													
a) Vegetable Crops													
Production of low volume and high value crops	152	1981	376	2357	543	130	673	914	440	1354	3438	946	4384
Off-season vegetables	110	1237	227	1464	757	99	856	886	330	1216	2880	656	3536
Nursery raising	91	1157	235	1392	364	172	536	491	201	692	2012	608	2620
Exotic vegetables like Broccoli	22	278	53	331	87	25	112	69	25	94	434	103	537
Export potential vegetables	38	376	78	454	60	71	131	290	131	421	726	280	1006
Grading and standardization	39	536	81	617	87	56	143	188	147	335	811	284	1095
Protective cultivation (Green Houses, Shade Net etc.)	85	2354	335	2689	221	43	264	430	144	574	3005	522	3527
Others, if any (Cultivation of Vegetable)	211	3137	623	3760	840	191	1031	833	460	1293	4810	1274	6084
TOTAL	748	11056	2008	13064	2959	787	3746	4101	1878	5979	18116	4673	22789
b) Fruits													
Training and Pruning	4	52	18	70	22	0	22	11	0	11	85	18	103

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Thematic Area	No. of					Ν	o. of Pa	rticipa	nts				
	Courses		Other			SC			ST		G	rand Tot	tal
		Μ	F	Т	М	F	Т	М	F	Т	М	F	Т
Layout and Management of Orchards	79	1212	91	1303	287	65	352	326	168	494	1825	324	2149
Cultivation of Fruit	66	713	85	798	221	67	288	388	119	507	1322	271	1593
Management of young plants/ orchards	31	401	58	459	129	38	167	116	52	168	646	148	794
Rejuvenation of old orchards	9	191	9	200	11	19	30	3	5	8	205	33	238
Export potential fruits	5	80	22	102	14	5	19	8	2	10	102	29	131
Micro irrigation systems of orchards	13	175	39	214	70	29	99	17	13	30	262	81	343
Plant propagation techniques	24	253	89	342	93	15	108	177	18	195	523	122	645
Others, if any	16	245	12	257	47	6	53	102	11	113	394	29	423
TOTAL	247	3322	423	3745	894	244	1138	1148	388	1536	5364	1055	6419
c) Ornamental Plants													
Nursery Management	12	143	30	173	45	49	94	107	47	154	295	126	421
Management of potted plants	4	54	0	54	8	0	8	21	9	30	83	9	92
Export potential of ornamental plants	1	6	13	19	0	0	0	0	3	3	6	16	22
Propagation techniques of Ornamental Plants	14	266	64	330	58	23	81	16	14	30	340	101	441
Others, if any	12	86	60	146	28	12	40	74	35	109	188	107	295
TOTAL	43	555	167	722	139	84	223	218	108	326	912	359	1271
d) Plantation crops													
Production and Management technology	15	179	68	247	74	25	99	57	17	74	310	110	420
Processing and value addition	5	17	34	51	7	28	35	0	10	10	24	72	96
Others, if any	5	34	11	45	19	8	27	52	27	79	105	46	151
TOTAL	25	230	113	343	100	61	161	109	54	163	439	228	667
e) Tuber crops													
Production and Management technology	23	288	59	347	66	28	94	172	94	266	526	181	707
Processing and value addition	4	74	25	99	8	1	9	0	5	5	82	31	113
Others, if any	8	118	9	127	10	12	22	61	67	128	189	88	277
TOTAL	35	480	93	573	84	41	125	233	166	399	797	300	1097
f) Spices													
Production and Management technology	40	427	74	501	138	10	148	244	102	346	809	186	995
Processing and value addition	1	4	9	13	0	2	2	0	0	0	4	11	15
TOTAL	41	431	83	514	138	12	150	244	102	346	813	197	1010
g) Medicinal and Aromatic Plants													
Nursery management	4	35	9	44	18	27	45	5	7	12	58	43	101
Production and management technology	8	110	8	118	25	5	30	30	0	30	165	13	178
Post harvest technology and value addition	9	105	31	136	11	8	19	2	0	2	118	39	157

ICAR-ATARI KOLKATA



Thematic Area	No. of Courses SC ST Crand Tatal												
	Courses		Other			SC			ST		G	rand Tot	al
		M	F	Т	М	F	Т	M	F	Т	M	F	Т
Others, if any	3	925	27	952	94	6	100	92	6	98	1111	39	1150
TOTAL	24	1175	75	1250	148	46	194	129	13	142	1452	134	1586
III. Soil Health and Fertility Management													
Soil fertility management	129	1914	292	2206	520	133	653	684	288	972	3118	713	3831
Soil and Water Conservation	60	802	173	975	284	104	388	387	102	489	1473	379	1852
Integrated Nutrient Management	206	3817	415	4232	924	219	1143	965	245	1210	5706	879	6585
Production and use of organic inputs	65	710	184	894	283	233	516	392	169	561	1385	586	1971
Management of Problematic soils	30	369	182	551	134	78	212	184	112	296	687	372	1059
Micro nutrient deficiency in crops	29	530	27	557	57	4	61	118	50	168	705	81	786
Nutrient Use Efficiency	25	330	49	379	41	9	50	315	90	405	686	148	834
Soil and Water Testing	85	1712	335	2047	492	155	647	376	164	540	2580	654	3234
Others, if any	59	937	128	1065	202	68	270	444	116	560	1583	312	1895
TOTAL	688	11121	1785	12906	2937	1003	3940	3865	1336	5201	17923	4124	22047
IV. Livestock Production and Management													
Dairy Management	188	3363	424	3787	596	274	870	370	270	640	4329	968	5297
Poultry Management	150	1465	583	2048	524	380	904	555	841	1396	2544	1804	4348
Piggery Management	60	272	69	341	258	87	345	525	518	1043	1055	674	1729
Rabbit Management	32	486	156	642	68	35	103	159	72	231	713	263	976
Disease Management	202	3127	480	3607	577	311	888	608	430	1038	4312	1221	5533
Feed management	173	2780	482	3262	612	345	957	468	382	850	3860	1209	5069
Production of quality animal products	47	583	375	958	168	136	304	118	67	185	869	578	1447
Others, if any Goat farming	134	1412	587	1999	514	368	882	498	350	848	2424	1305	3729
TOTAL	986	13488	3156	16644	3317	1936	5253	3301	2930	6231	20106	8022	28128
V. Home Science/Women empowerment													
Household food security by kitchen gardening and nutrition gardening	117	797	1168	1965	401	753	1154	317	278	595	1515	2199	3714
Design and development of low/minimum cost diet	27	141	353	494	17	171	188	2	80	82	160	604	764
Designing and development for high nutrient efficiency diet	28	246	250	496	43	57	100	52	162	214	341	469	810
Minimization of nutrient loss in processing	23	206	323	529	42	115	157	15	77	92	263	515	778
Gender mainstreaming through SHGs	32	348	476	824	111	441	552	27	70	97	486	987	1473
Storage loss minimization techniques	57	552	531	1083	82	192	274	64	89	153	698	812	1510
Enterprise development	38	169	414	583	104	179	283	51	91	142	324	684	1008

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Thematic Area	No. of No. of Participants												
	Courses		Other			SC			ST		G	rand Tot	al
		М	F	Т	М	F	Т	М	F	Т	М	F	Т
Value addition	154	783	1298	2081	177	508	685	172	624	796	1132	2430	3562
Income generation activities for empowerment of rural Women	78	390	934	1324	127	332	459	55	367	422	572	1633	2205
Location specific drudgery reduction technologies	39	429	316	745	274	298	572	29	132	161	732	746	1478
Rural Crafts	70	168	970	1138	125	387	512	2	157	159	295	1514	1809
Women and child care	43	233	440	673	225	362	587	153	151	304	611	953	1564
Others, if any	105	980	1176	2156	185	487	672	205	218	423	1370	1881	3251
TOTAL	811	5442	8649	14091	1913	4282	6195	1144	2496	3640	8499	15427	23926
VI. Agril. Engineering													
Installation and maintenance of micro irrigation systems	56	965	181	1146	258	148	406	284	131	415	1507	460	1967
Use of Plastics in farming practices	26	355	69	424	53	33	86	156	14	170	564	116	680
Production of small tools and implements	34	626	106	732	162	46	208	138	58	196	926	210	1136
Repair and maintenance of farm machinery and implements	147	2648	273	2921	579	324	903	365	145	510	3592	742	4334
Small scale processing and value addition	29	369	20	389	140	47	187	163	92	255	672	159	831
Post Harvest Technology	35	565	48	613	143	34	177	169	90	259	877	172	1049
Others, if any	98	1861	330	2191	383	207	590	448	165	613	2692	702	3394
TOTAL	425	7389	1027	8416	1718	839	2557	1723	695	2418	10830	2561	13391
VII. Plant Protection													
Integrated Pest Management	570	11236	1220	12456	2688	603	3291	1552	485	2037	15476	2308	17784
Integrated Disease Management	247	4442	554	4996	999	263	1262	651	354	1005	6092	1171	7263
Bio-control of pests and diseases	52	852	105	957	231	94	325	235	74	309	1318	273	1591
Production of bio control agents and bio pesticides	27	559	50	609	161	21	182	68	54	122	788	125	913
Others, if any	84	1288	170	1458	436	139	575	264	109	373	1988	418	2406
TOTAL	980	18377	2099	20476	4515	1120	5635	2770	1076	3846	25662	4295	29957
VIII. Fisheries													
Integrated fish farming	41	649	173	822	209	40	249	145	145	290	1003	358	1361
Carp breeding and hatchery management	16	277	14	291	65	14	79	19	0	19	361	28	389
Carp fry and fingerling rearing	22	204	17	221	70	11	81	199	56	255	473	84	557
Composite fish culture	78	1210	189	1399	481	87	568	242	77	319	1933	353	2286
Hatchery management and culture of freshwater prawn	22	380	37	417	161	14	175	39	1	40	580	52	632
Breeding and culture of ornamental fishes	10	77	19	96	81	2	83	69	35	104	227	56	283
Portable plastic carp hatchery	4	50	7	57	39	8	47	3	0	3	92	15	107
Pen culture of fish and prawn	2	10	3	13	9	2	11	14	4	18	33	9	42

ICAR-ATARI KOLKATA



Thematic Area	No. of No. of Participants												
	Courses		Other	·		SC			ST		G	rand Tot	tal
		Μ	F	Т	Μ	F	Т	M	F	Т	М	F	Т
Shrimp farming	2	44	0	44	20	0	20	0	0	0	64	0	64
Edible oyster farming	6	94	4	98	37	1	38	0	0	0	131	5	136
Pearl culture	5	83	8	91	32	3	35	0	0	0	115	11	126
Fish processing and value addition	22	386	11	397	72	1	73	24	17	41	482	29	511
Others, if any	35	1304	123	1427	311	55	366	102	46	148	1717	224	1941
TOTAL	265	4768	605	5373	1587	238	1825	856	381	1237	7211	1224	8435
IX. Production of Inputs at site													
Seed Production	43	815	28	843	121	5	126	94	29	123	1030	62	1092
Planting material production	12	196	59	255	27	8	35	99	46	145	322	113	435
Bio-agents production	7	266	4	270	54	2	56	0	0	0	320	6	326
Bio-pesticides production	5	160	8	168	25	0	25	6	0	6	191	8	199
Bio-fertilizer production	7	222	0	222	61	0	61	19	18	37	302	18	320
Vermi-compost production	39	384	188	572	112	61	173	210	135	345	706	384	1090
Organic manures production	15	213	12	225	122	13	135	49	53	102	384	78	462
Production of fry and fingerlings	1	28	0	28	2	0	2	0	0	0	30	0	30
Production of Bee-colonies and wax sheets	6	65	46	111	5	5	10	59	0	59	129	51	180
Small tools and implements	2	52	16	68	20	7	27	10	10	20	82	33	115
Production of livestock feed and fodder	7	127	21	148	62	23	85	16	46	62	205	90	295
Production of Fish feed													
Others, if any	17	311	129	440	164	20	184	10	2	12	485	151	636
TOTAL	161	2839	511	3350	775	144	919	572	339	911	4186	994	5180
X. Capacity Building and Group Dynamics													
Leadership development	23	349	59	408	103	14	117	34	17	51	486	90	576
Group dynamics	28	460	88	548	91	17	108	126	73	199	677	178	855
Formation and Management of SHGs	74	851	403	1254	250	166	416	68	165	233	1169	734	1903
Mobilization of social capital	10	128	70	198	42	43	85	1	26	27	171	139	310
Entrepreneurial development of farmers/youths	33	371	96	467	48	71	119	203	183	386	622	350	972
WTO and IPR issues	4	124	2	126	25	5	30	7	0	7	156	7	163
Others, if any (Women Legal Rights)	63	1556	214	1770	226	77	303	251	118	369	2033	409	2442
TOTAL	235	3839	932	4771	785	393	1178	690	582	1272	5314	1907	7221
XI Agro-forestry													
Production technologies	3	34	9	43	0	4	4	26	13	39	60	26	86
Nursery management	7	85	65	150	20	1	21	19	17	36	124	83	207
Integrated Farming Systems	34	207	6	213	48	18	66	712	244	956	967	268	1235
TOTAL	44	326	80	406	68	23	91	757	274	1031	1151	377	1528
XII. Others (Pl. Specify)	11	239	74	313	23	21	44	0	41	0	186	136	322
TOTAL	7459	114453	25242	139695	29110	12875	41985	30071	15782	45853	173634	53899	227533



(Table).

programmes organized by the KVKs reveals that altogether 1848 number of courses were conducted by the KVKs for 44673 farmers and 7886 farm women in crop production thematic area. Among various sub-thematic areas, highest number of courses (570) was offered in integrated pest management and followed by integrated crop management (352) and integrated disease management (247). Other subthematic areas in order of courses organized were general crop cultivation (211), integrated nutrient management (206), disease management in livestock (202), dairy management (188), feed management (173), resource conservation technologies (161), weed management (155), value addition (154), poultry management (150), crop diversification (144), goat farming (134), soil fertility management (129), kitchen gardening (117), off- season vegetable cultivation (110), cropping systems (101), nursery raising (91), integrated farming (77) and others

In horticulture as a whole, 1163 number of courses were organized for 34839 farmers of which 6946 were women (19.9%). Among seven sub-thematic areas, highest number of courses was offered in cultivation of vegetable crops (748) for 22789 number of farmers followed by cultivation of fruit (247 courses for 6419 farmers), ornamental plants (43 courses for 1271 farmers) and others.

Livestock production and management was the third-most important area of training both in respect of number of courses offered and participation of farmers took place. In this thematic area, 986 numbers of training programmes was organized for 28128 farmers. Disease management and dairy management were the two major areas where 202 and 188 number of training programmes were conducted by the KVKs for 5533 and 5297 number of farmers, respectively.

Plant protection was another important thematic area both in terms of training programmes organized and participation of farmers. The KVKs orgnaized 980 number of courses for the benefit of 29957 farmers of which 4295 (14.3%) participants were farm-women. In terms of courses offered and participation took place, home science/women empowerment was the next important thematic area where 811 number of courses were conducted for 23926 farmers. However, nearly 65 per cent of the participants were women. In the areas of value addition and kitchen and nutritional gardening, participation of farmers was more compared to other thematic areas, otherwise all other thematic areas were dominated by farm women only. Soil health and fertility management was one of the important thematic area of the training programme conducted where 688 numbers of courses covered for 22047 numbers of farmers. Repair and maintenance of farm machinery and implements, was the most important sub-thematic area under agricultural engineering thematic area both in terms of courses conducted and farmers participated. In this thematic area, 425 numbers of courses were offered to 13391 farmers out of which 147 courses were in repair and maintenance of farm machinery. The participation of farmers in this sub-thematic area was to the extent of 4334 number of 32.4 percent. Installation and maintenance of micro-irrigation systems was the second-most important area where 56 courses were offered to 1967 farmers. The overall participation of farm-women was to the tune of 19.1 per cent. In fisheries, 265 number of courses were conducted by the KVKs for the participation of 8435 farmers and farm-women. However, the participation of farm-women was recorded as high as 14.5 per cent. Among various sub-thematic areas, composite fish culture attracted most number of participants (2286) followed by integrated fish farming, carp fry and fingerling rearing and others.

KVKs also conducted 235 number of courses for 7221 farmers and farm-women in capacity building and group dynamics. Major areas covered in this thematic area included formation and management of SHGs (74 number), women legal rights (63 number), entrepreneurial development of farmers/youths (33 number of courses), group dynamics (28 courses), leadership development (23 number) and others. However, highest number of participation was recorded in women legal rights (2442) followed by formation and management of SHGs (1903), entrepreneurial development of farmers/youths (972), group dynamics (855) and others. Production of inputs at site was another area where 161 number of courses were conducted for 5180 participants. Seed production, vermicompost production, organic manure production and others were the major area of training. The KVKs also covered agro-forestry through this training courses and 44 number of courses were organized in this thematic area of 1528 farmers and farm-women. Integrated farming systems, nursery management were the major area where 1528 and 1230 farmers, respectively, participated. The overall analysis of the training programmes organized by the KVKs of Zone-II indicates that KVKs have tried to provide required skill and knowledge to the farmers and farm-women in various aspects to enable them to enhance the production and productivity of crops, livestock, fishery and all other areas. Moreover, concentration on certain areas like group dynamics, women empowerment, production of inputs at site etc. has helped the farmwomen in improving their socio-economic condition through SHG/group formation which is a welcome step on the part of KVKs.



4.4.2 Rural youth

The KVKs of Zone II with an aim to boost the youths planned and conducted enterprise-potential training programmes for a large number of rural youths to make them self-employed through their own efforts and acquired managerial and related skill. In the course of inculcating knowledge and skill, the KVKs conducted 2186 number of training programmes for benefit of 52023 rural youths and girls. Among the participants 19.4% were in the cateogry of Schedule Caste and 20.8% in Schedule Tribe. In terms of preferred courses, mushroom production was mostly prefrred by trainees. A total of 226 courses were offered for 5379 rural youths while training on Para extension workers attracted more people from the rural youths. Total participant in this category was 5735 in 253 courses. In seed production 109 courses were organized for 2664 trainees, ICT application in agriculture (99) for 2788 participants, sericulture in 84 courses for 2282 trainees, integrated farming in 85 courses for 1752 trainees, production of

Table: Training programme for Rural Youth

organic inputs was taken by 2124 rural youths, sheep and goat farming was taken was taken by 2498 in 75 courses, planting material production training was taken by 1933 rural youths and girls and 75 courses were organized for them. Other important areas for self employment training were vermiculture (72 courses for 1472 participants), nursery management in horticulture crops (71 courses for 1418 participants), tailoring and stitching (71 courses for 1031 participants), dairying (69 courses for 1739 participants), enterprise development (68 courses for 1536 participants), bee keeping (63 courses for 1411 trainees), repair and maintenance of farm machinery (62 courses for 1465 participants), value addition(58 courses in 1626 participants), training and pruning orchards (58 courses for 1045 trainees) and (composite fish culture (40 courses for 1080 participants). Overall picture showed that tural youths and girls have rely on the training from the KVKs for self employment generation and additional income. The details are given in following table.

Thematic Area	No. of	o. of No. of Participants											
	Courses		Other			SC			ST		G	rand Tot	al
		М	F	Т	Μ	F	Т	M	F	Т	М	F	Т
Mushroom Production	226	1627	1477	3104	361	514	875	533	867	1400	2521	2858	5379
Bee-keeping	63	719	159	878	154	24	178	263	92	355	1136	275	1411
Integrated farming	85	859	133	992	202	64	266	394	100	494	1455	297	1752
Seed production	109	1661	207	1868	376	75	451	294	51	345	2331	333	2664
Production of organic inputs	81	893	522	1415	255	112	367	197	145	342	1345	779	2124
Planting material production	75	1062	145	1207	296	60	356	271	99	370	1629	304	1933
Vermi-culture	72	610	111	721	246	28	274	311	166	477	1167	305	1472
Sericulture	84	1093	160	1253	317	96	413	348	268	616	1758	524	2282
Protected cultivation of vegetable crops	45	427	98	525	121	51	172	150	95	245	698	244	942
Commercial fruit production	59	676	134	810	360	56	416	152	124	276	1188	314	1502
Repair and maintenance of farm machinery and implements	62	933	78	1011	235	5	240	206	8	214	1374	91	1465
Nursery Management of Horticulture crops	71	720	99	819	200	37	237	245	117	362	1165	253	1418
Training and pruning of orchards	58	553	79	632	170	22	192	140	81	221	863	182	1045
Value addition	58	453	405	858	157	173	330	146	292	438	756	870	1626
Production of quality animal products	35	372	356	728	59	102	161	23	36	59	454	494	948
Dairying	69	830	322	1152	242	127	369	157	61	218	1229	510	1739
Sheep and goat rearing	75	911	308	1219	276	174	450	441	388	829	1628	870	2498
Quail farming	34	282	111	393	99	51	150	106	133	239	487	295	782
Piggery	32	130	43	173	103	27	130	247	71	318	480	141	621
Rabbit farming	13	84	27	111	58	12	70	71	77	148	213	116	329

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Thematic Area	No. of	. of No. of Participants											
	Courses		Other			SC			ST		G	rand To	tal
		М	F	Т	Μ	F	Т	Μ	F	Т	М	F	Т
Poultry production	58	481	156	637	185	68	253	193	73	266	859	297	1156
Ornamental fisheries	35	370	145	515	83	121	204	91	137	228	544	403	947
Enterprise development	68	616	303	919	256	87	343	196	78	274	1068	468	1536
Para vets	15	149	42	191	40	17	57	113	8	121	302	67	369
Para extension workers	253	3063	1205	4268	820	536	1356	87	24	111	3970	1765	5735
Composite fish culture	31	294	141	435	93	46	139	55	22	77	442	209	651
Cold water fisheries	3	14	37	51	7	3	10	0	0	0	21	40	61
Fish harvest and processing technology	8	173	21	194	36	2	38	9	1	10	218	24	242
Fry and fingerling rearing	16	222	54	276	66	19	85	87	11	98	375	84	459
Small scale processing	27	269	116	385	81	56	137	64	151	215	414	323	737
Post Harvest Technology	41	342	294	636	153	96	249	68	115	183	563	505	1068
Tailoring and Stitching	71	104	427	531	58	154	212	47	241	288	209	822	1031
Rural Crafts	55	278	405	683	84	148	232	88	308	396	450	861	1311
Others, if any (ICT application in agriculture)	99	965	551	1516	389	288	677	282	313	595	1636	1152	2788
TOTAL	2186	22235	8871	31106	6638	3451	10089	6075	4753	10828	34948	17075	52023

4.4.3 Extension functionaries

Extension functionaries of state Government departments play an important role in disseminating agricultural and allied technologies among the farming community. Because KVKs helps in updating technological knowledge skill in the frontier areas of the agriculture and allied technologies. During the last year, 799 courses were organized for 25735 extension functionaries in different areas of production, capacity development and management of agriculture and animals. Out of the total extension functionaries trained 23.1% were female functionaries, 76.7% were male functionaries. The functionaries trained were 16.9% from schedule caste and 18.9% were from schedule tribe category. Among the field choosen for updating of knowledge were productivity enhancement in field crops and management in farm animals were in top of the list. About 119 courses were organized for 4006 extension functionaries in the field of productivity enhancement in field crops and 104 courses in management in farm animals. Integrated nutrient management and integrated pest management were the other important thematic area as per as training of extension functionaries are concerned. In this area 59 and 58 courses were organized for 1801 and 2099 number of extension staff, respectively. Training on formation and management of SHGs and protected cultivation were also conducted for the extension functionaries where total participants were 1239 in 44 courses and 968 in 41 courses, respectively. Other important areas were care and maintenance of farm machinery and implements (41 courses in 977 participants), livestock feed and fodder production (38 courses for 933 participants), rejuvenation of old orchards (34 courses in 1208 participants), gender mainstreaming through SHGs (32 courses for 964 participants). The details were given in following Table. In order to extend the benefit to large number of extension worker, these category of training includes line department officials, teachers, NGO staff and other agricultural related workers of the districts.

Thematic Area	No. of	No. of Participants											
	Courses		Other			SC			ST		Grand Total		
		М	F	Т	М	F	Т	М	F	Т	М	F	Т
Productivity enhancement in field crops	119	2575	223	2798	397	68	465	629	114	743	3601	405	4006
Integrated Pest Management	58	1321	134	1455	391	89	480	132	32	164	1844	255	2099
Integrated Nutrient management	59	1332	72	1404	181	15	196	173	28	201	1686	115	1801

ICAR-ATARI KOLKATA



Thematic Area	No. of	No. of Participants											
	Courses		Other			SC			ST		Grand Total		
		M	F	Т	Μ	F	Т	Μ	F	Т	М	F	Т
Rejuvenation of old orchards	34	584	74	658	113	47	160	326	64	390	1023	185	1208
Protected cultivation technology	41	659	113	772	74	15	89	85	22	107	818	150	968
Formation and Management of SHGs	44	265	378	643	46	220	266	163	167	330	474	765	1239
Group Dynamics and farmers organization	22	480	70	550	92	8	100	27	34	61	599	112	711
Information networking among farmers	16	634	14	648	113	2	115	782	36	818	1529	52	1581
Capacity building for ICT application	11	182	16	198	40	9	49	42	16	58	264	41	305
Care and maintenance of farm machinery and implements	41	726	54	780	136	4	140	50	7	57	912	65	977
WTO and IPR issues	7	145	5	150	19	6	25	5	12	17	169	23	192
Management in farm animals	104	1321	274	1595	580	180	760	267	621	888	2168	1075	3243
Livestock feed and fodder production	38	387	137	524	183	69	252	80	77	157	650	283	933
Household food security	30	446	259	705	61	117	178	36	46	82	543	422	965
Women and Child care	20	65	279	344	40	152	192	7	49	56	112	480	592
Low cost and nutrient efficient diet designing	19	241	133	374	74	65	139	31	74	105	346	272	618
Production and use of organic inputs	25	407	84	491	73	27	100	62	9	71	542	120	662
Gender mainstreaming through SHGs	32	403	91	494	123	27	150	39	281	320	565	399	964
Others, if any	79	1572	359	1931	261	233	494	123	123	246	1956	715	2671
TOTAL	799	13745	2769	16514	2997	1353	4350	3059	1812	4871	19801	5934	25735

4.4.4 Sponsored training programme

Outreach of KVKs of Zone-II in almost every corner of the district has not only helped the farming community in receiving need-based support and information backup but also attracted different organizations engaged in agricultural development activities to come in close contact with KVKs. Visit and interaction with KVKs and farming community convinced them to solicit help and guidance from KVKs in better implementation of their plan of action. At the same time, the organizations felt it appropriate to utilize the expertise of KVKs in upbringing the knowledge and skill of their target beneficiary through HRD programmes of KVKs. KVKs of Zone-II towards agricultural development in general and capacity building of farmers in particulars, a number of govt. and other organizations are approaching the KVKs to get their clientels trained in various aspects of agricultural development, livestock rearing, fishery, postharvest technology and value addition, farm machienry, women empowerment/home science, capacity building etc. The KVKs, on the other hands, have tried to fulfill the expectations of those organizations apart from working on the mandated activities. In the process of sharing expertise with those organizations, the KVKs trained 101105 number of farmers, youths and other stakeholders during last one year by offering 1560 number of courses of varied duration.

The major areas covered by the KVKs were crop production and management, production and value addition, post-harvest technology and value addition, livestock and fishery, home science, agricultural extension and others. Among the identified thematic areas, highest number of courses (543) was offered in crop production and management for 31890 participants followed by livestock



and fisheries (307 no.) for 7157 participants, production and value addition (265 no.) for 14193 beneficiaries and others.

The trend of participation indicates that the sponsoring organizations preferred to get their clientele trained in those areas where the participants might start their own venture for self-employment.

Table: Sponsored training conducted by Zone-II

Area of training	No. of	o. of No. of Participants									
			General			SC/ST		C	Grand Tota	1	
		Male	Female	Total	Male	Female	Total	Male	Female	Total	
Crop production and management											
Increasing production and productivity of crops	471	20079	2572	22651	5026	1152	6178	25105	3724	28829	
Commercial production of vegetables	72	1890	78	1968	612	481	1093	2502	559	3061	
Total	543	21969	2650	24619	5638	1633	7271	27607	4283	31890	
Production and value addition											
Fruit Plants	33	472	50	522	244	83	327	716	133	849	
Ornamental plants	0	0	0	0	0	0	0	0	0	0	
Spices crops	5	106	30	136	77	71	148	183	101	284	
Soil health and fertility management	55	1573	205	1778	482	206	688	2055	411	2466	
Production of Inputs at site	0	44	0	44	6	0	6	50	0	50	
Methods of protective cultivation	10	344	9	353	47	0	47	391	9	400	
Others (pl. specify)	162	7321	809	8130	1450	564	2014	8771	1373	10144	
Total	265	9860	1103	10963	2306	924	3230	12166	2027	14193	
Post harvest technology and value addition											
Processing and value addition	18	373	56	429	104	132	236	477	188	665	
Others (pl. specify)	14	263	18	281	41	7	48	304	25	329	
Total	32	636	74	710	145	139	284	781	213	994	
Farm machinery											
Farm machinery, tools and implements	70	3881	254	4135	1142	115	1257	5023	369	5392	
Others (pl. specify)	2	45	2	47	1	0	1	46	2	48	
Total	72	3926	256	4182	1143	115	1258	5069	371	5440	
Livestock and fisheries											
Livestock production and management	123	1496	486	1982	778	462	1240	2274	948	3222	
Animal Nutrition Management	6	165	7	172	57	15	72	222	22	244	
Animal Disease Management	13	1024	18	1042	74	29	103	1098	47	1145	
Fisheries Nutrition	39	637	231	868	404	47	451	1041	278	1319	
Fisheries Management	2	27	19	46	3	1	4	30	20	50	
Others (pl. specify)	124	275	651	926	131	120	251	406	771	1177	
Total	307	3624	1412	5036	1447	674	2121	5071	2086	7157	
Home Science											
Household nutritional security	19	49	216	265	426	364	790	475	580	1055	
Economic empowerment of women	1	0	16	16	0	5	5	0	21	21	
Drudgery reduction of women	2	28	1	29	25	0	25	53	1	54	
Others (pl. specify)	6	40	51	91	13	115	128	53	166	219	
Total	28	117	284	401	464	484	948	581	768	1349	
Agricultural Extension											
Capacity Building and Group Dynamics	100	1947	991	2938	857	758	1615	2804	1749	4553	
Others (pl. specify)	213	29922	773	30695	4349	485	4834	34271	1258	35529	
Total	313	31869	1764	33633	5206	1243	6449	37075	3007	40082	
GRAND TOTAL	1560	72001	7543	79544	16349	5212	21561	88350	12755	101105	



4.4.5 Vocational training programme

Addressing unemployment problem of the rural youths as well as retaining them in agriculture has been one of the major accomplishments of the KVKs of the Zone-II. Based on the potential of agro-based enterprise in the district, the KVKs identified areas like crop production and management, integrated crop management, post-harvest technology and value addition, livestock and fisheries, income generating activities and agriculture extension to enable the youths to develop their own enterprise/ consultancy as a source of their livelihood. In most of the cases, financial/credit institutions were associated to help the youths overcome their anxiety in the case of enterprise development.

Vocational training in different areas of crop production, livestock rearing, fishery, post harvest technology, value addition are the part of KVK training programme which helps to build up trained manpower who can take up self employment in different areas of rural farming. Vocational courses are being longer duration, these training helps to upgrade the skill and knowledge of the rural youths and farmers. During the year 2015-16, KVKs of Zone II organized 2914 courses different areas of agriculture and allied sector which covered 11841 rural youths and 4100 rural girls. Among total trained process 8314 were in general category and 3527 were in SC/ST category. Category-wise analysis of vocational training showed that rural youths and girls preferred maximum training in mushroom production i.e. 962 rural youths and 966 girls were trained through 272 courses during the year. In preference of the trainees commercial vegetable production were second where 784 participants were trained through 158 courses. Composite fish culture was on demand by many of the trainees, 704 rural youth took this training through 135 courses. About 624 participants were trained in repair and maintenance of farm machinery and implements in 208 courses. Commercial fruit production, vermicomposting, dairy farming, poultry farming, organic farming, rural crafts were also the other areas liked by trainees.

Table: Vocational training conducted by Zone-II

Area of Training	No. of		General		SC/ST			Grand Total		
	courses	Male	Female	Total	Male	Female	Total	Male	Female	Total
Commercial fruit production	182	317	51	368	135	21	156	452	72	524
Commercial vegetable production	158	488	64	552	205	27	232	693	91	784
Total	340	805	115	920	340	48	388	1145	163	1308
Organic farming	9	37	21	58	15	8	23	52	29	81
Others (pl. specify)	227	937	215	1152	400	91	491	1337	306	1643
Total	236	974	236	1210	415	99	514	1389	335	1724
Value addition	71	95	308	403	41	131	172	136	439	575
Others (pl. specify)	5	6	28	34	3	13	16	9	41	50
Total	76	101	336	437	44	144	188	145	480	625
Dairy farming	164	233	36	269	96	15	111	329	51	380
Composite fish culture	135	379	115	494	161	49	210	540	164	704
Sheep and goat rearing	58	196	87	283	84	37	121	280	124	404
Piggery	47	180	64	244	76	27	103	256	91	347
Poultry farming	155	298	99	397	127	43	170	425	142	567
Others (pl. specify)	70	96	158	254	41	68	109	137	226	363
Total	629	1382	559	1941	585	239	824	1967	798	2765
Vermicomposting	153	266	215	481	112	93	205	378	308	686
Production of bio-agents, bio-pesticides, bio-fertilizers etc.	29	88	23	111	38	9	47	126	32	158
Repair and maintenance of farm machinery and implements	208	406	33	439	171	14	185	577	47	624
Rural Crafts	15	0	34	34	0	15	15	0	49	49
Seed production	7	32	0	32	13	0	13	45	0	45
Sericulture	0	0	0	0	0	0	0	0	0	0
Mushroom cultivation	272	678	680	1358	284	286	570	962	966	1928



Area of Training	No. of	General			SC/ST			Grand Total		
	courses	Male	Female	Total	Male	Female	Total	Male	Female	Total
Nursery, grafting etc.	0	0	0	0	0	0	0	0	0	0
Tailoring, stitching, embroidery, dying etc.	274	6	251	257	2	107	109	8	358	366
Agril. Para-workers, para-vet training	39	63	0	63	26	0	26	89	0	89
Others (pl. specify)	187	430	204	634	183	88	271	613	292	905
Total	1184	1969	1440	3409	829	612	1441	2798	2052	4850
Capacity building and group dynamics	35	61	120	181	26	52	78	87	172	259
Others (pl. specify)	414	146	70	216	64	30	94	210	100	310
Total	449	207	190	397	90	82	172	297	272	569
Grand Total	2914	5438	2876	8314	2303	1224	3527	7741	4100	11841

4.5 EXTENSION PROGRAMMES

In creating awareness among farmers about the benefit of advanced agricultural and allied technologies, scientific livestock rearing, fish fingerling production, soil testing, group farming and other related aspects, the KVKs of Zone II organized 149376 number of various extension activities to reach out 2039955 farmers and extension officials. Among the beneficiaries farmers constituted 2013395 number of participants and 26560 were extension officials. Gender-wise classification indicates that 287457 number of women took part in various extension activities against 1725938 number of farmers. In respect of extension officials, however, only 5136 members were women extension officials and 21424 were male extension officials. The overall participation trained indicates that nearly 15% of the total participants belonged to women category. In respect of programme organized, farmers' visit to KVK where 56654 number of programmes were organized by the KVKs to facilitate 95188 farmers and farmwomen to visit KVKs. Advisory service was the second most important programme for the KVKs who provided 28288 number of advisory services to 109340 number of farmers and farmwomen. The KVK personnel also paid visit 21322 times to the farmers' field to interact with 61648 numbers of farmers and farmwomen followed by 9136 times diagnostic visit to provide solution against crop/livestock related problem of 26927 number of farmers. The KVKs also extended their expertise through delivering 7589 number of lectures as resource person. Other important extension activities carried out by the KVKs include conducting kisan gosthi, field day, film show, method demonstration, group meeting, soil test campaign, self-help group mahilamandal and farm science club, conveners' meet, celebration of important days and others.

Table: Extension activities conducted in Zone II

Nature of Extension Activity	No. of		Farmers		Extension Officials			Total		
	activities	Male	Female	Total	Male	Female	Total	Male	Female	Total
Field Day	848	26311	5544	31855	1173	180	1353	27484	5724	33208
Kisan Mela	213	124531	55483	180014	4064	967	5031	128595	56450	185045
Kisan Ghosthi	1309	71181	14067	85248	2456	489	2945	73637	14556	88193
Exhibition	2888	53714	21439	75153	884	309	1193	54598	21748	76346
Film Show	1711	28215	39303	67518	499	130	629	28714	39433	68147
Method Demonstrations	754	12534	3956	16490	774	267	1041	13308	4223	17531
Farmers Seminar	852	9420	2158	11578	648	130	778	10068	2288	12356
Workshop	429	7183	1718	8901	700	132	832	7883	1850	9733
Group meetings	5247	12629	2642	15271	489	82	571	13118	2724	15842
Lectures delivered as resource persons	7589	33190	7069	40259	993	191	1184	34183	7260	41443
Advisory Services	28288	91546	16142	107688	1367	285	1652	92913	16427	109340
Scientific visit to farmers field	21322	51047	9292	60339	1150	159	1309	52197	9451	61648
Farmers visit to KVK	56654	73877	20130	94007	938	243	1181	74815	20373	95188
Diagnostic visits	9136	22394	4138	26532	311	84	395	22705	4222	26927

ICAR-ATARI KOLKATA



Nature of Extension Activity	No. of		Farmers		Extension Officials			Total			
	activities	Male	Female	Total	Male	Female	Total	Male	Female	Total	
Exposure visits	1241	10403	1825	12228	303	80	383	10706	1905	12611	
Ex-trainees Sammelan	150	10216	1037	11253	267	54	321	10483	1091	11574	
Soil health Camp	134	7552	1105	8657	308	59	367	7860	1164	9024	
Animal Health Camp	177	11046	2355	13401	320	74	394	11366	2429	13795	
Agri mobile clinic	1552	104299	56430	160729	13	3	16	104312	56433	160745	
Soil test campaigns	1255	15749	2187	17936	355	112	467	16104	2299	18403	
Farm Science Club Conveners meet	95	3856	708	4564	228	56	284	4084	764	4848	
Self Help Group Conveners meetings	173	1380	2819	4199	117	175	292	1497	2994	4491	
Mahila Mandals Conveners meetings	55	524	948	1472	82	61	143	606	1009	1615	
Celebration of important days (specify)	601	25928	8346	34274	978	236	1214	26906	8582	35488	
Any Other (Specify)	6377	907945	4691	912636	1582	564	2146	909527	5255	914782	
Video conferencing	69	800	849	1649	27	4	31	827	853	1680	
Kisan Chaupal	257	8468	1076	9544	398	10	408	8866	1086	9952	
Total	149376	1725938	287457	2013395	21424	5136	26560	1747362	292593	2039955	

State-wise analysis of extension activities conducted by the KVKs indicates that the KVKs of Bihar carried out 92781 number of extension activities for the benefit of 699690 number of farmers, farmwomen and extension officials. Visit of farmers to KVK (29416 number), providing advisory services (21320 number), visit of scientists to farmers' field (15362 times), diagnostic visit (5017 times), exhibition (2243 numbers), kisangosthi (7000 numbers), soil test campaign (426 numbers), film show (678 numbers), field day (324 number of activities) and others. In respect of participation 62663 number of farmers in kisan goshthi, 51216 farmers received advisory services, 36194 number of farmers visited KVKs, 27888 number of farmers got their problems treated by the KVK personnel during diagnostic visit, 19739 number of farmers attended lecture of KVK personnel, 11528 number of farmers watched film show, 14246 farmers witnessed performance of crop during field day, 40707 number of farmers took part in kisan mela etc.

The KVKs of Jharkhand conducted 24246 number of various extension activities for 816646 number of farmers, farmwomen and extension officials. Major extension activities of the KVKs included farmers' visit to KVK, advisory services, diagnostic visit, scientists visit to farmers' field, kisan gosthi, field day, film show, soil test camping etc. With regard to participation 53488 number of farmers were benefitted from the exhibition in kisan mela followed by visit of 36905 farmers in film show in the KVKs. During field day, 9384 farmers were present whereas 14825 number of farmers got benefitted by the scientists visit to their field.

In organizing extension activities, the KVKs of West Bengal took up 30379 number of such activities for the benefit of 514692 number of farmers and extension personnel. In this state also highest number of activities (17538) was conducted in organizing farmers visit to KVKs, providing advisory services to 49486 number of farmers through 2209 activity, scientific visit to farmers fields were 3016 number of activity for 17074 number of farmers, diagnostic visit (1796 numbers) to provide agriculture and related problems to 6919 farmers. However, highest number of participants was recorded in agri mobile clinic (160278 number) and exhibition (53113 number). More than 12,000 farmers and extension officials attended lecture of KVK personnel also.

For the KVKs of A&N Islands, visit of scientists to farmers' field, group meetings and lectures delivered as resource persons were three major extension activities conducted by the KVKs. Altogether, 1970 number of various extension activities were conducted for the benefit of 8927 farmers and farmwomen. Diagnostic visits, workshop and farmers seminar were other major three activities with substantial number of participants.

Table: Extension activities organized by different states

Nature of Extension Activity	A&N Islands		Bihar		Jha	rkhand	West Bengal		
	No. of activities	No. of participants							
Field Day	17	413	324	14246	222	9384	285	9165	
Kisan Mela	5	172	94	40707	62	53488	52	90678	

Nature of Extension Activity	A&N	I Islands	I	Bihar	Jharkhand		West Bengal	
	No. of activities	No. of participants						
Kisan Ghosthi	9	1960	700	62663	380	16053	220	7517
Exhibition	22	397	2243	13560	36	9276	587	53113
Film Show	6	151	678	11528	351	36905	676	19563
Method Demonstrations	5	126	418	7351	56	2051	275	8003
Farmers Seminar	33	461	759	8080	3	452	57	3363
Workshop	86	154	300	6493	20	1840	23	1246
Group meetings	238	480	4774	8012	70	3197	165	4153
Lectures delivered as resource persons	187	962	6632	19739	338	8198	432	12544
Advisory Services	142	164	21320	51216	4617	8474	2209	49486
Scientific visit to farmers field	865	1861	15362	27888	2079	14825	3016	17074
Farmers visit to KVK	185	204	29416	36197	9515	23878	17538	34909
Diagnostic visits	150	157	5017	11017	2173	8834	1796	6919
Exposure visits	4	102	69	4665	874	4361	294	3483
Ex-trainees Sammelan	2	61	60	2021	20	6731	68	2761
Soil health Camp	1	45	28	2831	44	4275	61	1873
Animal Health Camp	1	26	75	5381	34	1951	67	6437
Agri mobile clinic	0	0	7	142	8	325	1537	160278
Soil test campaigns	0	0	426	4181	576	9913	253	4309
Farm Science Club Conveners meet	0	0	26	932	16	1204	53	2712
Self Help Group Conveners meetings	4	40	67	2240	32	1164	70	1047
Mahila Mandals Conveners meetings	0	0	14	434	7	337	34	844
Celebration of important days (specify)	7	970	78	12990	384	13990	132	7538
Any Other (Specify)	1	21	3569	333894	2328	575190	479	5677
Video conferencing	0	0	69	1680	0	0	0	0
Kisan Chaupal	0	0	256	9602	1	350	0	0
Total	1970	8927	92781	699690	24246	816646	30379	514692

4.5.1 Other Extension activities

The KVKs also exercised for other means of communication like publishing through newspaper, radio/TV talks, writing popular article, preparing extension literature as well as organizing awareness camps etc. The KVKs of Zone-II conducted 10462 number of such extension activities for the benefit of farmers. The KVKs prepared and distributed 1191 extension literature depicting cultivation technique of crops, vegetables, fish rearing, livestock rearing etc. in local vernacular. Among all the states, KVKs of Bihar developed and distributed highest number (517) of extension literature followed by West Bengal (484). KVK personnel delivered TV talk 248 times in West Bengal, 245 times in Jharkhand, 92 times in Bihar and 8 times in A & N Islands. Activities of KVKs of Zone II also were published through newspaper by 3693 times.

Table: Other Extension Activities organized in different states

Nature of Extension Activity		Number	of Activities		
	A&N Islands	Bihar	Jharkhand	West Bengal	Total
Newspaper coverage	75	1951	755	912	3693
Radio talks	7	132	84	1575	1798
TV talks	8	92	245	248	593
Popular articles	3	274	37	633	947
Extension Literature	5	517	185	484	1191
Any other	0	2033	12	195	2240
Total	98	4999	1318	4047	10462



5. PRODUCTION OF SEED PLANTING MATERIALS AND BIO-PRODUCTS

5.1 **SEED**

Production of seed by the KVKS (Farm and village seed production)

S eed is the most critical input which is needed by the farmers to maintain productivity of the crop. Due to limited land in the KVKs, seed production could not be done in large quantities in KVK farm. To cater the need of the farms, seed production has been initiated in the villages under the head of "village seed production".

During the year 2015-16, the KVKs produced 47172.9 q of seeds of major crops like paddy, wheat, maize, mustard, linseed, niger, groundnut, red gram, chick pea, black gram, vegetables, spices, fodders etc. The seed production under village seed production scheme was 32474 q whereas in KVK farm production was 14698.6 q. In total 42694 farmers were benefitted from those seed production

programme directly.

The seed production system of KVKs takes care of major important varieties of cereals, pulses, oilseeds, vegetables, fruits etc. Major varieties in seed production are Abhishek, MTU 7029, Prabhat, Swarna Sub-1, Pratima in paddy, HI 1563, DBW-17, DBW-39, PBW-580, HD 2985, K 307, HD 2824, WR 544, HD 2733, K-9107 etc. In wheat, Pusa Mahak, Shavani, Rajendra suflam, B-54, Sita in mustard. Tomato Arka Bikash, Arkha Abha, Rai-GPU-28, Redgram-Birsa Arhar 1, Malviya 13, NDA 1, Chickpea PG 186, Pusa 362 Groundnut TG22, BAU25 Niger-Birsa niger 3, Birsa niger-1 Lentil HUL 57, KLS-218, DPL 62, PL 639 Greengram HUM-16 Sesame - TKG306 etc.

Table: Statewise seed production by the KVKs

			-							
State		Village seed			KVK seed		Total			
	Quantity (q)	Value (Rs)	Farmers	Quantity (q)	Value (Rs)	Farmers	Quantity (q)	Value (Rs)	Farmers	
A&N Islands	0	0	0	20.93	21618	8	20.93	21618	8	
Bihar	5000.73	9456090	1578	10609.38	12968509	4110	15610.11	22424599	5688	
Jharkhand	14300.63	26694589	719	1778.96	5569893	0	16079.59	32264482	719	
West Bengal	13172.95	13780065	30207	2289.36	3984539	6072	15462.31	17764604	36279	
Total	32474.31	49930744	32504	14698.63	22544559	10190	47172.94	72475303	42694	

State-wise analysis of seed production showed that A&N Islands produced 20.93 q of seeds, Bihar 15610 q of seed, Jharkhand 16079 q of seed and West Bengal 15462 q of seed. In Bihar 10609.38 q seed produced in KVK farm and 5000.73 q seed produced in village seed production programme. In Jharkhand, KVK seed production was 1778.96 q and village seed production was 14300.63 q. In West Bengal, large quantities of seed was produced

Table: Seed Production in Zone II

Сгор	Name of the crop	Quantity of seed (q)	Value (Rs)	Number of farmers
Cereals	Paddy	34275.9	51016625	29523
	Wheat	4876.71	8092188	1773
	Maize	8.95	22700	67
Oilseeds	Mustard	725.54	1974750	5369
	Toria	12.75	44625	0
	Linseed	62.19	125085	76
	Niger	2.92	18000	0
	Sesame	95.92	380280	853
	Groundnut	76.32	645275	230
	Mustard	314.62	104000	0
Pulses	Redgram	446.02	682743	217
	Chickpea	103.42	536060	95

in KVK farm is 2289.36 q. Village seed programme was 13172.95 q.

The contribution of different crops in seed production programme were paddy 78.7%, wheat 8.1%, mustard 0.51%, green gram 1.42%, potato 27.5%, sugarcane 1.63%. Production of paddy seed was 47640q, wheat 4876.7 q, mustard 725.5 q, red gram 446 q, green gram 862.7 q, onion 21.6 q, turmeric 304.5 q.

Сгор	Name of the crop	Quantity of seed (q)	Value (Rs)	Number of farmers
	Lentil	1261	2926270	971
	Greengram	862.66	1044195	702
	Blackgram	105.56	391952	1162
	Pea	156.32	802150	35
	Cowpea	4.6	169500	0
	Rajmash	0.86	5167	0
Commercial crops	Potato	1644.3	1139800	92
	Sugarcane	989.44	381200	162
Vegetables	Okra	1.1	40095	1
	Tomato	3.52	5610	292
	Palak	9.2	19320	17



Сгор	Name of the crop	Quantity of seed (q)	Value (Rs)	Number of farmers
	Radish	1.3	3700	4
	Onion	21.6	46000	5
	chilli	0.89	4260	57
	Brinjal	8.5	68525	166
	Lobia	5.73	174700	103
Flower crops	Flower	0.22	2400	31
Spices	Coriander	2.07	11100	28
	Ginger	4.76	21540	0
	Methi	0	0	0
	Turmeric	304.49	596900	73
	Fenugrick	0.01	0	0

Сгор	Name of the crop	Quantity of seed (q)	Value (Rs)	Number of farmers
Fodder crop seeds	Rice Bean	1.05	930	14
	Barseem	250	0	21
Fiber crops	Jute	3.8	24950	291
	Sunhemp	0	0	0
Forest Species		0	0	0
Others	Dhaincha	427.6	712168	244
	Elephant Footyam	100.75	224520	20
	Sisbania	0.4	16020	0
Total		47172.95	72475303	42694

Table: State wise seed production

			Bihar		J	harkhand			West Bengal	
Сгор	Name of the crop	Quantity of seed (q)	Value (Rs)	Number of farmers	Quantity of seed (q)	Value (Rs)	Number of farmers	Quantity of seed (q)	Value (Rs)	Number of farmers
Cereals	Paddy	8078.93	9688507	2395	14742.08	29234875	493	11433.96	12071625	26627
	Wheat	4356.71	6794457	863	68.23	450812	0	451.77	846919	910
	Maize	1.1	1800	17	4.5	15500	0	3.35	5400	50
Oilseeds	Mustard	34.32	118585	261	160.29	1053175	0	530.93	802990	5108
	Toria	12.75	44625	0	0	0	0	0.00	0	0
	Linseed	13.33	74310	0	2.36	11240	0	46.50	39535	76
	Niger	0.4	2000	0	2.52	16000	0	0.00	0	0
	Sesame	16.68	191780	0	1.74	16000	0	77.50	172500	853
	Groundnut	0	0	0	2.97	2400	0	73.35	642875	230
	Soybean	0	0	0	0	0	0	0.00	0	0
	Mustard	314.62	104000	0	0	0	0	0.00	0	0
Pulses	Redgram	434.97	602068	178	4.85	48175	0	6.20	32500	39
	Chickpea	53.1	199800	95	7.07	55760	0	43.25	280500	0
	Lentil	249.98	1436050	412	0.8	8000	0	1010.22	1482220	559
	Greengram	139.96	1009560	648	635.4	28800	0	87.30	5835	54
	Blackgram	10	60000	0	1.86	12352	0	93.70	319600	1162
	Pea	27.42	292200	35	44.5	474250	0	84.40	35700	0
	Cowpea	4.6	169500	0	0	0	0	0.00	0	0
	Rajmash				0.86	5167	0	0.00	0	0
Commercial crops	Potato	675.5	656000	68	0	0	0	968.80	483800	24
	Sugarcane	989.44	381200	162	0	0	0	0.00	0	0
Vegetables	Okra	1	40000	0	0	0	0	0.10	95	1
	Tomato	0.02	2610	267	1	1000	0	2.50	2000	25
	Palak				0	0	0	9.20	19320	17
	Radish				1.2	3600	0	0.10	100	4

ICAR-ATARI KOLKATA



			Bihar		J	harkhand			West Bengal	
Сгор	Name of the crop	Quantity of seed (q)	Value (Rs)	Number of farmers	Quantity of seed (q)	Value (Rs)	Number of farmers	Quantity of seed (q)	Value (Rs)	Number of farmers
	Onion							21.60	46000	5
	chilli							0.89	4260	57
	Brinjal	0.5	60525	166	8	8000	0	0.00	0	0
	Lobia	5.73	174700	103	0	0	0	0.00	0	0
Flower crops	Flower	0.02	0	0	0.2	2400	31	0.00	0	0
Spices	Coriander	0.05						2.02	11100	28
	Ginger				3.76	15040	0	1.00	6500	0
	Methi							0.00	0	0
	Turmeric	54.49	154200	0	168	176000	0	82.00	266700	73
	Fenugrick	0.01	0	0				0.00	0	0
Fodder crop seeds	Rice Bean							1.05	930	14
	Barseem							250.00	0	21
Fiber crops	Jute	1.55	13950	6				2.25	11000	285
	Sunhemp							0.00	0	0
Forest Species								0.00	0	0
Others	Dhaincha	115.69	106422	0	210	591416	195	101.87	14330	49
	Elephant Footyam	17.25	45750	12	7	18500		0.00	160270	8
	Sisbania				0.4	16020		76.50		
A & N Islands	Paddy	20.93	21618	8				0.00		
Total		15610.12	22424599	5688	16079.59	32264482	719	15462.31	17764604	36279

5.2 PLANTING MATERIALS

Seedlings, saplings and other planting materials like grafts, gooties, bulbs etc. were produced to supply among the farmers of the neighbouring locality and the district. During 2015-16, 68.43 lakh no. of planting materials were produced by the KVKs which earned a revenue of Rs.219.20 lakh. The number of beneficiaries covered under this programme was 42.9 lakh in Zone-II. Vegetable seedlings produced were 22.67 lakh. Fruits sapling was produced were 4.6 lakh. Forest species 0.085 lakh and medicinal and aromatic plant was produced were 0.592 lakh. These contribution was mainly come from vegetable

seedlings (67.8%) and fruits seedling (13.7%).

State-wise analysis showed that state of West Bengal produced 49.1 lakh planting materials (71.8%), followed by Bihar 9.47 lakh (13.8%) and Jharkhand produced 9.75 lakh (19.8%). The varieties of the different crops which supplied Dushang, Amrapalli, Jardata Guava – Allahabad Safeda, L-49, Lalit Midule, Lime-Pant Lemon, Kagji, Papaya – Puysa Delicious, Ranchi local Banana, Litchi-Sahi, China , Cauliflower – Madhuri, Tomato-Swarna Sampada Rupali, Capsicum – Buffalo, Chilli – Flame. State-wise productions of planting materials are provided in following table.

Table: P	lanting mat	terial p	roduc	tion		1.0 1.0									et et	
		A&N Islands				Bihar			Jharkhand		≷	est Benga	-		Total	
Crop	Name of the crop	Number	Value (Rs.)	Number of farmers	Number	Value (Rs.)	Number of farmers	Number	Value (Rs.)	Number of farmers	Number	Value (Rs.)	Number of farmers	Number	Value (Rs.)	Number of farmers
Commercial																
Vegetable	Cauliflower	0	0	0	197810	99713	1116	128276	122143	359	525362	305714	401238	851448	528690	402751
seedling	Brinjal	4240	1120	38	108776	56026	820	114926	90800.75	322	62919	33924	865	290861	180795	2019
	Tomato	590	45	12	185624	111042	1084	197608	153600	652	165989	110238	823	549811	374880	2567
	Chilli	500	0	8	38467	25571	313	127370	28850	169	45002	31400	367	211339	85821	849
	Bottle gourd	0	0	0	4513	19075	571	500	3000	60	20	20	0	5033	22095	631
	Cabbage	0	0	0	79738	54930	275	110082	109582	197	102881	92442	578	292701	256954	1050
	Capcicum	0	0	0	445	445	2	3200	4400	40	14388	38500	492	18033	43345	534
	Brocoli	0	0	0	225	225	2	4786	4972	95	42662	47300	156	47673	52497	253
	Cucumber	0	0	0	115	575	30	300	1800	40	0	0	0	415	2375	70
	Bittergourd	0	0	0	26	140	16	600	3600	60	0	0	0	626	3740	76
	Radish														2872.5	50
	Other vegetable	161	2872.5	50	15965	3865	112	55876	13806.5	123	3546389	58530	400	3618391	76201.5	645
		5491	4037.5	108	631704	371607	4341	743524	536554.3	2117	4505612	718068	404919	5886331	1630266.75	411495
Fruits	Banana	30	0	10	830	3100	260	0	0	0	1100	24510	160	1960	27610	420
	Mango				246568	13261210	5364	13504	633325	1249	73552	2823524	866	333624	16718059	7611
	Litchi				2379	53645	136	400	16000	06	300	7500	75	3079	77145	301
	Guava				32570	413762	919	6972	239320	322	7259	192536	817	46801	845618	2058
	Sapota				164	1240	25	0	0	0	4800	168000	121	4964	169240	146
	Lemon				4054	56410	874	652	22819	35	520	10000	54	5226	89229	963
	Anola				314	240	0	0	0	0	100	1000	50	414	1240	65
	Papaya	50	0	15	20888	44948	400	23648	48375	320	15144	78910	813	59730	172233	1533
	Pomegranate				1664	30315	112	100	150	0	0	0	0	1764	30465	112
	Jack fruit				657	3620	100	0	0	0	350	3250	42	1007	6870	142
	Woodapple				299	2870	29	0	0	0	0	0	0	299	2870	29
	Citrus				42	20	0	520	17600	40	6300	165970	1022	6862	183590	1062
	Sweetorange										1200	38000	488	1200	38000	488
	Orange				95	15								95	15	0
	Cashewnut				42	15								42	15	0



		A&N Islands				Bihar			Jharkhand		Ŵ	est Bengal			Total	
Crop	Name of the crop	Number	Value (Rs.)	Number of farmers	Number	Value (Rs.)	Number of farmers	Number	Value (Rs.)	Number of farmers	Number	Value I (Rs.)	Number of farmers	Number	Value (Rs.)	Number of farmers
		80	0	25	310566	13871410	8219	45796	977589	2056	110625	3513200	4640	467067	18362199	14930
Ornamental Mants	Ornamental				4000	28000	150	16496	20250	225	37097	45187	266	57593	93437	1174
Medicinal	Aloe Vera				0	0	0	28000	80000	94	1200	2000	12	29200	82000	106
and aromatic	Lemon grass	0	0	0	0	0	0	30000	60000	55				30000	74900	60
Plantation	Arecanut	3300	14900	ß										3300	2080	0
	Coconut	210	2080	0							268	800	32	478	800	32
Spices	Black pepper	0	0	0	26.5	78900	c	4125	7531.25	15	0	0	0	4152	86431.25	18
Tuber		0	0	0	10	25000	0	40310	702500	205	67719	194600	151	108039	922100	360
Fodder crop aplings		2000	0	4	0	0	0	50510	1500	0	68411	149700	104	120921	151200	104
Forest Sp																
	Forest Sp				385	3850	0	8200	32800	0	0	0	0	8585	36650	0
Other	Tuberose				747	50540	0	06	2700	60	67500	269000	219	68337	322240	279
	Chrysenthemum										1000	3000	0	1000	3000	0
	Dahlia										50000	130000	0	50000	130000	0
	Marigold				0	0	0	8000	2000	300	0	0	0	8000	23017.5	442
		5510	16980	6	5168.5	186290	153	185731	909281.3	954	293195	794287	1317	489605	1927855.75	2575
Fotal		11081	21017.5	142	947439	14429307	12713	975051	2423425	5127	490432	5025555	410876	6843003	21920322	429000







5.3 BIO-PRODUCTS

The KVKs of Zone-II also facilitated supply of biofertilizers, bio-pesticides and bio-agent, vermicompost, azolla, earthworm for use by the farmers. Vermicompost is very much in demand by the farmers. A large quantity of 337545.7 kg vermicompost was produced by the KVKs along with the bio-fertilizers 151988 kg, Bio-agent 3801.8 kg, vermicompost 237317 litre was also produced by the KVKs. The production of bio product was maximum in Bihar i.e. 339197 kg having value of Rs.187093/-.

Table: Statewise bio-product production by KVKs of Zone II

		Bihar			J	harkhna	d	w	est Beng	al		Total	
Product Name	Name of the bio-product	Quantity (kg)	Value (Rs.)	No. of Farmers									
Bio Fertilisers	Vermi- compost	117100	161843	258	46891	270882	280	155420	756210	217	319411	1188935	755
	Bio Fertilisers	150040		20	1015	2700		932.5	53425	225	151988	56125	245
Total		267140	161843	278	47906	273582	280	156353	809635	442	471399	1245060	1000
Bio Agents	Bio Agent							3801.8	26900	1190	3801.8	26900	1190
	Vermi wash	7.25	3650	9	233810	131905	232	3500	7000	35	237317	142555	276
	BGA	50	0	15	102.4	10024	45	2680.8	1580	24	2833.2	11604	84
Earth- worm		72000	21600	85				8000	8000	34	80000	29600	119
Total		339197	187093	387	281819	415511	557	174335	853115	1725	795351	1455719	2669

5.4 LIVESTOCK PRODUCTION

In order to provide quality materials to the farmers like livestock strain, poultry ducks, chicks, eggs, piglets, fingerlings spawn etc. KVK produced 45673 strains of

Table: Livestock production in Zone II

broilers, 7213 strains of layer, 9798 ducklings for supply to the farmers. Indian carp 48.96 lakh, 3.78 lakh fingerlings and 37.8 lakh fish spawn were also produced by the KVKs. The details are given in table below.

Particulars of		Bihar			Jharkhand		١	West Bengal			Total	
Live stock	Number	Value (Rs.)	No. of Farmers									
Dairy animals												
Cows	1	0	0	6	63000	2	112	4171500	137	119	4234500	139
Buffaloes	3	15000	1	0	0	0	0	0	0	3	15000	1
Calves	9	23500	0	13	44000	6	37	639000	29	59	706500	35
Other (Pl. specify) Goat	64	58000	0	63	182000	43	5986	642581	322	6113	882581	365
Poultry										0	0	0
Broilers	41648	605143	45	3500	430000	0	525	137750	32	45673	1172893	77
Layers	290	31000	0	5300	795000	250	1623	165540	162	7213	991540	412
Duals (broiler and layer)	0	0	0	0	0	0	680	29760	90	680	29760	90
Ducks	96	14500	0	4350	665000	185	5352	2670790	52	9798	3350290	237
Egg	0	0	0	0	0	0	311	1484	26	311	1484	26
Others (Pl. specify) Rabbit, Ornamental bird, feed, chicks etc.							368	159800	45	368	159800	45
Pig				17	18000	0	27	134000	42	44	152000	42
Piglet				151	332200	131	85	283000	178	236	615200	309
Fisheries										0	0	0



Particulars of		Bihar			Jharkhand		٦	West Bengal			Total	
Live stock	Number	Value (Rs.)	No. of Farmers	Number	Value (Rs.)	No. of Farmers	Number	Value (Rs.)	No. of Farmers	Number	Value (Rs.)	No. of Farmers
Indian carp	552000	292500	107	408000	24000	25	4487685	1353825	462	5447685	1670325	594
Mix carp							0	0	0	0	0	0
Fingerling							6500000	550000	95	6500000	550000	95
Fish spwan	12500000	75000	35				3780000	26000	42	16280000	101000	72
Others (Pl. specify) Ornamental fish, Carp fry, Exotic fish etc.							1683025	1752161	449	14183025	1827161	484
Total	13094111	1114643	188	421400	2553200	642	16465816	12717191	2163	42481327	16460034	2993

6. SOIL, WATER AND PLANT SAMPLE ANALYSIS AND 'WORLD SOIL DAY' CELEBRATION

The KVKs of ICAR-ATARI, Kolkata have tested 51893 soil samples and 743 water samples in their laboratory which benefitted 90784 farmers from 5226 villages in the Zone. The data indicated that the number of soil sample analysis is increasing substantially over the years. It

means KVK Scientists are able to convince the farmers to let them know the nutrients status of their agricultural land and the way of judicious use of fertilizer application in the field. Through this the KVKs also earned Rs. 15.67 lakhs during the year 2015-16.

State	Name of		Number of		
State	sample	Samples	Farmers	Villages	Amount realized (RS.)
A & N Islands	Soil	314	280	33	
	Water	121	115	20	
Sub-total		435	395	53	
Bihar	Soil	30609	45355	2762	488800
	Water	47	37	6	
Sub-total		30656	45392	2768	488800
Jharkhand	Soil	10068	27193	572	441667
	Water	79	825	5	670
Sub-total		10147	28018	577	442337
West Bengal	Soil	10902	16552	1770	620035
	Water	496	427	58	16110
Sub-total		11398	16979	1828	636145
Zone-II	Soil	51893	89380	5137	1550502
	Water	743	1404	89	6780
Total		52636	90784	5226	1567282

Table: Soil & Water Sample Analysis

World Soil Day: The 68th UN General Assembly declared 2015 as the "*International Year of Soils (IYS)*" and 5th December as the "*World Soil Day*" which aimed to increase awareness and understanding of the importance of soil for food security and essential ecosystem functions. The soil is considered as a critical component of the natural

system and as a vital contributor to human wellbeing. Considering the importance, all 83 KVKs under ICAR-ATARI, Kolkata celebrated *"World Soil Day"* on 5th December, 2015. Out of total 32982 farmers participated in different districts of the Zone, 435 farmers were from Andaman & Nicobar Islands, 15020 from Bihar, 13989



Annual Report 2015 - 16 ICAR-ATARI KOLKATA

from Jharkhand and 4538 from West Bengal. As a part of programme, all the KVKs of this Zone analysed the soil samples to know the soil status of farmers' field in the district. The soil samples were made available by the line department of concerned state and sometimes it was collected by the KVK personnel. The KVKs pertaining to Andaman & Nicobar Islands, Bihar, Jharkhand and West Bengal state distributed 374, 10569, 5953 and 4364 soil







health cards, respectively. The Central Ministers, State Ministers, Members of Parliament (MPs) and Members of Legislative Assembly (MLAs) were invited to distribute the Soil Health Cards (SHC) to the farmers. From this Zone, 2 Central Ministers, 8 State Ministers, 18 Members of Parliament (MPs) and 42 Members of Legislative Assembly (MLAs) graced the function organized in different KVKs.




7. SCIENTIFIC ADVISORY COMMITTEE

The Scientific Advisory Committee (SAC) Meeting is a routine activity of KVKs. In the meeting, the Action Plan for the very next year of a particular KVK is finalized in a consultative mode in the presence of the committee already constituted as per the guidelines of ICAR. The committee mainly comprises of representatives from ICAR-ATARI, Kolkata, host organization, other nearby ICAR Institutes, State Agricultural Universities, development departments of the district, media personnel, financial institutions, progressive farmers and farm women and others. During 2015-16, 83 KVKs of ICAR-ATARI, Kolkata conducted a total of 84 SAC meeting which was attended by 2538 participants. Data of state-wise SAC meeting revealed that 38 and 24 districts of Bihar and Jharkhand state organised 39 and 25 meeting, respectively. Eighteen KVKs of West Bengal state organised 17 meeting whereas every KVK of A & N Islands conducted one meeting.

Table: State wise SAC meeting conductedby KVK

State	No. of SAC	No. of participants
A&N Islands	3	129
Bihar	39	1341
Jharkhand	25	641
West Bengal	17	427
TOTAL	84	2538

8. PUBLICATION BY KVKS

A ll KVKs under ICAR-ATARI, Kolkata are actively engaged in research and other related activities throughout the year. To make it available to other KVKs, SAUs, ICAR institutes, line departments, ATMA, NABARD, related agricultural development departments, other agencies and farmers, KVKs regularly publish their achievements in the form of research paper, technical

bulletin, newsletter, popular article, leaflet/pamphlet, DVD/CD etc. During the period, KVKs of this zone published 143 research papers, 81 symposia papers, 55 newsletter, 160 popular articles, 41 books, 48 book chapters, 90 bulletins, 382 technical reports, 498 extension literatures, 87 electronic publication (DVD/CD etc.). A total of 519767 circulations were also made by the KVKs.

Item	A&N Islands		Bihar		Jharkhand		West Bengal		Total	
	Number	Circulation	Number	Circulation	Number	Circulation	Number	Circulation	Number	Circulation
Research paper	9		60		17		57		143	0
Seminar/ conference/ symposia papers	14		33		5		29		81	0
Newsletter			37	22850	15	2000	3	1680	55	26530
Popular Articles			55	7750	21	9700	84	2100	160	19550
Book			16	5200	1		24	4662	41	9862
Book Chapter	2	275	27	2000	3	325	16	50580	48	53180
Extension Pamphlets/ literature	2	215	253	205500	94	78405	149	42794	498	326914
Bulletins	4	1156	69	69365	12	10500	5	1015	90	82036
Technical Reports	0	0	162	139	60	0	160	400	382	539
Electronic Publication (CD/DVD etc)	0	0	18	1106	4		65	50	87	1156
Total	31	1646	730	313910	232	100930	592	103281	1585	519767

Table: Publication in KVKs in Zone II



9. CELEBRATION OF TECHNOLOGY WEEK BY KVKS

The technology week celebration is a very effective and impact oriented transfer of technology tool. It favours in cultivating the recent innovations in field of agricultural and allied sectors as well as bridging the knowledge gap between farming community, researchers and research systems. Under very fast changing climatic conditions, this type of programme creates the opportunity to enrich the knowledge of different stakeholders through exchanging their views in a common platform. Authorities from host organizations, universities, ICAR institutes, different line departments from states, NABARD, ATMA, lead bank, IFFCO, Mahindra, input dealers, seed companies, NGOs, SHGs, marketing agencies, men and women farmers, scientists and many other organizations took part in the technology week celebration with their own interest. Farmers interacted with different resource persons as per their need to solve their problems faced in varying farming situations and got assurance about the availability of inputs and marketing of their farm produce. The KVKs of ICAR-ATARI, Kolkata organized this programme in such a systematic manner that farmers and other stakeholders could interact very comfortably. During 2015-16, a total of 767 activities were organized by 39 KVKs of ICAR-ATARI, Kolkata which benefitted about 108797 stakeholders. State-wise data of this zone showed that 17 KVKs from West Bengal, and 11 KVKs each from Bihar and Jharkhand were involved in this programme.

Table: Technology	/ week	celebration	in	different	states
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Type of Activities	Bihar		Jharkhand		West Bengal		Total	
	No of Activities	No of Participants						
Gosthies	6	825	13	955	0	0	19	1780
Demonstration	2	34	21	1509	38	1058	61	2601
Exhibition	17	764	21	667	144	6620	182	8051
Exposure visit	1	146	14	734	11	250	26	1130
Farmers training	12	1085	3	238	35	2322	50	3645
Farmer-Scientist interaction	6	297	22	1211	63	2415	91	3923
Field visit	8	992	0	0	7	361	15	1353
Flim Show	5	570	30	735	28	2113	63	3418
Group discussion	2	100	0	0	3	61	5	161
KrishiMela	1	200	2	404	61	73083	64	73687
Lectures Organized	30	480	0	0	32	3021	62	3501
Seminar	10	628	2	250	17	1284	29	2162
Animal health camp	0	0	1	150	4	784	5	934
Ex-trainees Meet	0	0	1	50	2	425	3	475
Soil testing camp	0	0	1	100	1	35	2	135
Cultural programme	0	0	0	0	12	201	12	201
Displaying of posters/charts	0	0	0	0	60	650	60	650
Distribution of Organic Inputs	0	0	0	0	1	168	1	168
Krishi quiz	0	0	0	0	4	435	4	435
Plant health clinic	0	0	0	0	2	187	2	187
Publication of Extension Literatures	0	0	0	0	11	200	11	200
Total	100	6121	131	7003	536	95673	767	108797









- 10. TECHNOLOGICAL BACKSTOPPING BY DIRECTORATES OF EXTENSION EDUCATION

s per needs of farmers' in the district related to agriculture and allied sectors, the concerned KVK uses to plan various activities round the year through conducting on-farm trial (OFT), front line demonstration (FLD), training programmes, health camps, hands on training etc. Eighty three KVKs of ICAR-ATARI, Kolkata disseminated agriculture related recent technologies, derived from State Agricultural Universities, Animal Science Universities and ICAR Institutes, for the farmers' field under the technological and administrative support of Directors of Extension Education (DEE) of universities. To transfer the technologies from lab to land in the effective way, all KVKs of this zone have been distributed under the jurisdiction of six DEEs irrespective of any host organizations. The Extension Directorate of Bihar Agricultural University (BAU), Sabour has been allotted with 25 KVKs; Rajendra Agricultural University (RAU), Pusa with 13 KVKs; Birsa Agricultural University (BAU), Ranchi with 24 KVKs, Uttar Banga Krishi Viswavidyalaya (UBKV), Pundibari with 6 KVKs, West Bengal University of Animal and Fishery Sciences (WBUAFS), Belgachhia with 3 KVKs and Bidhan Chandra Krishi Viswavidyalaya(BCKV), Mohanpur with 12 KVKs. During the year 2015-16, DEEs extended their hands in supplying seeds, planting materials, bio-products, livestock and poultry birds, livestock products, package of management practices for agriculture, livestock and fish farming, printed literatures, organizing HRD training for KVK personnel and so on.

However, it has become a routine feature of the Directorate to conduct HRD programme throughout the year as per demands of KVK personnel to enhance the capability of technology transfer skills and sometimes, to make the newly recruited staff of KVK aware of mandate and functioning of KVK. In the year 2015-16, the Directorates of this Zone organised 41 different HRD programmes for 1425 KVK personnel covering various areas like soil testing, soil health management, communication and management skills to transfer technologies in the field, frontiers in diagnosis/ management of pest and diseases, pulse and oilseed demonstration, recent advances in agriculture and veterinary science, KVK's role towards agricultural development in the district etc. A total of 427 KVKs from different Directorates under ICAR-ATARI, Kolkata were involved such type of programmes.

The DEEs and/ or their officials visited KVKs for 438 occasions for attending different programmes viz. SAC meeting, technology week, field day, inaugurating training

programme, '*Pre-rabi and Pre-kharif Sammelan*', 'World Soil Day' celebration, '*Pradhan Mantri Fasal Bima* Yojana' programme, seminar/ workshop organized by KVKs, interactive meet with farmers/ input dealers, '*Kisan Mela*' and many others. The DEEs of Bihar state visited their KVKs for 192 times (BAU, Sabour- 149 times and RAU, Pusa- 43 times) and DEE of Jharkhand state for 85 times during the year 2015-16. On the other hand, the total visit of DEEs in West Bengal state was 161 times (BCKV, Nadia- 127 times; UBKV, Pundibari- 16 times and WBUAFS, Belgachhia- 18 times).

To discharge the responsibility as DEE, it is very necessary to assess the technological needs of KVKs and to make the KVKs enriched with latest agricultural knowledge and skills time to time. During the last one year, the officials from different Directorates of this Zone frequently visited the experimental field of KVK as well as farmers along with KVK scientists to oversee their KVK activities. The DEE officials from BAU, Ranchi visited their OFT field for 30 occasions and FLD for 40 occasions to check the performance of different crop varieties, elephant foot yam based multilayer vegetable cropping system, seed treatment technology, performance of neem based pesticides, polythene mulching in tomato, use of small implements like lady's finger plucker, single and twin wheel hoe, grubber for weeding and inter-culture operation, maize sheller etc. to reduce drudgery reduction, lac based intercropping and many others. The officials of BAU, Sabour inspected OFT and FLD fields 20 times each during the period of report to know the performance of moisture stress rice variety (Sabour Ardyajal), hybrid maize varieties (SSM 1 and 2), improved wheat varieties (Sabour Shreshth, Sabour Samridhi and Sabour Nirjal), to control fruit fly of bitter guard and mango, sucking pest of okra, pod borer of gram, to manage weeds in zero tillage wheat etc. Similarly, the respective numbers of field visit by the officials of WBUAFS, Belgachhia were 9 and 13 to know the performance of supplementing mineral mixture and/ or vitamins in crossbred as well as desi cows, to compare the performance of RIR and Vanaraja poultry breeds under backyard farming, to study the production efficiency of culturing pangas fish in jute retting pond or shallow beel and others. The BCKV, Mohanpur officials visited OFT field for 11 times and FLD field for 25 times in the year 2015-16. The purposes of their visit included performance evaluation of different varieties of cashew, chrysanthemum, tuberose and marigold; comparing the productivity of cashew and jute with various planting density; analyzing the performance of using Trichoderma



viridae with farm yard manure (FYM) in guava; checking the efficacy of different herbicides, fungicides and insecticides in different crops; polythene mulching; intercropping etc. The Directorate of RAU, Pusa and UBKV, Pundibari also made their visit for the similar purposes.

In addition to continuous update of various technological inventories, all Directorates under ICAR-ATARI, Kolkata published a large number of literatures in the form of newsletter, diary, bulletin, magazine etc. in English and local languages covering all aspects related to agriculture and allied sectors for the benefit of farmers. The Directorate of BAU, Sabour published 7 such publications i.e. *Bihar Ke Gaurav Kisan* (Hindi), *Agri-entrepreneurs of Bihar* (English), *Bihar Kisan Diary 2016* (Hindi), *Krishi Calendar 2016* (Hindi), *Mrida Swastha Prabandhan* Dwara Tikaoo Kheti (Hindi), Udyan Parshikhan Nirdeshika (Hindi), Krishi evam Samdadh Kshetra ke Vishisth Kisan evam Vaigyanik (Hindi) and 13 technological inventories during 2015-16. Likewise, BCKV Directorate published 14 publications and 5 inventories, and BAU, Ranchi published one each.

During the year 2015-16, all the Directorates of this Zone supplied updated technologies and technological products like seeds, planting materials, biological products, livestock and poultry breeds, mineral mixture for animals, fish spawn/ fingerlings, mushroom spawn etc. The BAU, Sabour Directorate supplied their products to 98 KVKs; WBUAFS, Belgachhia to 12 KVKs; BCKV, Mohanpur to 21 KVKs and BAU, Ranchi to 107 KVKs.

— 11. AGRICULTURAL TECHNOLOGY INFORMATION CENTRE

s a "single window" system, Agricultural Technology Information Centre (ATIC), usually established at the entrance of any Research Institute/ State Agricultural Universities, enables the farmers to access the desired information for the solution to their problems related to agriculture, animal husbandry and fishery sciences. The ATIC links various units of a research institute/ agricultural university with the intermediary and end users. It is being operated in the Union Territory of Andaman and Nicobar Islands under ICAR-Central Island Agricultural Research Institute (ICAR-CIARI), Port Blair; in Bihar state under Bihar Agricultural University (BAU), Sabour and Rajendra Agricultural University (RAU), Pusa; in Jharkhand state under Birsa Agricultural University (BAU), Ranchi; and in West Bengal state under Bidhan Chandra KridhiViswavidyalaya (BCKV), Mohanpur and Uttar Banga Krishi Viswavidyalaya (UBKV), Pundibari. The ATIC has the facility of reception centre, exhibition/ technology museum, touch screen kiosk, sales counter, farmers' feedback register, video conferencing facility, library, cafeteria, community radio station etc. A total of 14153 farmers from different districts of this Zone visited ATICs during 2015-16 for technology information (5877 persons), technology products (2319 persons), technology services (1137 persons) and other purposes (4820 persons).

Considering the technology information, 5519 farmers used Kisan Call Centre to get the information on varieties/ hybrids, pest management, disease management, agro-techniques, soil and water conservation, post-harvest technology and value addition and animal husbandry and fisheries during the year 2015-16. The call data envisaged that farmers were more interested in receiving information on hybrids, pest and disease management than other

aspects. Apart from kisan call centre, 816 farmers got benefit from video showing and 53 farmers from writing letters to the concerned persons of ATICs. Moreover, as per the request of farmers/ technocrats/ students, a number of training programmes were also organized in the ATICs for 816 persons. Out of total training participants, maximum (130) persons took training on varietal trial followed by disease management (118), animal husbandry (117) and other agricultural techniques (110).

The detail information on agriculture and allied sectors was supplied to the farmers and other stakeholders of this Zone through providing priced and sometimes free of cost literatures/ publications. During the period of 2015-16, 14145 books, 8338 technical bulletins, 4515 technical inventory, 583 CDs, 240 DVDs and 7117 other publications including leaflets, magazines, kisan samachar, kisan diary, newsletter etc. were sold from ATICS under ICAR-ATARI, Kolkata which benefitted 33282 farmers in enriching agricultural knowledge. The ATICs of this Zone also generated the revenue of Rs. 16.09 lakh from the sale of those types of publications.

Various technological products e.g. seeds, planting materials, livestock, poultry birds, eggs, fish fingerlings, bio-products, bio-fertilizers, farm-produces etc. were available in the sale counter for farmers in ATICs of this Zone. During the period under report, 4270 quintals seed, 2.73 lakh planting materials, 1218 pigs/goats, 5557 poultry birds, 1.46 lakh fertilized eggs, 358.75 lakh fish fingerlings, 222.36 quintals bio-products and 91822 packets bio-fertilizers were supplied to the farmers through ATICs. In addition, aromatic rice, mustard oil, green coconut, different vegetables etc. were also sold. From the sale of



those technology products, 62969 farmers were benefitted and Rs. 202.32 lakh revenue was generated during the year 2015-16.

The facility of technology services like soil and water testing, diagnosis of plant diseases, informationon facility available with line departments about various campaigning programmes launched by state governments, and so on was also provided to the farmers through ATICs. During 2015-16, with the help of ATICs, 3427 soil/ water samples were tested by 3238 farmers, and 926 plants samples were diagnosed for diseases by 589 farmers. Not only that, more than 3000 farmers of this Zone were benefitted to give treatment to their diseased animals using ATICs facility.

12. HRD PROGRAMME

Table: Workshop-cum-training programme and meetings organized by ATARI Zone-II

Sl. No.	Title of the programme	Organized at	Date	No. Of Participant
1	State Level Workshop for KVKs of WB	ICAR-ATARI, Kolkata	07.04.2015	35
2	State Level Workshop for KVKs of Jharkhand	KVK Deoghar	09.04.2015	53
3	State Level Workshop for KVKs of Bihar (under BAU Bhagalpur)	BAU Bhagalpur	18.04.2015	78
4	Zonal Workshop for NICRA KVKs of Zone-II	ICAR-ATARI, Kolkata	23.04.2015 – 24.04.2015	35
5	State Level Workshop for KVKs of Bihar (Under RAU Pusa Samastipur)	RAU Pusa Samastipur	28.04.2015	28
6	Meeting with Directors of Research on Preparation of Technology Inventory	ICAR-ATARI, Kolkata	22.05.2015	14
7	Zonal Annual Workshop for KVKs of Zone-II	CIFRI, Barrackpore	26.05.2015 – 27.05.2015	122
8	Workshop on Area expansion of sunflower in West Bengal, Bihar and Jharkhand	ICAR-ATARI, Kolkata	09.06.2015	26
9	Pre-IRC Meeting of ICAR-ATARI, Kolkata	ICAR-ATARI, Kolkata	10.06.2015	10
10	Orientation Course on Integrated Pest Management in important crops with special reference to West Bengal, Jharkhand, Bihar and A & N Islands	BCKV, Mohanpur, Nadia		73
11	Meeting on Finalization of Demonstration on Oilseeds & Pulses in Zone-II, ICAR	ICAR-ATARI, Kolkata	06.08.2015	10
12	Meeting on Cluster Demonstration of Pulses and Oilseeds in ICAR-ATARI, Kolkata	ICAR-ATARI, Kolkata	23.09.2015	35
13	Hindi Pakhwada Concluding Programme	ICAR-ATARI, Kolkata	30.09.2015	25
14	Meeting on Universalization of Soil Health Card through KVKs	ICAR-ATARI, Kolkata	17.10.2015	28
15	Interactive meeting with DDG (AE & Fishery), ICAR on Different Programmes on MGMG, ARYA, USHC, FF etc.	ICAR-ATARI, Kolkata	01.11.2015	66
16	Workshop-cum-training on Cluster Demonstration on Oilseed & Pulse crop and PPVFR at FTC, Kalyani	FTC, Kalyani	08.12.2015- 10.12.2015	116
17	Meeting on Diploma in Agricultural Extension Services for Input Dealers (DAESI)	ICAR-ATARI, Kolkata	19.02.2016	9
18	Sensitization Workshop on ARYA	ICAR-ATARI, Kolkata	01.03.2016	60



13. REVENUE GENERATION

The KVKs of Zone-II have created interest for funding by a number of organisations/project implementing authorities of State Department of Agriculture, Animal Husbandry and Fisheries, Central Government as well as organisations like ATMA, NABARD, RKVY, NGOs, MNREGAS,NHM and others who depend on KVKs for fulfilment of their mandate through the technical expertise of KVKs. Through sponsorship from different organisations, KVKs earn a substantial amount of revenue for its use for the development of agriculture and allied sectorial activities. During the financial year 2015-16, the KVKs of Zone –II generated a total sum of Rs. 495.29375 lakh through IFS model, Poly house, green house, vermicomposting, demonstration unit etc. Among all KVKs of Zone –II, Bihar generated 75.23209 lakh followed by Jharkhand (59.81268 lakh) and West Bengal (360.24897 lakh). This clearly indicates the potentiality of KVKs to attract different agencies for agricultural development in the district. The details of revenue generated by the KVKs of Zone-II are shown in the table.

Table:Statewiserevenuegenerationduring 2015-16

State	Amount (Rs.)
Bihar	7523209
Jharkhand	5981268.5
West Bengal	36024897.85
TOTAL	49529375.35

Table: KVK wise revenue generation during 2015-16

KVK	Ammount (Rs.)	KVK	Ammount (Rs.)
Bihar		Godda	1655000
Bhagalpur	1523325	Gumla	545086
Buxar	3000	Hazaribag	737500
Jehenabad	970286	Latehar	12075
Kaimur	265345	Ranchi	917987.5
Katihar	573497	Sahibganj	106750
Khagaria	10000	Saraikela	206000
Kishanganj	30000	Simdega	52800
Madhepura	591000	West Singbhum	54375
Nawada	812000	Total	5981268.5
Purnea	168463	West Bengal	
Rohtas	1371768	Bankura	4568130.85
Saharsha	9000	Birbhum	250782
Supaul	85000	Burdwan	1020000
Darbhanga	54500	Coochbehar	1034947
Muzaffarpur	326875	Dakhin Dinjpur	315000
Sheohar	15000	Hooghly	126000
Vaishali	714150	Howrah	525000
Total	7523209	Jalpaiguri	706052
Jharkhand		Murshidabad	1698308
Bokaro	161540	Nimpith	10064144
Chatra	145630	Purulia	1140680
Deoghar	40000	Paschim Medinipur	2342254
Dhanbad	1079775	Uttar Dinajpur	12233600
Dumka	88750	Total	36024897.85
East Singbhum	178000	Grand Total	49529375.35



14. NATIONAL FARMERS PORTAL

The mKisan SMS Portal for farmers has empowered all Central and State Government organizations in agriculture & allied sectors (including State Agriculture Universities, Krishi Vigyan Kendras, Agromet Forecasts Units of India Meteorological Department, ICAR Institutes, Organization in Animal Husbandry, Dairying & Fisheries etc.) to give information/ services/ advisories to farmers by SMS in their language, preference of agricultural practices and locations. The Department of Agriculture & Cooperation (DAC) has widened the outreach of scientists, experts and Government officers posted down to the Block level to disseminate information, give advisories and to provide advisories to farmers through their mobile telephones. Since its inception nearly 327 crore messages or more than 1044 crore SMSs have been sent to farmers throughout the length and breadth of the country. These figures are rising ever since. The detail information on crops, seeds, pesticides, farmers' insurance, farm machineries, storage, fertilizers, market price of agricultural produce, package of practices, various extension activities etc. is available for farmers. They can also download different schemes, farm friendly handbook and like many other things.



The portal can be accessed at www.mkisan.gov.in.The ICAR-ATARI, Kolkata as ADMIN activated the registration requests received from different KVKs of this Zone and ultimately, almost all KVKs of ICAR-ATARI, Kolkata have been registered. Now, KVKs are providing

information to the farmers through sending messages. During the period under report, KVKs of Bihar, Jharkhand and West Bengal sent 4393, 1291 and 1121 advisory, respectively which benefitted total 8.59 crore farmers.





Table: State wise distribution of SMS advisories and number of beneficiaries during 2015-16

Sl. No.	State	No. of Advisory Sent	No. of Beneficiaries
1.	Bihar	4393	56259275
2.	Jharkhand	1291	26383831
3.	West Bengal	1121	3253691
	Total	6805	85896797



15. TRIBAL SUB-PLAN

The Tribal Sub-Plan (TSP) strategy was evolved for the rapid socio-economic development of tribal people and for bridging the gap between their levels of livelihood to that of the general communities. During the year 2015-16, forty six KVKs of ICAR-ATARI, Kolkata were involved in this scheme. This Zone earmarked Rs. 535 lakhs under Tribal Sub-Plan for the period. The KVKs of ICAR-ATARI, Kolkata conducted various activities throughout the year which favoured the livelihood upliftment of tribal people. The scheme ensured the direct benefit to the individual or families belonging to schedule tribes adopting various agricultural and allied sectoral activities e.g. agricultural farming, horticulture, animal husbandry, fish production, vocational training and so on. The KVKs created 4567 number of assets i.e. sprayer, weeder, agro-shed net, ridge maker, maize sheller, sickle, khurpi, seed bin/ drum, drip irritation kits, chaff cutter, poultry feeder and drinker, pheromone trap, water tank etc. for the tribal people in the district. During the period under report, KVKs tested 78 technologies and conducted 5297 front line demonstration (FLD). A total of 1.59 lakh tribes including youths, farmers, farm women and extension personnel enriched their knowledge through training provided by KVK scientists and about 1.78 lakh tribal farmers took part in different extension activities. The KVKs of this zone also produced 299 tonnes various seeds, 8.2 lakh planting materials and 3.64 lakh livestock strains and fish fingerlings. About 13 lakh farmers of this zone were benefitted through disseminating farm related SMSs.



Table: Achievements of Tribal Sub Plan (TSP)

State	Fund allotted 2015-16 (Rs. in lakh)	Achievements in different activities during 2015-16			
Andaman & Nicobar Islands	24.10	Asset created (Number; Sprayer, ridge maker, pump set, weeder etc.)	4567		
Bihar	10.00	On-farm trials (Number)	255		
Jharkhand	426.90	Frontline demonstrations (Number)	5297		
West Bengal	74.00	Farmers training (in lakh)	1.50431		
		Extension personnel training (in lakh)	0.08628		
		Participants in extension activities (in lakh)	1.7846		
		Seed production (in tonnes)	298.985		
		Planting material production (in lakh)	8.19285		
		Livestock strains and fingerlings production (in lakh)	3.64182		















16. PROTECTION OF PLANT VARIETIES AND FARMERS RIGHTS

n order to establish an effective system for the protection of plant varieties, the rights of farmers and plant breeders and also to encourage the development as well as cultivating new plant varieties, Government of India enacted 'The Protection of Plant Variety and Farmers Right Act' during 2001 in India. Protection of the plant varieties under the Act accelerates agricultural development and stimulates investment for research and development for developing new plant varieties facilitating the growth of seed industry and also ensuring the availability of high quality seeds including planting materials to the farmers. However, in the era of fast growing agricultural systems where advance biotechnological tools are being used for increasing the agricultural productivity for its full potential, it is very essential to judiciously use of available genetic resources and to protect the proper right of the farmers. In support, the KVKs of ICAR-ATARI, Kolkata conducted several programmes in their respective districts throughout the period of 2015-16 which was aimed in conserving, improving and making available plant resources for future use in favour of human kind. Out of total 85 training programmes organized in the Zone, Bihar organized 25, Jharkhand 31 and West Bengal 29. A total of 235 resource persons were involved in the training programme. In Bihar, 2389 farmers were participated whereas 2444 and 2332 farmers were participated from Jharkhand and West Bengal, respectively. Thirty nine KVKs from ICAR-ATARI, Kolkata (14 from Bihar, 13 from Jharkhand and 12 from West Bengal) were involved in PPVFR programme. During the period under report, 103 indigenous crop/ varieties from Bihar, 120 from Jharkhand and 293 from West Bengal were identified. A total of 1341 number of registration forms were filled up and submitted to the concerned authorities to register the varieties.

Table: Details of Protection of Plant Varieties and Farmers Right

State	No.of training programme	Resource Person	No.of participant	No.of crop/variety identified	No. of registration	No. of KVK
Bihar	25	78	2389	103	177	14
Jharkhand	31	83	2444	120	871	13
West Bengal	29	74	2332	82	293	12
Total	85	235	7165	305	1341	39





17. NATIONAL INNOVATIONS IN CLIMATE RESILIENT AGRICULTURE

TECHNOLOGY DEMONSTRATION COMPONENT

Anation-wide project, National Innovations in Climate Resilient Agriculture (NICRA), has been launched in 2011 to address this challenge by application of science and technology. This project of ICAR aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. Technology Demonstration Component (TDC) of NICRA offers great opportunity to work with farmers and apply such technologies under field conditions to address current climate variability. This will enhance the pace of adoption of these resilient technologies. On-



farm participatory demonstrations for climate resilience are being implemented in village clusters through KVKs in 121 climatically vulnerable districts across the country and by 7 core research institutes of ICAR. The emphasis has been on capturing and improving the understanding on performance of technologies in different agro-ecologies and farming systems. This also facilitates identification



Plastic Mulching

of what constitutes climate resilience in different biophysical and socio-economic contexts. NICRA KVKs prepared and implemented village level contingency crop plans and measures.

Technology Demonstration Component (TDC) of NICRA offers a great opportunity to work with farmers to address current climate variability with matching responses. Getting existing technologies into the hands of small and marginal farmers and developing new technologies like drought or flood tolerant crops to meet the demands of a changing climate also come under the purview of NICRA programme. Climatic vulnerability of selected 17 KVK districts of Bihar, Jharkhand, West Bengal and union Territory of A & N Islands assessed during implementation of NICRA programme brought forward definite requirement in terms of technological support, human resource development and overall empowerment of farming community to enable them to cope up with climate vulnerabilities like droughts, erratic rainfall, heat wave, flood, cyclonic storm. Plan of action, accordingly, was prepared for its implementation through executing technological interventions to initiate crop production,



NATURAL RESOURCE MANAGEMENT

In-situ moisture conservation, water harvesting and recycling for supplemental irrigation, improved drainage in flood prone areas, conservation tillage where appropriate, artificial ground water recharge and water saving irrigation methods and rainwater harvesting structure development. In-situ moisture conservation technologies have been demonstrated in 17 NICRA adopted villages covering 459 farmers in 95.2 ha area. Water harvesting and recycling forb supplemental irrigation were demonstrated in 17



Azolla cultural unit

NICRA adopted villages by the different KVKs involving 1106 numbers of farmers. Conservation tillage in wheat, paddy, lentil, pea and chickpea demonstrated in various NICRA adopted villages in an area of 244.7 ha of 447 numbers of farmers. The technologies followed mainly by zero tillage operation. Wheat with cultivation through ZTD showed maximum yield of 35-43 g/ha. Zero tillage technology showed very promising results in pulse and oilseed cultivation. Pea (Var. Arkel) gave highest economic return (B:C ratio:: 2.72) amongthe pulse demonstration through ZTD. Artificial ground water recharge done by field bunding, water management and through SRI by sub soiler in paddy in various NICRA adopted villages covering 71.0 ha area in 100 farmers fields. Ground water recharge through SRI by sub-soiler recorded highest paddy yield (56 q/ha) and benefit: cost ratio (2.14). Water saving



Renovation of Canal



irrigation methods like sprinkler irrigation, LEWA in rice, RBF in brinjal, micro-lift irrigation in paddy demonstrated in NICRA adopted villages covering an area of 81.0 ha in 358 farmers fields. There were 131number of rainwater harvesting structures have been developed which could store 602046.5 cu m of water. This intervention increased the cropping intensity to the maximum extent upto 300%.

CROP PRODUCTION

Introducing drought, salt and flood tolerant/ resistant varieties, advancement of planting dates of rabi crops in areas with terminal heat stress, water saving paddy



Maize Var. HQPM-7

cultivation methods (SRI, aerobic, direct seedling), community nurseries for delayed monsoon, location specific intercropping systems with high sustainable yield index, introduction of new crops/ crop diversification, custom hiring centres for timely planting. Under crop production module introduction of drought resistant varieties of paddy, brinjal, niger, maize, pigeon pea, and ragi were demonstrated in 17 NICRA adopted villages involving 2182 number of farmers in 557.0 ha area. Drought tolerant paddy varieties like Sahbhagi, Anjali, Naveen, Abhishek were demonstrated in 238.0 ha areas of 767 number of farmers' field, among which Sahbhagi with drum seded showed highest yield potential (47.5 q/ha) and



DPW-17

economic return 2.40 with maximum increase (60%) as compared to local check. Shorty duration variety of potato pukkhraj gave maximum economic return (B:C ratio of 3.41). Salt tolerant varieties of paddy like CARI Dhan5, UsarDhan-5, Jarava, Geetanjali, SR-26B, Amalmona were introduced in 72.6 ha area in 162 farmers' fields. Javarva, Geetanjali and Amalmona varieties proved



CARI Dhan 5

maximum salt tolerant potential by giving highest yield of 49.0 q/haand more economic return (BC ratio of 2.35). Flood tolerant varieties of paddy like Swarna sub 1 and Sabita were introduced through demonstration in 32.0 ha area in 125 farmers' fields. To avoid terminal heat stress in crops like rice, wheat, lentil, mustard, potato, etc. were sown in 12 days advance (avg) during rabi season. These demonstrations were carried out in seven NICRA adopted villages involving 393 number of farmers' fields. Water saving paddy cultivation through SRI, short duration varieties, direct seeded rice, brown manuring etc. have been demonstrated in 229.6 ha area of 702 number of farmers' fields. These interventions were carried out in



SR 268

12 NICRA adopted villages. Among all the interventions paddy cultivation with Sahbhagi variety showed highest increase in yield whereas paddy cultivation with variety RajendraSweta with ZTD gave maximum economic return in the tune of BC ratio of 2.97. To combat the situation of delayed monsoon intervention of staggered community nursery for paddy has become very popular in Bihar and Jharkhand. Seedlings of 25-30 days age are transplanted in July so as to complete flowering of photosensitive varieties before October and harvesting by mid-November to facilitate taking up of timely sowing of rabi crops. Such a practice ensures optimum performance of both kharif and rabicrops. However, Bihar experienced aberrant rainfall situations in 5 out of the previous 10 years impacting adversely rice production and livelihood of farmers. It appeared that failure of rain in July is responsible as transplanting of paddy is delayed with resultant adverse effect on productivity and a cascading negative impact on rabi crops. Delay in transplanting of paddy affects productivity as over aged seedlings suffer from low tillering ability various crops of different crop duration and varieties has been promoted. Besides paddy other crops like of cauliflower, brinjal, and tomato are followed for staggered nursery development. These intervention were demonstrated in 40.5 ha area of 231 numbers of farmers. These interventions were carried out in 12 NICRA adopted villages. Among all the demonstration the community nursery for cauliflower was the mostpromising one which showed highest increase in yield as well as economic return. Crop diversification through introducing new crops in prevailing cropping pattern was demonstrated in the different NICRA adopted villages. These demonstration were carried out in 157.6 ha area of 916 number of farmers' fields. Introduction of ol(var. Gajendra) in the cropping pattern.

LIVESTOCK AND FISHERIES

Use of community lands for fodder production during drought/flood, improved fodder/feed storagemethods, preventive vaccination, improved livestockdemonstration, improved shelters for reducing heat stressin livestock, management of fish ponds/tanks duringwater scarcity and excess water.

Community lands of an area of 182.5 ha involving 1098 number of farmers utilized for different fodder production were demonstrated in ten different NICRA adopted villages. Berseem, oat, sudanchari, maize, hybrid napierwere the major fodder produced in the programme. Of all these demonstration quality legume Sudan grass demonstrated showed maximum benefit return (B:C:: 5.54). Adequate supply of fodder, either green or dry, is crucialto the livelihoods of livestock in rainfed areas. In 2015-16, delayed onset and deficit rainfall conditions wereexperienced in several states. There was reduction inarea under millets and pulses, which are important tomeet the fodder requirements in the rainfed areas. Shortand medium duration fodder cultivars of several cropsand fodder species both in kharifand rabiseasons weredemonstrated in farmers' fields under rainfed and limitedirrigation conditions to support income and cash flowfrom animal husbandry Improved fodder of rice beanand silage making were demonstrated in farmers fields. Silage making for 18 numbers and 1.5 ha of units showedvery promising results. Various vaccination camps



were organized against FMD of cattle, PPR against goat, Ranikhet of poultry, BQ vaccine, deworming etc. in 17 different NICRA adopted villages. Mortality rate reduce up to the extent of 100% and average increase in cattle milk yield upto 40% have been recorded after the vaccination camps organized.Composite and cat fish rearing in the existing pond or in renovated pond were demonstrated in 140 farmers fields of NICAR adopted villages. Khaki Campbell duck was also introduced through this intervention. Demonstration of rural backyard poultry (kuroiler, Nicobari fowl), khaki Campbell duck, T X D breed of pig, mineral mixture and azolla as cattle feed werecarried out in 480 number of farmers fields. Improvedornamental bird was introduced through this intervention which showed very promising results (B:C :: 5.94). Improved Poultry shed recorded low mortality rate and in shady area reduced heat stress. Standard spacing in improved shed resulted better performance in poultry and dairy animals. Interventions to reduce heat stress for higher survivability of backyard poultry and dairy animals were demonstrated of improved shelter.



Vaccination Programme of Animal Vaccination

INSTITUTIONAL INTERVENTION

Strengthening the existing institutional interventions or initiating new ones relating to seed bank, fodder bank, commodity groups, custom hiring centre, collective marketing group, introduction of weather index based insurance and climate literacy through a village weather station and awareness developed of 3684 number of farmers in the zone.



Seed Bank



VILLAGE CLIMATE RISK MANAGEMENT COMMITTEE (VCRMC)

Village Climate Risk Management Committee (VCRMC) was constituted after in-depth discussion with the villagers about the mitigation of the climatic vulnerabilities of the villages and the strategies to be adopted under NICRA. The members of the committee were selected by the villagers under the facilitation of KVKs where NICRA was being implemented. VCRMC became operational with opening of a bank account in their name being jointly handled by the President of VCRMC and the Programme Coordinator of the KVK concerned. The custom hiring of



Zonal Monitoring Committee interacting with VCRMC members of NICRA village

various farm tools and implements was being supervised by VCRMC apart from taking important decisions on the technological interventions to be implemented at the village in consultation with the KVK.

CUSTOM HIRING OF FARM IMPLEMENTSAND MACHINERY AT NICRA ADOPTED VILLAGES

Timeliness of agricultural operations is crucial to cope with climate variability, especially in case of sowing and intercultural operations. Access to implements for planting in ridge-furrow, broad bed furrow and raised beds is essential for widespread adoption of resilient practices for in situ soil moisture conservation and drainage of excess water in heavy soils. In rainfed areas, availability of such farm implements to small and marginal farmers is important. Similarly in irrigated areas, residue management of kharif crops through zero till cultivation of rabi crops reduces the problem of burning of residues and adds to the improvement of soil health and increases water use efficiency. Custom hiring centres (CHCs) for farm implements were established in NICRA villages. A committee of farmers' manages thecustom hiring centre. The rates for hiring the machines/ implements are decided by the VCRMC. This committee also uses the revenue generated from hiring charges and deposits in a bank account opened in the name of VCRMC. The revenue is used for repair and maintenance of the implements and 25% share is earmarked as asustainability fund. Different types of farm machinery are stocked in the CHCs, the most popular being zero till drill, Happy seeder, BBF planter, drum seeder, multicropplanter, power weeder and chaff cutter. Each CHC was provided an initial sum of Rs. 6.25 lakhs for its establishment under NICRA project. Revenue generated through Custom hiring and under VCRMC in different KVKs were presented in the following table.

Table: Revenue generated through Customhiring Centres and VCRMC in KVKs

Name of KVK	Revenue generated (Rs.)					
	From Custom Hiring Centres	Total under VCRMC				
Aurangabad	12253.00	69824.00				
Buxar	2240.00	30597.00				
Chatra	37922.00	59482.00				
Cooch Behar	19354.00	67340.00				
East Singhbhum	3500.00	36900.00				
Gumla	22788.00	84899.00				
Jehanabad	5500.00	53332.00				
Koderma	4470.00	30110.00				
Malda	7050.00	32000.00				
Nawada	10250.00	299212.00				
Palamu	6600.00	24000.00				
Port Blair	2380.00	30304.00				
Saran	-	60000.00				
Supaul	4400.00	67012.00				
South 24 Parganas	8070.00	199840.00				
Godda	30000.00	30000.00				
Total	176777.00	1174852.00				

CAPACITY BUILDING

A total of 672 courses were conducted by all NICRA implementing KVKs under Capacity Building Programme on various thematic areas benefitting 13538 farmers and farm women (10858 male and 2680 female) during the year 2015-16. Thematic areas covered on SRI, scientific crop management, crop diversification, land shaping, green manuring, natural resource management, resource conservation technology, animal feed management, nursery raising, pest and disease management, weed control, vermicompost, value addition, livestock management, oilseed and pulse demonstration, farm implements, drudgery reduction etc. The HRD programme conducted on the basis of priority area of farmers or farm women.



Capacity Building programme conducted in NICRA adopted villages



EXTENSION ACTIVITIES

NICRA implementing KVKs conducted a total of 1859 extension activities on various thematic areas benefitting 19067 practicing farmers andfarm women (13503 males and 5564 females) during 2015-16. The extension activities were conductedon Method demonstrations, Agro advisory services, Awareness camp, Animal Health Camp, Krishak Chaupal, Kishan gosthi Resource conservation technologies, celebration field and farmers' days, diagnostic visits, group discussion, Technology week, Kisan mela etc.



NICRA Extension activities at NICRA adopted villages

18. PRADHAN MANTRI FASAL BIMA YOJANA (PMFBY) Kisan Sammelan

🗋 radhan Mantri Fasal Bima Yojana (PMFBY) is a newly launched crop damage insurance scheme of the Union Cabinet which has replaced the previously existed two crop insurance schemes- i) National Agricultural Insurance Scheme (NAIS) and ii) Modified NAIS. The scheme aims at supporting sustainable production in agriculture sector by way of - a) providing financial support to farmers suffering crop loss/damage arising out of unforeseen events, b) stabilizing the income of farmers to ensure their continuance in farming, c) encouraging farmers to adopt innovative and modern agricultural practices, and d) ensuring flow of credit to the agriculture sector which will contribute to food security, crop diversification and enhancing growth and competitiveness of agriculture sector besides protecting farmers from production risks. In this regard, all the KVKs under ICAR-ATARI, Kolkata have been given responsibility to sensitize the farming community towards the new insurance and to create awareness on different other schemes like soil health cards, production of organic inputs and water use efficiency etc. through organizing PMFBY Kisan Sammelan. During the year 2015-16, 80 KVKs from this Zone organized the programme involving local MPs, MLAs and other public representatives of the concerned districts. From the Union Territory of Andaman and Nicobar Islands, total 559 farmers participated in the meeting and from Bihar, Jharkhand and West Bengal state, the number of participants was 28901, 16234 and 6357, respectively. In addition to total 2129 number of MPs, MLAs and other public representatives from different districts, 4 Central Ministers from Bihar and 3 Central Ministers from Jharkhand graced the occasion.

SI. No.	State/ UT	No. of KVKs conducted PMFBY 2016	No. of Ministers attended	No. of MP/ MLA/ public representatives attended	No. of farmers attended				
1	Andaman & Nicobar Islands	3	0	51	559				
2	Bihar	38	4	1141	28901				
3	Jharkhand	23	3	798	16234				
4	West Bengal	16	0	139	6357				
	Total	80	7	2129	52051				

Table: PMFBY Kisan Sammelan











19. PRE-KHARIF AND PRE-RABI KISAN SAMMELAN

Under the banner of the Indian Council of Agricultural Research (ICAR), Ministry of Agriculture and Farmers' Welfare, the Pre-Kharif and Pre-Rabi Sammelan 2015-16 were organized by the KVKs of ICAR-ATARI, Kolkata to create awareness amongst the farmers and other stake holders about the latest agricultural technologies through using different extension methodologies and for wider publicity of the KVK. On the occasion, group meetings, film shows, exhibitions,

demonstrations, seminars, lectures etc. were arranged by the KVK personnel to enrich the farmers with agricultural knowledge for developing and adopting various strategies for the ensuing crop season. During the period under report, Pre-Kharif and Pre-Rabi sammelan were organized by 43 KVKs each from this Zone which involved 176 number of public representatives in the concerned district. A total of 47075 farmers got benefit from conducting such types of programmes.

Sl. No.	State/ UT	No. of KVKs conducted Pre- Kharif	No. of KVKs conducted Pre- Rabi	Total No. of KVKs	No. of public representatives attended	No. of farmers attended
1	Andaman & Nicobar Islands	0	1	1	7	338
2	Bihar	18	20	38	64	19803
3	Jharkhand	12	8	20	53	12959
4	West Bengal	13	14	27	52	13975
	Total	43	43	86	176	47075



























20. SPECIAL PROGRAMMES

20.1 SWACHH BHARAT ABHIYAN

s a part of mass movement of cleanliness, initiated by the Government of India, all the staff members of ICAR-ATARI, Kolkata including KVKs under this Zone picked up the broom to clean the dirt, garbage, debris, litters, other obnoxious/ unwanted materials from the office surroundings, roads, dwelling places etc. The KVKs of this Zone observed the cleanliness drive through sensitizing farmers/ villagers adopting the slogan "Neither litter, nor let others litter". A number of awareness programmes, sensitizing workshops and campaigns were carried out within KVKs and even in the remote villages for all categories of citizens. A sense of responsibility was evolved among the people to keep the environment clean. Scientists of KVKs made effort to train the people for making compost from different kinds of waste materials and also taught them in maintaining hygiene and sanitation in and around the houses. Fifty five KVKs under ICAR-ATARI, Kolkata conducted this abhiyan during last one vear. State-wise data envisaged that Andaman & Nicobar Islands, Bihar, Jharkhand and West Bengal organized 45, 61, 63 and 71 programmes, respectively in various forms.

20.2 CELEBRATION OF NATIONAL SCIENCE DAY

uring the year 2015-16, the National Science Day was celebrated by a number of KVKs under ICAR-ATARI, Kolkata to popularise the benefits of scientific knowledge and its practical appropriation in day to day life. Eighteen KVKs i.e. 2 from Andaman & Nicobar Islands, 6 from Bihar, 4 from Jharkhand and 6 from West Bengal state observed National Science Day through organizing lectures, quiz competitions, debates, film shows, awareness camps, demonstrations, seminars, trainings, painting competitions etc. to inculcate the latest scientific knowledge on various issues related to agriculture, animal husbandry, fishery sciences and other day to day activities. Out of total 26 such different programmes, Bihar state conducted maximum programmes during the period. More than 1200 persons from different strata of the society participated in such programmes.

State	No. of Observation	No. of KVK
A&N Islands	2	2
Bihar	13	6
Jharkhand	4	4
West Bengal	7	6
Total	26	18

Table: Celebration of National Science day

Table: Swachh Bharat Abhiyan

State	No. of observation/ programme	No. of KVK
A&N Islands	45	3
Bihar	61	21
Jharkhand	63	16
West Bengal	71	15
Total	240	55





20.3 NEHRU YUVA KENDRA TRAINING

The training to the volunteers of Nehru Yuva Kendra (NYK) was a part of KVK activities during the year 2015-16. Various need based training programmesparticularly on mushroom cultivation, bee keeping, vermi-composting, protected vegetable cultivation etc. were organized for the rural youths to enrich their knowledge and skills with latest available technologies in the field of agri-based enterprises which could help them in generating employment. In this light, 3 KVKs of Jharkhand state trained 135 persons and 12 KVKs of Bihar state trained 558 persons.



Table: Nehru Yuva Kendra Training

State	No. of training programme	No. of the participant
Jharkhand	3	135
Bihar	12	558
Total	15	693



20.4 BSF PERSONNEL TRAINING

The scientists of KVKs of this Zone extended their hands in educating BSF personnel available in their respective districts on various agricultural technologies for increasing production through utilizing existing resources. They were trained for horticultural production, grafting techniques, honey production, hi-tech agriculture, livestock rearing, fish rearing and so on. The KVK also established very good liaison between army personnel and local civilians. During the period under report, four KVKs from Bihar state organized 13 training programmes to train 644 BSF personnel. On the other hand, one KVK of Jharkhand and 3 KVKs of West Bengal trained 160 and 192 BSF personnel, respectively in different areas.

Table: BSF Personnel Training

State	No. of programme	No. of participant	No. of KVKs
Bihar	13	644	4
Jharkhand	2	160	1
West Bengal	6	192	3
Total	21	996	8





20.5 INCIDENCE OF LIVESTOCK DISEASES

The incidence of various livestock diseases was started reporting by the KVKs of ICAR-ATARI, Kolkata during the year 2013-14 in collaboration with National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI), Bengaluru. During the period under report, a substantial numbers of livestock especially cattle, buffalo, sheep, goat, pig, duck, poultry were affected by various diseases like Foot and Mouth Disease (FMD), Black Quarter (BQ), Haemorrahagic Septicaemia (HS), Peste des Petits Ruminants (PPR), Goat Pox, Ranikhetetc. which caused huge economic loss. The KVKs of this Zone reported the incidence of such outbreaks and conducted awareness and vaccination camps to control livestock diseases. Out of total 69515 vaccinated animals, 31991 animals were from Bihar, 13588 from Jharkhand and 23936 from West Bengal state.

Table:Vaccinationprogrammeagainstdiseases in livestock

State	No. of animals vaccinated
Bihar	31991
Jharkhand	13588
West Bengal	23936
Total	69515



20.6 PROGRAMME ON RURAL AGRICULTURAL WORK EXPERIENCE (RAWE)

The KVKs of this zone organized programmefor ARS trainee probationers to acquaint with the agricultural farming situations under rural conditions. They were also associated with ICAR-ATARI, Kolkata to interact with the scientists and administrative staffs and to know the activities of the institute. Out of total 642 ARS trained from this zone during the year 2015-16, 161 trainees were from Bihar, 110 from Jharkhand and 371 from West Bengal. Altogether they stayed for 1345 days.

Table: RAWE Programme organized

State	No of student/ARS trained	No of days stayed
Bihar	161	963
Jharkhand	110	126
West Bengal	371	256
Total	642	1345

20.7 KVK IN RURAL SCHOOL

griculture has always been an important factor in developing and sustaining of human society like India. Proper agricultural knowledge and skills, attitude and dedication of farming community are considered as the prerequisites for successful farming. New technologies are being developed and adopted to cope up with the changing agricultural scenario considering its potentiality, production and demand. Now-a-days, farmers are well aware of these technologies. But, the most unfortunate part is that the current generation of children and youths are rarely accepting agriculture as their dignified profession. Therefore, it has become very essential to properly educate the children at young stage about the importance and benefits of agricultural farming so that they can choose agriculture in their career. Fifty one KVKs of ICAR-ATARI, Kolkata made effort to motivate such young buds to inculcate the basic knowledge of agriculture through





delivering lectures, showing audiovisuals, distributing leaflets and pamphlets, group discussion, presentations, organizing quizzes etc. One hundred and forty two schools from Andaman & Nicobar Islands, Bihar, Jharkhand and West Bengal were approached for this activities. In Bihar, 63 programmes were conducted whereas in Jharkhand, West Bengal and Andaman & Nicobar Islands 59, 38 and 4 programmes, respectively were conducted during the year 2015-16.

Table: KVK in Rural School

State	No. of School	No. of visit	No. of KVKs
A&N Islands	3	4	1
Bihar	55	63	21
Jharkhand	47	59	16
West Bengal	37	38	13
Total	142	164	51





21. TRAINING AND CAPACITY BUILDING

In order to further the step taken by the Council in initiating the process of Training Need Assessment (TNA) and preparation of Annual Training Plan (ATP) for all categories of employees, ICAR-ATARI, Kolkata has performed TNA and prepared ATP for the year 2015-16 as well as 2016-17. For a continuous Human Resource Development (HRD) in the institute, such plans became instrumental and category-wise trainings planned and implemented have also been undertaken and completed trainings have successfully been uploaded in ERP system by individual employees. During 2015-16, out of 15 employees of the institute, six persons were planned to be trained in various skill deficiency areas identified as Executive HRM, Personnel management, ERP (MIS/FMS) etc. Out of those six two persons (33.3 %) got trained from the institutes like ICAR-NAARM, Hyderabad.



22. राजभाषा

"हिन्दी पखवाड़ा – 2015" समारोह का आयोजन

ि तकनीकी अनुप्रयोग संस्थान, कोलकाता में दिनांक 14.09. 2015 से दिनांक 29.09.2015 तक "हिन्दी पखवाड़ा–2015" समारोह का आयोजन लगातार दूसरी साल के लिए किया गया। इनमें संस्थान के सभी अधिकारी एवं कर्मचारी भाग लिया। संस्थान में 30.09.2015 को "हिन्दी पखवाड़ा–2015" का समापन समारोह आयोजित की गयी। इस समापन समारोह की अध्यक्षता संस्थान के निदेशक डॉ. ए. के. सिंह ने की।

पखवाड़ा का समापन समारोह का शुभारंभ डॉ. एस. के. मंडल, प्रधान वैज्ञानिक के स्वागत भाषण एवं मुख्य अतिथि के परिचय से हुआ। तत्पश्चात डॉ. मंडल ने संस्थान में राजभाषा कार्यान्वयन की प्रगति प्रतिवेदन प्रस्तुत की। इस प्रतिवेदन में संस्थान से प्रकाशित हुए वार्षिक वैज्ञानिक पद्रिका "कृषि – पूर्वी किरण", हिन्दी में पत्राचार, सभी हिन्दी पत्रों में हिन्दी टिप्पणी देना, हिन्दी में छुटटी आदि के फर्म बनाना एवं रोज एक हिन्दी शब्द 'आज का शब्द' में लिखना इत्यादि के उल्लेख किए गए।

हिन्दी पखवाड़े के दौरान आयोजित हिन्दी काव्य पाठ प्रतियोगिता एवं हिन्दी अनुवाद प्रतियोगिता (तत्कालिक) के विजेताओं को मुख्य अतिथि डॉ. एस. के. झा, प्रधान वैज्ञानिक, क्राईजाफ, वाराकपुर द्वारा पुरस्कार वितरित किए गए।

पखवाड़े के समापन समारोह के मुख्य अतिथि डॉ. एस. के. झा, प्रधान वैज्ञानिक, काईजाफ, वाराकपुर ने अपने संबोधन में संस्थान के सभी अधिकारी एवं कर्मचारी के प्रशंसा करते हुए हिन्दी को और तेजी से बढ़ावा देने पर जोर दिए एवं सूचना प्रौद्योगिकी के सफल प्रयोग के साथ हिन्दी के प्रगति पर अपने विचार रखे।







23. Krishi Unnati Mela 2016

PARTICIPATION IN 'KRISHI UNNATI MELA' ORGANIZED AT ICAR-IARI, PUSA, NEW DELHI

Krishi Unnati Mela', an event for showcasing the progess made in agriculture and allied sectors in the country was organized at ICAR-Indian Agricultural Research Institute (ICAR-IARI), Pusa, New Delhi from 19th to 21st March 2016. ICAR-ATARI Kolkata put a Stall in order to showcase and demonstrate various agricultural technologies and agricultural development across the Zone with the help of some selected and awarded KVKs of the Zone and also to provide the opportunities for the farmers to interact with the scientists and expose them to different farm technologies which will enhance their farm productivity and income. Dr. S.K. Roy, Director, Dr. S.K. Mondal, Principal Scientist and scientists from selected KVKs coordinated, established and managed the Stall of ATARI Kolkata.

Hon'ble Prime Minister of India, Shri Narendra Modi inaugurated the *Krishi Unnati Mela 2016* on 19th March 2016. Scientists from ATARI Kolkata, selected KVKs of West Bengal, Jharkhand and Bihar and selected and awarded farmers from the Zone were present in the Stall. On 19th March 2016, Dr. Mangala Rai, Former Secy, DARE and DG, ICAR visited the institute stall and appreciated the collective efforts of KVKs in bringing green revolution in the eastern India. On 21st March 2016, Hon'ble Agriculture Minister, Shri Radha Mohan Singh visited ICAR-ATARI Kolkata Stall and showed his keen interest in handicrafts manufactured by SHGs through KVK's technological interventions. Officials from ICAR Headquarters, interested entrepreneurs and farmers also visited the Stall and interacted with the scientists on various agricultural technology and technology products and their marketing avenues etc. during the Mela.



Zone	No. of farmers given exposure	No. of scientists/ KVK staff visited the mela	Whether stall exhibited	Awards/ Recognition
ATARI Kolkata Zone-II	215	10	Yes (with the help of 6 KVKs)	Best Innovative Farmer Award to Mr. Tapan Kumar Ghosh, Farmer from Birbhum dist., WB.









24. MERA GAON MERA GAURAV PROGRAMME

n ambitious initiatives has been taken by Indian Council of Agricultural Research, New Delhi to promote direct interface of scientists with the farmers with the farmers in the name of Mera Gaon Mera Gaurav (MGMG) Programme to faster the process of lab to land technology dissemination. The basic objectives of this unique endeavour are to identify a village and strengthen interface with farmers; periodically update the farmers about agricultural activities through phone and mobile messages; provide technology handouts as per the agroecological conditions of the village; provide information to farmers about agricultural inputs, seed, fertilizer, chemical, agricultural machinery, climate, market etc. educate farmers through newspapers, community radio, etc., create awareness among farmers about the programmes being implemented by various organizations and institutions working at local level e.g. voluntary organizations, farmers' organizations, ATMA, other Govt. departments; make farmers aware of the sensitive issues of national importance such as Swachh Bharat Abhiyaan, climate change, water conservation, soil fertility etc., organize farmers' meet by the visiting the selected villages as per need and facilitate the participation of specialists of the concerned institutes; identify technical problems at village level and make use of those in prospective research programmes and generate technical, social and economic data related to a village and to submit quarterly report of work done.

In a bid to accomplish the set objectives, 20,000 scientists working in National Agricultural Research and Education System (NARES) are involved across the country from State Agricultural Universities and ICAR institutes as per the delineated plan of action. In Zone-II, ICAR-ATARI, Kolkata is working as Nodal Office to guide two SAUs, nine ICAR institutes and eight Regional Centres of ICAR Institutes functioning in the Union Territory of A&N Islands and States of Bihar, Jharkhand and West Bengal. The Nodal Office i.e. ICAR-ATARI, Kolkata is also regularly obtaining quarterly reports to submit to SMD apart from adopting 5 villages in North 24 Parganas district of West Bengal. The SAUs and ICAR institutes/Regional Centres have adopted 357 villages and 86 teams have been formed to conduct 346 baseline survey as well as providing information and technological support to the farmers of the adopted villages. In addition, 19925 number of farmers have been benefitted/ made aware of the development of technological package, seeds, climate related advisories, market and other related areas. The constitute teams also collected the feedback from the farming community to modify their approach for more intense reach among the farming community. Performance of MGMG programme for the period October 2015 to March 2016 is presented below in a tabular form.



Table: Summary of activities carried out by SAUs and ICAR Institutes under MGMG

Name of Institute	No. of	No. of	No. of	Activities carried out during 2015-16				
	teams formed	selected	Baseline survey	Interface meeting	No. of Demo	No. of farmers benefitted	Special remarks/ Observations	
ICAR-Central Inland Fisheries Research Institute, Barrackpore, West Bengal	10	52	52	73	5	1391	 Marketing facilities of Agriculture produce Pest and disease outbreak Non availability of certified seeds in time Crops damaged due to water scarcity No irrigation facility by Govt. agency in the village Lack of extension activity as a result of which farmers are not aware of latest development Discharge of chemical waste from small industry degrading soil health as well as water quality of irrigation canal 	
ICAR-Research Complex for Eastern Region, Patna, Bihar	6	28	28	13	8	2481	 Marketing, transport and Road Poor irrigation facilities Lack of sanitation Poor supply of electricity Grazing Problem Lack of access to improved technologies Lack of information and awareness on new improved farming practices. 	
ICAR-NIRJAFT, Kolkata West Bengal	5	40	40	41		2126	 Poor infrastructure, transportation & preservation Water logging during rainy season Poor economic condition, labour problem, no proper drinking water facility Selling price of agriculture produce is low, no market yard is nearby. 	
ICAR-Central Institute of Brackishwater Aquaculture, Kakdwip Research Centre , West Bengal	2	10	10	12		148	 Soil salinity Scarcity of irrigation water Marketing of highly perishable agricultural commodities e.g. Fish and vegetables Lack of awareness regarding scientific farming 	
ICAR-Indian Institute of Agricultural Biotechnology, Ranchi, Jharkhand	1	1		1		150	• Lowering of ground water table	
ICAR-Bihar Agriculture University, Sabour, Bhagalpur, Bihar	7	7	7	10	4	60		

ICAR-ATARI KOLKATA



Name of Institute	No. of	No. of	Activities carried out during 2015-16				
	teams formed	villages selected	Baseline survey	Interface meeting	No. of Demo	No. of farmers benefitted	Special remarks/ Observations
ICAR-IVRI Eastern Regional Station, Kolkata, West Bengal	3	13	13	1		3290	• No agricultural and grazing land, low yielding animals, lack of awareness about scientific animal husbandry
ICAR-Central Island Agriculture Research Institute, Port Blair, A & N Islands	13	56	56	84	81	7264	 Lack of knowledge on the advanced techniques in marine capture fisheries, other job vacancies associated with marine capture fisheries. Lack of awareness on fish and poultry production technologies Non-conception in cows through AI of some farmers cows Unawareness of fodder cultivation technology and varieties in plantation crops. Low yield of coconut due to lack of proper management Low quality of copra due to conventional method of drying. Non availability of fish seed. Non availability of fodder for milch animal. Lack of irrigation facilities during dry period Bacterial wilt in Brinjal Low growth rate and survivability of fish fry
Central Institute of Fresh Water Aquaculture Regional Research Center, Rahara & Kalyani, West Bengal	2	8	8	5	10		
ICAR-National Research Centre on Litchi, Mushari, Muzaffarpur, Bihar	3	3	3	10	6	954	No Primary Health CentreNo veterinary hospital
ICAR-National Bureau of Soil Survey and Land Use Planning, Regional Centre, Kolkata	3	15	15	1			
ICAR-CRIJAF, Barrackpore , West Bengal	11	55	55	8	6		• Lack of soil testing facility, poor price of farm produce

Contd.



Name of Institute	No. of	No. of	Activities carried out during 2015-16					
	teams formed	villages selected	Baseline survey	Interface meeting	No. of Demo	No. of farmers benefitted	Special remarks/ Observations	
ICAR-Central Potato Research Station, Patna, Bihar	1	5	5	13	12		• Unavailability of farm labourers at proper cropping time.	
ICAR-CIFE, Kolkata, West Bengal	2	10	10					
ICAR-Central Soil Salinity Research Institute, Regional Research Station, Canning Town, West Bengal	2	10		10	10	205	 Access to information on new schemes Pest and diseases of crops and timely advisory 	
ICAR-IINRG Namkum, Ranchi, Jharkhand	8	8	8		1	1856		
ICAR-ATARI, Kolkata	1	6	6	6				
ICAR-National Dairy Institute Eastern Regionaltation, Kalyani, West Bengal	3	15	15	3	2		 Lack of awareness about various schemes of state and central government Lack of knowledge regarding cultivation of green fodder throughout the year 	
Total	83	342	331	291	145	19925		







25. DIPLOMA IN AGRICULTURAL EXTENSION SERVICES FOR INPUT DEALERS (DAESI)

A gricultural input dealers are the easy and preferred source of agricultural information for the majority of the farmers of this country. However, majority of these dealers do not have formal agricultural education. In order to shape them as para-extension professional through requisite knowledge and skill, MANAGE, Hyderabad initiated a programme on Diploma in Agricultural Extension Services For Input Dealers (DAESI) with specific mission and objectives. This diploma course of one-year duration imparts relevant and location specific agricultural education to equip the agri-input dealers with sufficient knowledge so as to enable them to address the day to day problems faced by the farmers at field level. KVK Nimpith, South 24 Pgs is regularly conducting this programme.

In collaboration with SAMETI, West Bengal, ICAR-ATARI, Kolkata has identified two KVKs namely Howrah and Purulia to conduct this diploma course for the agri-input dealers of the respective districts during the reported period. All the stakeholders involved in this programme namely, input dealers, resource persons, facilitators, ATMA, NGOs and others have been contacted by the KVKs to carry out this training programme as per guidelines of MANAGE. The KVKs are in regular contact both with SAMETI, West Bengal and ICAR-ATARI, Kolkata to make the training programme fruitful one.





26. MANAGEMENT DEVELOPMENT PROGRAMME

he initiative of Indian Council of Agricultural Research, to train the Programme Coordinators of all the KVKs of this country in a phased manner starting with newly recruited Programme Coordinators was adequately supported by ICAR-ATARI, Kolkata during 2015-16 through identification of suitable Programme Coordinators from the KVKs of this zone and ensuring their participation in the Management Development Programme. The Programme was attended by 6 (six) Programme Coordinators of KVKs Begusarai, Darbhanga, Gopalganj, Muzaffarpur, West Champaran and North 24 Parganas. The training programme was conducted in three phases – 15 days at NAARM, Hyderabad, 10 days at best KVKs and 5 days at concerned ATARIs. The areas covered at NAARM included Agricultural Extension Management, Capacity Building and Management of KVKs, Knowledge Management and Sharing, Technology Assessment, Integration and Application etc. followed by field visit, hand on training etc. The best KVKs where the participants were sent made the Programme Coordinators aware of the

office administration and management system. Visit to demonstration units, farmers' field, methods to organize various extension activities, planning of KVK activities based on identified thrust areas and other related areas.

ICAR-ATARI, Kolkata exposed the participants towards agricultural situation of the zone, methodology to conduct baseline survey and diagnosis of field problems, prioritization of thrust areas, writing skill, KVK management guidelines including purchase procedures, administrative and financial matters including need-wise budget utilization, utilization of KVK infrastructure, resource mobilization etc. The participants were put at the disposal of financial and administrative staff as well as the scientists to thoroughly interact with the participants in all areas of KVK functioning. The Programme Coordinators were made understand their roles and responsibilities to run the KVKs as the manager soliciting cooperation from the staff, host organization and all other stakeholders involved in agricultural development of the district.











27. PUBLICATIONS

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OTHERS



Developed ICAR-ATARI, Kolkata website (www.atarikolkata.org).

ICAR-Agricultural Technology Application Research Institute (ATARI): A documentary.

ICAR-ATARI KOLKATA







28. AWARDS -

FARMERS AWARD

Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose	
Bihar							
	Krishi Samrat Samman (East Zone)	Sri Amitabh Anand	2015	Mahindra Samridhi India Agri Award –2015	51,000	Mechanized farming	
Nalanda	Jagjivan Ram Abvhinav Puruskar (Zonal)	Smt Anita Kumari	2015	ICAR., New Delhi	50,000	Outstanding work in mushroom production	
East Champaran	Rajat Award	Ram Chandra Pd Kushwaha	2016	Director. IVRI, Varanasi			
Muzaffarpur	Mahindra samridhi award	Avinash Kumar	2016	Mahindra and Mahindra	50000		
Sitamarhi	Best Kisan Club Award	Ram Shreshth Singh	2015	NABARD	-	Club strengthening	
Jharkhand							
Ranchi	Padma Shri	Sri Simone Oraon	2016	Ministry of home affairs, Govt of India		Water conservation	
	Best farmers club	Tirlakocha Kisan club	2015	NABARD	3000		
West Bengal							
Birbhum	Innovative Farmer Award	Sri Tapan Kumar Ghosh	2016	Director, ICAR- IARI, New Delhi	-	To encourage the innovative- ness of Sri Tapan Kumar Ghosh in innovating a 4 Row SRI Marker and to popularize the Marker among the farming community	
Darjeeling	Progressive Farmer	Mr. Arun Chettri	2015- 2016	CII		Floriculturist	
Jalpaiguri	Limca Book of Records	Sri Sumanta Mishra	2016	Limca Book of Records		Conservation and Development of Basella & Pointedgourd	





Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
Murshidabad	Krishak Samman	Abdul Mohit Khan	2016	Mahindra Samriddhi	51000	Poly house capsicum cultivation
	Krishak Ratna	Md. Abul Kalam	2016	Deptt. Of Agriculture, Govt. of WB	10000	Round the year vegetable cultivation
Purulia	Outstanding Progressive Farmer	Sri Adhir Mahato	2015- 16	ICAR	-	Agriculture
	Outstanding Progressive Farmer	Sri Bipadtaran Kuiri	2015- 16	ICAR	-	Agriculture
Narendrapur	Best Ornamental fish breeder	Mr. Shankar Middya	2015	ICAR-CIFE (Kolkata centre)		Fish Farmer Day

KVK AWARDS

Name of KVK	Name of the Award	Year	Conferring Authority	Amount/ Citation	Purpose			
A & N Islands								
Nicobar	2 nd Prize	2016	Nicobar District Administration		For displaying IFS and Agricultural technologies relevant for Nicobar district			
Bihar								
Banka	Registration of Maximum no. of farmers in portal	2015-16	-	-	Knowledge about agriculture technology			
Bhagalpur	Best Jhanki in Republic Day	2016	BAU, Sabour, Bhagalpur	Certificate	Demonstration of KVK Activities			
	Extension Scientist Award (Dr. Md. Zeyaul Hoda)	2016	BAU, Sabour, Bhagalpur	Certificate	Best Extension Work			
	Extension Scientist Award (Er. Pankaj Kumar)	2016	BAU, Sabour, Bhagalpur	Certificate	Best Extension Work			
Jehanabad	Best KVK Scientist Award	2015	Indian Society of extension education	Certificate	Best extension service			
Khagaria	3 rd prize for the best KVK stall in Kisan Mela-2015	2015	BAU, Sabour					
Lakhisarai	Kisan Mela	2016	BAU, Sabour		1 st prize for best stall			
Patna	Best KVK Scientist award	2015	ISEE, New Delhi	Certificate				
Vaishali	KVK Best Award	2015	V.C., RAU, Pusa					
Jharkhand								
Chatra	Best performance in soil testing & soil health card distribution	2016	D.R.D.A, Chatra	Certificate & Momentum	Soil Testing			
Godda	Agril (Crop Exhibition)	2016	DAO Cum PD, ATMA	-	Tecnology demonstration			
West Bengal								
Dakshin Dinajpur	2 nd Best Stall award in UBKV Krishi Mela – 2015	2015	Uttar Banga Krishi Viswavidyalaya	-	Encouraging KVK towards development of farming community in the district			